PHASE I ENVIRONMENTAL SITE ASSESSMENT FOR THE SUNFLOWER WIND PROJECT MORTON AND STARK COUNTIES, NORTH DAKOTA

Prepared for

Sunflower Wind Project, LLC
Hebron, North Dakota

Prepared by

TRC Environmental Corporation
Laramie, Wyoming

November 2016

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Phase I environmental Site Assessment with attachments

Sunflower Wind Project, LLC

Aron Anderson, Sr. Project Manager

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LIST OF ABBREVIATIONS AND ACRONYMS

AMSL	Above mean sea level
AST	Aboveground storage tank
ASTM	American Society for Testing and Materials
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CERCLIS-NFRAP	CERCLIS No Further Remedial Action Planned
CONSENT	Superfund (CERCLA) Consent Decrees
CORRACTS	RCRA Corrective Action
CRP	Conservation Reserve Program
DNPL	Delisted NPL
DOD	Department of Defense
EDR	Environmental Data Resources, Inc.
ERNS	Emergency Response Notification System
ESA	Environmental Site Assessment
FCC	Federal Communications Commission
FINDS	Facility Index System/Facility Identification Initiative Program Summary Report
FTTS	FIFRA/TSCA Tracking System
FUDS	Formerly Used Defense Sites
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
HIST FTTS INSP	FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing
HMIRS	Hazardous Materials Information Reporting System
I-94	Interstate Highway 94
LLP	Landowner Liability Protection
LTANKS	Leaking storage tank sites
MLTS	Material Licensing Tracking System
NPL	National Priority List
NPL Liens	Federal Superfund Liens
NRCS	Natural Resources Conservation Service
O&M	Operations and maintenance
PADS	PCB Activity Database System
PCB	Polychlorinated biphenyl
PNPL	Proposed National Priority List
RAATS	RCRA Administrative Action Tracking System
RCRIS	Resource Conservation and Recovery Information System
RMP	Risk Management Plan
ROD	Record of Decision
Solas	Solas Energy Consulting US Inc.
SPCC	Spill Prevention, Control, and Countermeasure
SSTS	Section 7 Tracking System
Subject Property	Sunflower Wind Project Area
Sunflower	Sunflower Wind Project, LLC
SWLF	Solid waste landfill
Tetra Tech	Tetra Tech, Inc.

LIST OF ABBREVIATIONS AND ACRONYMS (Continued)

TRC	TRC Environmental Corporation
TRIS	Toxic Release Inventory System
TSCA	*Toxic Substances Control Act*
US MINES	Mines Master Index File
USGS	U.S. Geological Survey
UST	Underground Storage Tank Data
VCP	Voluntary Remediation Program
WAPA	Western Area Power Administration

1.0 EXECUTIVE SUMMARY

TRC Environmental Corporation (TRC) was retained by Sunflower Wind Project, LLC (Sunflower) to conduct an on-site Phase I environmental site assessment (ESA) of the Sunflower Wind project area (Subject Property), which encompasses approximately 11,415 acres located approximately 2.8 to 6.9 mi south of Hebron, North Dakota, and approximately 7.6 to 16.1 mi west of Glen Ullin in Morton and Stark counties (Figure 1.1). The ESA was conducted to facilitate the financial closing of the project. An original ESA was conducted for the general project in June 2014 (Tetra Tech, Inc. [Tetra Tech] 2014), with desktop updates completed in August 2015 and January 2016 (TRC 2015, 2016); however, the project area considered in this ESA is amended and slightly smaller than the previous ESAs, and the current ESA includes an updated database search, well report, and aerial photograph review; updated landowner interviews; and a recent on-site reconnaissance survey.

The content and format of this Phase I ESA conforms to *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process for Forestland or Rural Property* (American Society for Testing and Materials [ASTM] Practice E:2247-08) (ASTM 2008). This Phase I ESA was conducted solely for the real property described above and does not address the potential for environmental liabilities as a result of actions at sites previously occupied by the current owners or its representatives.

Based on results of the database searches, interviews, reconnaissance survey, and other background searches, this Phase I ESA has revealed no evidence of recognized environmental conditions or threats in connection with the Subject Property. None of the sites or sources of potential contamination identified through the database search, interviews, reconnaissance survey, and other background searches appear to pose an environmental threat to the Subject Property.

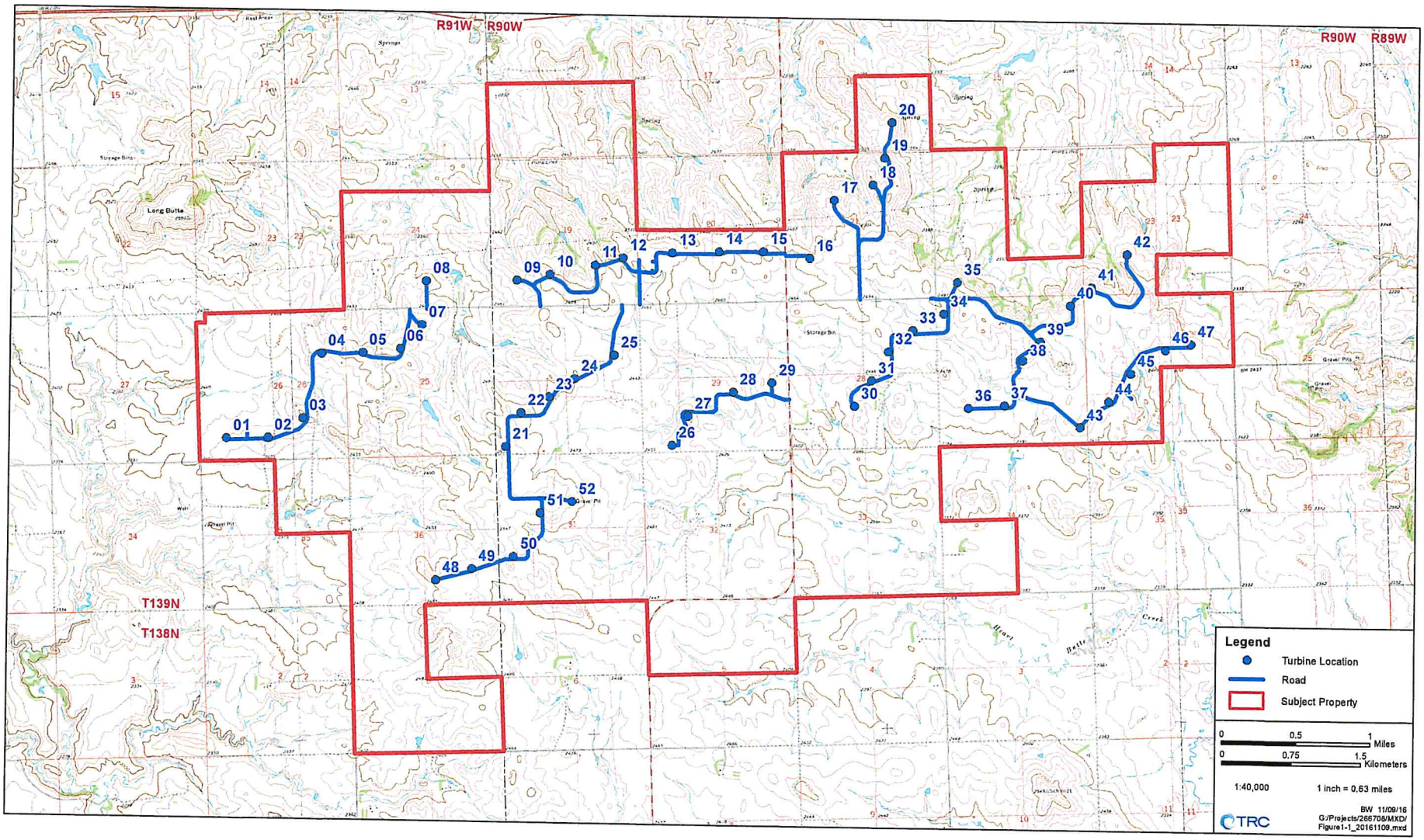


Figure 1.1 General Location of the Sunflower Wind Project Area. Taken from the Antelope (1973), Glen Ullin SW (1970), and Hebron SE (1973), North Dakota USGS 7.5' Series Quadrangles (1:24,000 Scale).

2.0 INTRODUCTION

2.1 PURPOSE OF THE PHASE I ESA

The purpose of this Phase I ESA is to evaluate the potential for recognized environmental conditions or threats on the Subject Property as a result of historical and current uses of the Subject Property and adjoining properties. Information was collected through an on-site reconnaissance survey, searches of state and federal regulatory databases, personal interviews, and a review of historic information such as U.S. Geological Survey (USGS) maps and aerial photographs from 1995, 1997, 2003, 2005, 2006, 2009, 2010, 2012, 2013, 2014, and 2016. The potential for environmental hazards on the Subject Property is documented in this report.

2.2 DETAILED SCOPE OF SERVICES

The scope of services for this Phase I ESA includes:

- a review of federal and local environmental regulatory agency records to determine the past and present environmental status of the Subject Property regarding permits or citations issued and reported accidents or chemical spills;
- identification of any registered National Priority List (NPL) sites; Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) hazardous waste sites; facilities engaged in the treatment, storage, or disposal of hazardous wastes as listed by the Resource Conservation and Recovery Information System (RCRIS); Toxic Release Inventory System (TRIS) sites; Emergency Response Notification System (ERNS) sites; solid waste landfills (SWLFs); underground storage tank and aboveground storage tank (UST/AST) sites; and/or leaking above- or underground storage tanks (LTANKS) located within ASTM-recommended search distances (ASTM 2008) of the Subject Property;
- a review of historical ownership and an evaluation of the potential for past hazardous waste contamination of the Subject Property;

- a review of historical aerial photographs to determine historical use of the Subject Property;
- completion of an on-site inspection of the Subject Property (including a limited assessment of adjoining areas) to determine if there are any observable existing environmental problems;
- interviews with company representatives, current tenants, or other available parties with potential knowledge of past or present activities at the site; and
- submission of a report detailing the results of the Phase I ESA.

2.3 SIGNIFICANT ASSUMPTIONS

Under this scope of services, existing structures occurring on the Subject Property were not tested for asbestos-containing material, radon, or lead-based paint, nor was drinking water tested for the presence of lead. Sampling and testing of soil, surface water, groundwater, or any other materials potentially containing contaminants are not included in this scope of services.

2.4 LIMITATIONS AND EXCEPTIONS OF ASSESSMENT

The conclusions presented in this report are professional opinions based on the data collected, reviewed, and described in this report and are intended solely for the purpose, site location, and project indicated. These conclusions are based on the assumption that site conditions do not deviate from those observed during the completion and preparation of this Phase I ESA. This report is not a definitive study of contamination at the site and should not be interpreted as such. In accordance with ASTM (2008), evaluations for the presence of asbestos-containing materials, radon, lead-based paint, use or production of illegal narcotics, and lead in drinking water and/or wetlands were not conducted for this Phase I ESA. In addition, evaluations of subsurface soil and groundwater conditions were not performed, nor were samples of any type collected or analyzed as part of this assessment.

A limited visual inspection for potential soil contamination was completed on the Subject Property on November 1-2, 2016, and there were no limiting conditions during the

survey. The inspector was able to adequately inspect the Subject Property for the potential environmental hazards discussed in Section 6.0 of this report.

This report has been prepared at the request of and for Sunflower pursuant to an agreement between TRC and Sunflower and is accurate to the best of TRC's knowledge. The accuracy and completeness of this report has been based, in part, on the time and financial resources dedicated to this project as agreed upon by TRC and Sunflower. This report also is based on unverifiable information supplied by third-party sources. While efforts have been made to substantiate all third-party information, TRC cannot guarantee its completeness or accuracy. Any finding of no recognized environmental conditions is not a warranty or guarantee that the property is free from or will remain free from contamination.

2.5 SPECIAL TERMS AND CONDITIONS

There are no special terms or conditions for this Phase I ESA.

2.6 USER RELIANCE

Sections 1.1.5 and 1.1.6 of ASTM Practice E:2247-08 (ASTM 2008) provide the following statements concerning user reliance on Phase I ESAs:

> 1.1.5 *Other Federal, State, and Local Environmental Laws* - This practice does not address requirements of any state or local laws or of any federal laws other than the *all appropriate inquiries* provisions of the *landowner liability protections* (*LLPs*). *Users* are cautioned that federal, state, and local laws may impose environmental assessment obligations that are beyond the scope of this practice. *Users* should also be aware that there are likely to be other legal obligations with regard to *hazardous substances* or *petroleum products* discovered on a *property* that are not addressed in this practice and that may pose risks of civil and/or criminal sanctions for non-compliance.
>
> 1.1.6 *Documentation* - The scope of this practice includes research and reporting requirements that support the *user's* ability to qualify for the *LLPs*. As such,

sufficient documentation of all sources, records, and resources utilized in conducting the inquiry required by this practice must be provided in the written report.

3.0 SITE DESCRIPTION

3.1 LOCATION AND LEGAL DESCRIPTION

The Subject Property is defined by and composed of 46 tracts of land in western Morton and eastern Stark counties in southwestern North Dakota (see Figure 1.1 and Appendix A). Specifically, the Subject Property is within all or portions of Section 5, T138N, R90W; Section 1, T138N, R91W; Sections 16, 18-23, and 26-34, T139N, R90W; and Sections 24-26 and 35-36, T139N, 91W. The 46 tracts are privately owned, and landowner names, tract numbers, and legal locations are provided in Table 3.1 and depicted on the map in Appendix A. Based on information and maps provided by Sunflower, the Subject Property contains a total of approximately 11,415 acres. Results of the landowner interviews are presented in Section 4.3 of this report.

Table 3.1 Sunflower Wind Project, LLC Landowners and Tract Locations.

Landowner/Contact	Tract #	Interviewed?[1]	Legal Location
Dittus, Larry & Peggy	28, 28A		SW Sec. 28, T139N, R90W
Heinle, Dale & Constance	1, 2	Yes	Sec. 31 and 32 except the E½SE Sec. 31, T139N, R90W
Heinle, Jeffrey & Amy	26, 27	No	NE and N½SE Sec. 23 and SW, NW, and NE Sec. 26, T139N, R90W
Heinle, Justin	3, 4, 5	Yes	SE Sec. 29, SW Sec. 30, and E½ Sec. 33, T139N, R90W
Hoerauf, Lyle & Lynda	6	No	SW and S½NW Sec. 23, T139N, R90W
Kitzan, Brian & Connie	35	Yes	SE Sec. 36, T139N, R91W
Kitzan, Florence et al.	34, 44, 46	Yes	E½ Sec. 26, NE Sec. 35, and W¼NW¼ Sec. 36, T139N, R91W
Kitzan, Steven & Joy	36	Yes	W½ Sec. 26, T139N, R91W
Kreis, Russell	31, 32	Yes	SE Sec. 20 and NW Sec. 21, T139N, R90W
Meberg, DJ & Claudia	7-10	Yes	SE Sec. 16, E½ Sec. 21, W½ and S½SE Sec. 22, E½ Sec. 27, T139N, R90W
Opp, David & Brenda	11	No	E½SE Sec. 31, T139N, R90W
Reich, Dennis & Donna	37, 38	Yes	Most of the S½N½ and S½ Sec. 24 and entire Sec. 25, T139N, R91W
Schantz, Miles & Sally	12, 13	Yes	SW Sec. 21 and NW Sec. 28, T139N, R90W
Schneider, R. Stanley & Lila	14, 48	Yes	E½SW, E½NW, and NE Sec. 29, T139N, R90W
Schneider, Scott & Pat	39, 40	Yes	SW Sec. 36, T139N, R91W; and the NW, SW, and SE Sec. 1, T138N, R91W

Table 3.1 (Continued)

Landowner/Contact	Tract #	Interviewed?[1]	Legal Location
Underdahl, Lynn, Alfred P., and Margary K.	15-21, 41-43	No	N½ Sec. 5, T138N, R90W; S½ Sec. 18, entire Sec. 19, SW Sec. 20, W½W½ Sec. 29, and NW, NE, and SE Sec. 30, T139N, R90W; and a small area of the E¼ of the SE Sec. 24, T139N, R91W
Vetter, Kerry & Pam	22	Yes	SW Sec. 27, T139N, R90W
Vetter, Roger	23, 24	No	E½ Sec. 28 and NW Sec. 27, T139N, R90W
Wetzstein, Dawn	47	Yes	All but the W1/8 of the N½ Section 36, T139N, R91W
Wilbert and Mae Buchli/Lyle and Brenda Voth	29, 30	No	E½ Sec. 33 and SW Sec. 34, T139N, R90W

[1] TRC reached out to all landowners; however, those landowners that were not interviewed could not be reached after numerous attempts to talk with them.

3.2 SITE AND VICINITY GENERAL CHARACTERISTICS

The Subject Property is approximately 0.5 mi south of Interstate Highway 94 (I-94) and generally is composed of gently rolling terrain, with several narrow northwest-trending ridges rising out of the northern portion of the Subject Property. Elevation is generally slightly higher than the surrounding areas, ranging from approximately 2,280 ft above mean sea level (AMSL) in the northeastern corner to 2,540 ft AMSL atop one of the ridges in the northern portion of the Subject Property. The majority of the Subject Property drains into Heart Butte Creek to the east and southeast, with the southwestern and western portions of the Subject Property draining into Beaver Creek to the south and Spring Creek to the west, and the northern portion of the Subject Property draining into Big Muddy Creek and its tributaries to the northeast and the Branch Knife River to the north and northwest. Appendix B provides representative photographs of the Subject Property.

3.3 CURRENT USE OF THE SUBJECT PROPERTY

Land use within the Subject Property is primarily hay production, cropland (e.g., sunflowers, corn), Conservation Reserve Program (CRP) land, residential homes, and the Sunflower Wind

Project and associated facilities currently under construction. Development within the Subject Property includes unpaved county and local roads, several residences (both inhabited and uninhabited) and associated farm/ranch outbuildings, stock ponds, local power lines, an underground natural gas pipeline (the Williston Basin Interstate Pipeline), local telephone lines, fence lines, a Federal Communications Commission (FCC) tower, a Western Area Power Administration (WAPA) switchyard and transmission line, and the Sunflower Wind Project, which is currently being constructed and includes 52 turbine locations, an Operations and Maintenance (O&M) facility, a laydown yard, a substation, and two meteorological towers (Figure 3.1). Based on the current land use, no conditions were noted or identified that would appear to pose an environmental concern or threat to the Subject Property.

3.4 DESCRIPTION OF STRUCTURES, ROADS, AND OTHER IMPROVEMENTS AT THE SITE

The Subject Property is primarily rural farm and ranchland, and developments generally are limited to several residences and associated farm/ranch outbuildings, fences, local power and telephone lines, a WAPA switchyard, and the Sunflower Wind Project, which is currently under construction. County roads are present along portions of the section boundaries, and the unpaved County Road 90 bisects the central project area. An east/west-oriented WAPA electric transmission line (WAPA 2014) and the east/west-oriented Williston Basin Interstate underground natural gas pipeline traverse the northern portion of the Subject Property (Figure 3.2).

3.5 CURRENT USES OF THE ADJOINING PROPERTIES

Observations of adjoining properties were made to evaluate and identify potential environmental concerns that may adversely impact the Subject Property. The adjoining properties are a mixture of undeveloped properties planted to crops or hay or used as pastureland, as well as several residences (see Figure 3.1).

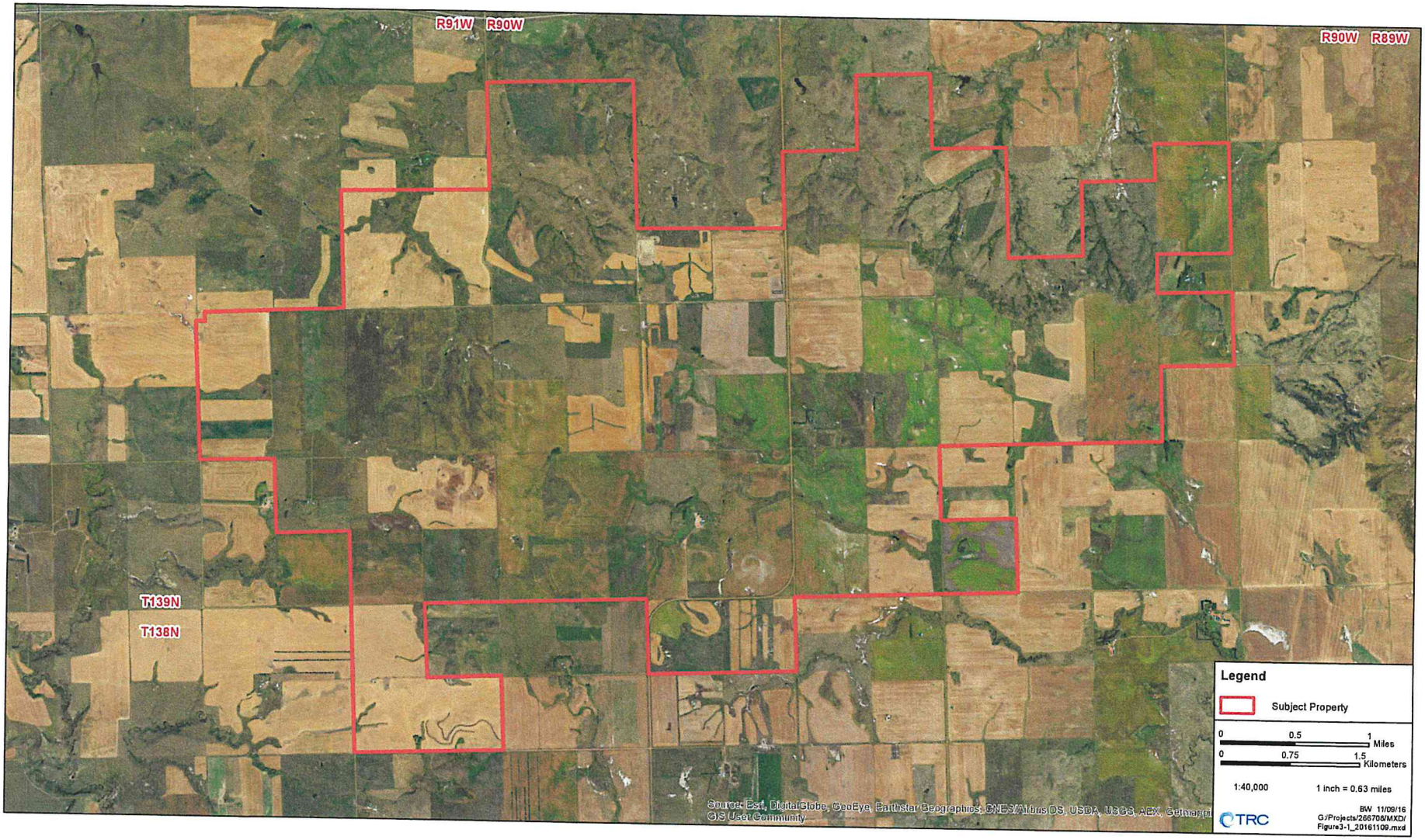


Figure 3.1 Aerial View of Subject Property.

4.0 USER-PROVIDED INFORMATION

4.1 RECORDED LAND TITLE RECORDS

The term "recorded land title records" means records of fee ownership, leases, land contracts, easements, liens, and other encumbrances on or of the Subject Property recorded in the place where land title records are, by law or custom, recorded for the local jurisdiction in which the Subject Property is located. A review of recorded land title records was conducted at the Stark County Courthouse in Dickinson on November 2, 2016, and at the Morton County Courthouse in Mandan on November 1, 2016, for the Subject Property. The Subject Property land tracts are owned by private individuals, and for the majority of the tracts, have been in the family, if not under the same ownership, for a decade or longer, with many held in the family for 30 or more years. Title records indicated various minerals rights deeds, as well as easements for the Williston Basin Interstate underground gas pipeline, Northwest Bell Telephone lines, and the WAPA transmission line. No environmental liens on the property were identified. Based on the results of the recorded land title records review, no information was identified relating to past uses that would indicate the presence or likely presence of recognized environmental conditions in connection with the Subject Property.

4.2 ENVIRONMENTAL LIENS OR ACTIVITY AND USE LIMITATIONS

According to Stark and Morton county records and interviews with property owners identified in Table 3.1 (personal communications, October 22-28, 2016), there is no evidence of any environmental liens or environmental use limitations being placed on the Subject Property.

4.3 SPECIALIZED KNOWLEDGE

Specialized knowledge about the Subject Property was obtained from all but six of the property owners for the 46 tracts of land comprising the Subject Property, and a summary of that information is presented below.

Larry and Peggy Dittus, Tracts 28 and 28A. In a phone interview, Mrs. Dittus indicated that they have owned the property for 10 years or more. She stated that the property is undeveloped and used primarily for pasture and hay production and that several storage buildings occur on the property. She indicated that she was unaware of any reduction in real property value due to any environmental contamination or other environmental issues. Mrs. Dittus was unaware of any environmental issues or concerns with the Subject Property (personal communication, October 27, 2016).

Dale and Constance Heinle, Tracts 1 and 2. In a phone interview, Mr. Heinle indicated that he has owned the property for approximately 30 years, that the property is undeveloped and used primarily for agriculture, and that a portion of the property is in CRP land and is leased to the North Dakota Game and Fish for hunting. He indicated that he was unaware of any reduction in real property value due to any environmental contamination or other environmental issues. Mr. Heinle was unaware of any environmental issues or concerns with the Subject Property (personal communication, October 24, 2016).

Jeffrey and Amy Heinle, Tracts 26 and 27. Several attempts were made to reach the Heinles by leaving phone messages, but the calls were not returned.

Justin Heinle, Tracts 3-5. In a phone interview, Mr. Heinle indicated that he has owned the property since approximately 2002, that the property is undeveloped and used primarily for agriculture, and that no buildings occur on the property. He indicated that he was unaware of any reduction in real property value due to any environmental contamination or other environmental issues. Mr. Heinle was unaware of any environmental issues or concerns with the Subject Property (personal communication, October 24, 2016).

Lyle and Lynda Hoerauf, Tract 6. Several attempts were made to reach the Hoeraufs by leaving phone messages, but the calls were not returned.

Brian and Connie Kitzan, Tract 35. In a phone interview, Mrs. Kitzan indicated that they inherited the property approximately 5 years ago, that the property is undeveloped and used

primarily for hay production and CRP land, and that there is one grain bin on the property. She indicated that she was unaware of any reduction in real property value due to any environmental contamination or other environmental issues. Mrs. Kitzan was unaware of any environmental issues or concerns with the Subject Property (personal communication, October 24, 2016).

Florence Kitzan et al., Tracts 34, 44, and 46. Ms. Kitzan's son, Greg, was the contact person for these three tracts, and he indicated in a phone interview that the property has been in the family for more than 68 years, that approximately 400 acres are in CRP and the rest is pasture, and that there is an abandoned residence, as well as a Quonset and grain silo, that are still in use on the property. He indicated that he was unaware of any reduction in real property value due to any environmental contamination or other environmental issues. Mr. Kitzan was unaware of any environmental issues or concerns with the Subject Property (personal communication, October 24, 2016).

Steven and Joy Kitzan, Tract 36. In a phone interview, Mr. Kitzan indicated that he has owned the property for at least 14 years, that the property is undeveloped and used primarily for agriculture and pasture, and that no buildings occur on the property. He indicated that he was unaware of any reduction in real property value due to any environmental contamination or other environmental issues. Mr. Kitzan was unaware of any environmental issues or concerns with the Subject Property (personal communication, October 24, 2016).

Russell Kreis, Tracts 31 and 32. In a phone interview, Mr. Kreis indicated that he and his family have owned the property for probably more than 100 years. He stated that the property is undeveloped and used primarily for agriculture and grazing land and that no buildings occur on the property within the Sunflower easement. He indicated that he was unaware of any reduction in real property value due to any environmental contamination or other environmental issues. Mr. Kreis was unaware of any environmental issues or concerns with the Subject Property (personal communication, October 27, 2016).

DJ and Claudia Meberg, Tracts 7-10. In a phone interview, Mr. Meberg indicated that he has owned the property for 20 years, that the property is undeveloped and used primarily for

pastureland due to the terrain, that there is a gas pipeline that has been in place through the property for the past several decades (that has had one small gas leak that was repaired), and that a farmstead occurs on the property in Section 22 (3950 75th Ave.), where they reside. He indicated that he was unaware of any reduction in real property value due to any environmental contamination or other environmental issues. Mr. Meberg was unaware of any environmental issues or concerns with the Subject Property (personal communication, October 22, 2016).

David and Brenda Opp, Tract 11. Several attempts were made to reach the Opps by leaving phone messages, but the calls were not returned.

Dennis and Donna Reich, Tracts 37 and 38. In a phone interview, Mr. Reich indicated that they have owned some portions of the property for 40 years and some portions for as few as 3 years. He stated that the property is undeveloped and used primarily for agriculture and CRP land and that no buildings occur on the property except an outhouse. He indicated that he was unaware of any reduction in real property value due to any environmental contamination or other environmental issues. Mr. Reich was unaware of any environmental issues or concerns with the Subject Property (personal communication, October 24, 2016).

Miles and Sally Schantz, Tracts 12 and 13. In a phone interview, Mrs. Schantz indicated that they have owned the property for at least 10 years and possibly as long as 20 years, that the property is undeveloped and used primarily for cropland, and that there is one small shed on the property. She indicated that she was unaware of any reduction in real property value due to any environmental contamination or other environmental issues. Mrs. Schantz was unaware of any environmental issues or concerns with the Subject Property (personal communication, October 24, 2016).

R. Stanley and Lila Schneider, Tracts 14 and 48. In a phone interview, Mrs. Schneider indicated that they have owned the property for approximately 55 years, that the property is undeveloped and used primarily for cropland and hay production, and that there is a barn on the property outside of the easement. She indicated that she was unaware of any reduction in real property value due to any environmental contamination or other environmental issues. Mrs. Schneider

was unaware of any environmental issues or concerns with the Subject Property (personal communication, October 24, 2016).

Scott and Pat Schneider, Tracts 39 and 40. In a phone interview, Mr. Schneider indicated that they have owned a portion of the property for approximately 20 years and the remainder for 30-40 years. He stated that the property is undeveloped and is used for agriculture and that there is an inhabited residence on the property. He indicated that he was unaware of any reduction in real property value due to any environmental contamination or other environmental issues. Mr. Schneider was unaware of any environmental issues or concerns with the Subject Property (personal communication, October 27, 2016).

Lynn Underdahl et al., Tracts 15-21 and 41-43. Several attempts were made to reach Ms. Underdahl by leaving phone messages, but the calls were not returned.

Kerry and Pam Vetter, Tract 22. In a phone interview, Mr. Vetter indicated that they have owned the property for approximately 50-60 years and that his father probably owned it in the 1950s. He stated that the property is undeveloped and is leased strictly for farming and that there are no buildings on the property. He indicated that he was unaware of any reduction in real property value due to any environmental contamination or other environmental issues. Mr. Vetter was unaware of any environmental issues or concerns with the Subject Property (personal communication, October 22, 2016).

Roger Vetter, Tracts 23 and 24. Mr. Vetter was contacted but declined to be interviewed.

Dawn Wetzstein, Tract 47. In a phone interview, Ms. Wetzstein indicated that she was given the property by her parents, Dennis and Donna Reich, and that it has been in the family for more than 10 years. She stated that the property is undeveloped and is primarily in CRP, with the remainder used for farming/cropland. She indicated that there are no buildings on the property. She indicated that she was unaware of any reduction in real property value due to any environmental contamination or other environmental issues. Ms. Wetzstein was unaware of any

environmental issues or concerns with the Subject Property (personal communication, October 28, 2016).

Wilbert and Mae Buchli and Lyle and Brenda Voth, Tracts 29 and 30. The Voths are the contact persons for these four tracts. Several attempts were made to reach the Voths by phone messages, but the calls were not returned.

4.4 VALUATION REDUCTION FOR ENVIRONMENTAL ISSUES

According to the landowners, there has been no reduction in real property value due to environmental issues or concerns at the Subject Property (see Section 4.3).

4.5 OWNER, PROPERTY MANAGER, AND OCCUPANT INFORMATION

Owner-, manager-, and occupant-provided information is presented in Section 4.3 of this report and will not be repeated here. In addition to landowner interviews, two Solas Energy Consulting US Inc. (Solas) project managers for the Sunflower Wind Project were interviewed regarding the wind facilities that are currently under construction.

Mr. Ryan Hartleben, Project Manager, Solas. In a phone interview on November 2, 2016, Mr. Hartleben indicated that he has been working at the site since approximately July of 2016. He indicated that chemicals and fuels stored at the site include diesel and gasoline, which are stored in aboveground tanks placed in secondary containers in the laydown yard to catch de minimus spillage; small amounts of antifreeze and washer fluid for on-site vehicle use; and oils in the substation, which are also protected within secondary containers. The O&M building will probably store some 55-gallon containers of oils and lubricants once operations are initiated, but such products are not stored there currently. He indicated that there are two separate, but related, Spill Prevention, Control, and Countermeasure (SPCC) plans for the project, and that no reportable spills have occurred during the project construction. Five de minimus spills have been reported and were cleaned up immediately.

Mr. Aron Anderson, Senior Project Manager, Solas. In a phone interview on November 7, 2016, Mr. Anderson confirmed that that chemicals and fuels stored at the site include diesel and gasoline, which are stored in aboveground tanks placed in secondary containers in the laydown yard to catch de minimus spillage and small amounts of antifreeze and washer fluid for on-site vehicle use. These products will be moved from the site once construction is complete (in a few months). He indicated that turbine-specific oils and lubricants will be stored at the O&M building during operations, but that such products are not stored there currently. He stated that mineral oil is stored at the substation within the main power transformer and four grounding transformers. Mr. Anderson indicated that there are three utility transformers on the Sunflower Project, one at the laydown yard, one at the substation, and one at the O&M building. He indicated that these transformers also contain mineral oil. Mr. Anderson was unaware of any reportable spills associated with construction of the wind facilities.

4.6 REASON FOR PERFORMING PHASE I ESA

This Phase I ESA was requested to facilitate the financial closing of the project.

5.0 RECORDS REVIEW

The purpose of the records review is to obtain and review records that will help identify recognized environmental conditions in connection with the Subject Property. Federal and state source information from pertinent environmental records was obtained from a computer database search completed by Environmental Data Resources, Inc. (EDR) located in Milford, Connecticut. The computer database search included federal- and state-listed sites of environmental hazards within ASTM Practice E 2247-08-recommended search distances (ASTM 2008) of the Subject Property (Figure 5.1). In order to address the size of the Subject Property, TRC delineated a single polygon that encompassed all 46 tracts. The Subject Property is located entirely within the EDR-searched polygon. Results of this search have been evaluated by TRC personnel and are included in this report, as appropriate. Source information from the federal and state database searches is presented in the EDR (2016) report in Appendix C. All recognized environmental conditions in connection with the Subject Property identified during the search of federal and state databases are discussed below.

5.1 STANDARD FEDERAL AND STATE ENVIRONMENTAL RECORD RESOURCES

To facilitate readability, definitions of acronyms are presented at the front of this document and, thus, are not repeated here. TRC requested information from federal (ASTM-standard and supplemental) databases regarding CERCLIS, CERCLIS-NFRAP, CONSENT, CORRACTS, DNPL, DOD, ERNS, FINDS, FTTS, FUDS, HMIRS, US MINES, MLTS, NPL, NPL Liens, PADS, PNPL, RAATS, RCRIS, ROD, SSTS, TRIS, and TSCA sites within ASTM Practice E 2247-08-recommended search distances (ASTM 2008) of the Subject Property. TRC also requested information from state (ASTM-standard [required] and ASTM-supplemental) databases regarding SWLFs, LTANKs, USTs, ASTs, and voluntary remediation program (VCP) sites within ASTM-recommended search distance of the Subject Property.

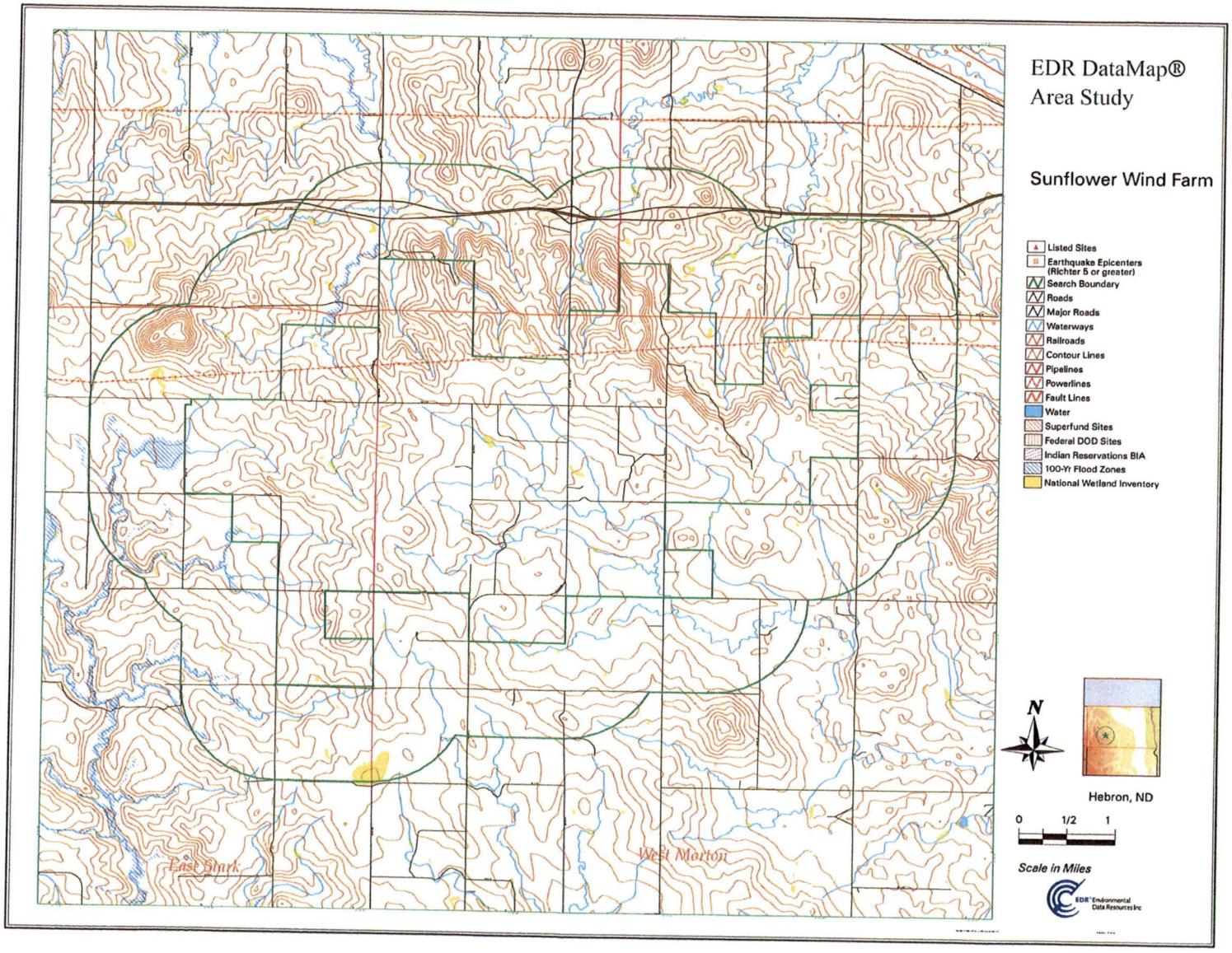


Figure 5.1 Database Search Area and Sites Identified Within the ASTM-Recommended Search Radii (Taken from EDR [2016]).

5.1.1 Federal Records Review

5.1.1.1 ASTM-required Federal Databases

All ASTM-required federal databases were searched within ASTM-minimum search distances in accordance with ASTM E 2247-08 (ASTM 2008), and no findings were identified (EDR 2016; see Appendix C).

5.1.1.2 ASTM-discretionary Federal Databases

EDR's search of additional discretionary federal databases uncovered no mapped sites within the Subject Property and the various database-specific search distances (EDR 2016; see Appendix C).

5.1.2 State of North Dakota Records Review

5.1.2.1 ASTM-required State Databases

EDR searched ASTM-required state databases within minimum search distances in accordance with ASTM E 2247-08 (ASTM 2008). No findings were identified for the Subject Property and associated buffers (EDR 2016; see Appendix C).

5.1.2.2 ASTM-discretionary State Databases

EDR's search of additional discretionary state databases uncovered no mapped sites within the Subject Property and the various database-specific search distances (EDR 2016; see Appendix C).

5.1.3 Unmapped Orphan Sites

As part of the record compilation process, EDR collected information on unmapped orphan sites from the various databases that are located with the zip code or general area of the Subject Property but that could not be readily mapped by the various databases to a specific location. Four unmapped orphan sites were identified as part of EDR's database report (EDR 2016; see Appendix C). TRC reviewed the location of the orphan sites by the site address and/or site name provided in the EDR orphan site summary to determine whether any of the sites were of concern to the current project.

The first two sites were identified as "Schmalenberger Farm" located 3 mi west of Hebron. An internet search did not locate Schmalenberger Farm; however, Schmalenberger Shop was listed at 7960 31st St., approximately 6 mi northwest of Hebron. Bing Maps indicated that the location is closed, and the Yellow Pages online indicate the business as "Farms, Farm Equipment". The sites were listed in the EDR report as Risk Management Plan (RMP) sites. RMP sites are those that are required to develop an RMP because of the use of certain flammable and/or toxic substances at the site. The Subject Property is nearly 3 mi south of Hebron, is well outside the minimum search distance of either of the abovementioned locations, and the two sites do not pose a recognized environmental condition or threat to the Subject Property.

The Burlington Northern Railroad Company described as on I-94 near Hebron was identified as a UST site. The ASTM-required minimum search distance for a UST site is the Subject Property and adjoining properties. Since the Subject Property is 0.5 mi south of I-94, this orphaned site does not pose a recognized environmental condition or threat to the Subject Property.

The final orphan site is listed as "George Messer Farm" in Richardton, North Dakota. An obituary for George Messer was found during an internet search for the location; however, a Timothy P. Messer Cattle Ranch was identified online at 8241 50th St. SW, Richardton, North Dakota. This location is more than 8 mi south-southwest of the southernmost Subject Property boundary and, therefore, does not pose a recognized environmental condition or threat to the Subject Property.

5.2 ADDITIONAL ENVIRONMENTAL RECORD SOURCES

The historic information sources presented in Table 5.1 were reviewed and referenced during the preparation of this Phase I ESA. TRC reviewed aerial photographs of the Subject Property available through Google Earth Pro for the years 1995, 1997, 2003, 2005, 2006, 2009, 2010, 2012, 2013, 2014, and 2016. The aerial photographs were reviewed for visual evidence of any industrial activity. There was no visual evidence of environmental hazards or concerns on the Subject Property or adjoining properties. With the exception of the ongoing construction of the Sunflower Wind Project and crop and hayfields, there was no visual evidence of any recent physical disturbance at the Subject Property. USGS 7.5' series topographic maps for the Subject Property also were reviewed, and no obvious environmental hazards or concerns were identified (see Figure 1.1).

5.3 PHYSICAL SETTING SOURCES

Information on the physical characteristics (e.g., topography and soils) of the Subject Property and adjoining properties was obtained from the appropriate USGS maps (see Figure 1.1) and the National Resources Conservation Service (NRCS 2016) (Appendix D). The Subject Property is located south of the city of Hebron, North Dakota, at an elevation ranging from 2,280 ft AMSL in the northeastern corner to 2,540 ft AMSL atop one of the ridges in the northern portion of the Subject Property. Topography across the project area is flat to slightly rolling, with several low ridges in the northern portion.

Table 5.1 Sources of Historic Information.

Material	Source
Aerial photographs	Google Earth Pro (multiple dates)
7.5' topographic maps (1970 and 1973)	U.S. Geological Survey
Property title search	Stark and Morton County Records Offices

The majority of the Subject Property drains into Heart Butte Creek to the east and southeast, with the southwestern and western portions of the Subject Property draining into Beaver Creek to the south and Spring Creek to the west, and the northern portion of the Subject Property draining into Big Muddy Creek and its tributaries to the northeast and the Branch Knife River to the north and northwest. Appendix B provides representative photographs of the Subject Property.

Soils information in this section is taken from NRCS (2016). Soils data in the EDR report (see Appendix C) also are relevant but are less detailed than NRCS (2016). Based on NRCS (2016), the Subject Property is composed of 52 soil map units in the Morton County portion of the Subject Property and 39 soil map units in the Stark County portion (see pp. 10-16 in NRCS 2016 [Appendix D]). Some of the map units likely are redundant between the two counties. These soils generally are moderately well-drained to excessively well-drained, are not subject to flooding or ponding, and have a depth to water table of 3.5 to >6 ft (NRCS 2016). Interpretation of well data within the Subject Property suggests that well depths in the area range from <10 to >400 ft, with most wells between 10 and 70 ft deep (EDR 2016).

Annual precipitation in the form of rain in nearby Hebron is approximately 17 inches, with an average of 37 inches of annual snowfall. The mean annual air temperature is approximately 42°F, with an average annual high of 54°F and an average annual low of 23°F (U.S. Climate Data 2016).

5.4 HISTORICAL USE INFORMATION ON THE SUBJECT PROPERTY

The historical uses of the Subject Property were established from a review of historical aerial photographs, topographic maps, personal interviews, and visual observations. With the exception of the Sunflower Wind Project currently under construction, interviews with the current property owners and visual observations did not indicate any evidence of industrial or commercial development on the Subject Property, nor did the historical aerial photographs. Based on the information presented above, historical land uses do not appear to pose an environmental concern or threat to the Subject Property.

5.5 HISTORICAL USE INFORMATION ON ADJOINING PROPERTIES

Information on historical land uses for the adjoining properties was obtained from a review of available aerial photographs dating from 1995 to 2016, topographic maps, and visual observations. The adjoining properties appear to be used predominantly for cropland, hay production, pastureland, and CRP land, similar to the tracts within the Subject Property. No sources of environmental concerns or threats were noted on any of the adjoining properties.

6.0 INFORMATION FROM SITE RECONNAISSANCE

6.1 METHODOLOGY AND LIMITING CONDITIONS

On November 1 and 2, 2016, the Subject Property was inspected by Ms. Diane Thomas, TRC Senior Project Manager. The survey was conducted via a four-wheel-drive vehicle from county and public roads and the wind farm access roads, and it included a limited visual inspection of the Subject Property. The Subject Property is generally undeveloped except for the Sunflower Wind Project and ancillary facilities currently under construction, a WAPA switchyard, a WAPA transmission line, the Williston Basin Interstate underground natural gas pipeline, and other light developments related to agricultural and residential activities in the area. A limited survey for evidence of existing or past environmental hazards on adjoining properties also was conducted.

6.2 GENERAL SITE SETTING

As described in Section 3.2, the Subject Property currently is generally undeveloped with the exception of the abovementioned wind facility, transmission line, pipeline, and other minor developments related to residential, farming, hay production, cropland, and livestock grazing activities in the area. There are several permanent buildings within the Subject Property, including abandoned residences and outbuildings, several current residences, outbuildings associated with current farming and haying activities, and the O&M building currently under construction, as well as a number of temporary trailers, outhouses, and storage containers associated with the laydown yard and wind farm construction. Roads in the Subject Property include the paved County Road 90, a number of unpaved county roads, unpaved wind farm access roads, and two-tracks.

Operations associated with the wind facility were clean and orderly, with no indication of spills or other environmental hazards. The easements were kept free of trash and well-maintained.

6.3 ADDITIONAL EXTERIOR OBSERVATIONS

6.3.1 Potable Water Supply

Private wells provide potable water to the private residences located adjacent to the Subject Properties. No fire hydrants were observed on the Subject Property.

6.3.2 Sewage Disposal System

There is no public municipal waste water disposal system(s) within the Subject Property; however, private waste water disposal systems (septic system and leach field) are available at private residences located within the Subject Property.

6.3.3 Storage Tanks

No regulated USTs or ASTs were identified during the reconnaissance survey of the Subject Property or the adjoining properties. Fuels and oils are stored in aboveground containers in the substation and laydown yard, and these containers are placed in secondary containers (e.g., metal stock tanks) to minimize/avoid spills.

6.3.4 Hazardous Substance, Unidentified Substance, and Petroleum Product Containers

Based on the reconnaissance survey, there is no evidence of any hazardous substance, unidentified substance, or petroleum product containers, drums, or barrels in the Subject Property except for those described in Section 4.5 of this report. The area adjacent to these containers did not show any signs of leakage or contamination (e.g., stressed vegetation, stained soils) (see Appendix B).

6.3.5 Pits, Ponds, and Lagoons

Several stock ponds occur within the Subject Property, but none exhibited any sign of recognized environmental concerns.

6.3.6 Chemical Releases

There was no evidence of any chemical releases in the form of stained soil, stressed vegetation, stained pavement, pools of liquid (besides standing water), or odors at the Subject Property.

6.3.7 Polychlorinated Biphenyls (PCBs)

The three electric transformers referenced in Section 4.5 contain mineral oil and no PCBs (personal communication, November 12, 2016, with Aron Anderson, Senior Project Manager, Solas). Two additional Mor-Gran-Sou Electric Cooperative transformers were observed in the project area that are associated with local distribution. The transformers were observed in the project area that area associated with local distribution. The transformers both were intact and in good condition and exhibited no signs of leakage (see Appendix B). A posted notice on the WAPA switchyard fence indicates that it is a PCB-free property. Therefore, PCBs do not appear to pose an environmental concern or threat to the Subject Property.

6.3.8 Wells

Forty-six water wells were identified within or directly adjacent to the Subject Property, but the wells are unlikely to pose an environmental hazard to the Subject Property (see Appendix C). An additional two oil and gas wells are identified in the EDR report (EDR 2016; see Appendix C). One of the two is approximately 0.2 mi west of the northern Subject Property boundary in the NENE Section 20, T139N, R90W. The well is outside of and downgradient of the Subject Property and does not appear to pose a recognized environmental concern. The second oil/gas well is located in the NWSESW Section 28, T139N, R90W. No sign of the well was observed during the on-site visit, and it is unlikely that the well poses a recognized environmental concern to the Subject Property.

6.3.9 Solid Waste

There is no evidence of any other solid waste being collected, stored, or transferred at the Subject Property with the exception of the storage or discard of some old abandoned farm equipment, lumber, and associated items in several discrete locations of the Subject Property. None of the items appeared to pose a recognized environmental concern to the Subject Property.

6.4 SUMMARY OF RECONNAISSANCE SURVEY

The reconnaissance survey revealed the Subject Property and adjoining properties as described in Section 3.0 of this report. Based on the results of the reconnaissance survey, no areas of environmental concern or threat were identified at the Subject Property.

7.0 INFORMATION FROM PERSONAL INTERVIEWS

In conjunction with the reconnaissance survey, Ms. Diane Thomas, TRC, made an effort to contact and interview 20 landowners/landowner representatives with knowledge of conditions at the Subject Property. Contact was made with 15 of the 20 representatives--14 provided information in the interview and one declined to be interviewed. The remaining five landowners were unavailable for interview despite several attempts to contact. A summary of these interviews is presented in Section 4.3 and will not be repeated here.

7.1 INTERVIEW WITH OWNERS

A summary of interviews with landowners is presented in Section 4.3.

7.2 INTERVIEW WITH SITE MANAGER

In general, the Subject Property is currently managed by the individual landowners, and summary information from landowner interviews is presented in Section 4.3. In addition, two project managers with Solas were interviewed regarding the ongoing construction of the Sunflower Wind Project. Those interviews are presented in Section 4.5.

7.3 INTERVIEW WITH OCCUPANT

Occupants of the few residences that occur within the Subject Property are landowners and were interviewed as such. Summary information from landowner interviews is presented in Section 4.3.

7.4 INTERVIEW WITH LOCAL GOVERNMENT OFFICIAL

Based on inquiries at the two county courthouses, no government officials with knowledge of the current and prior uses of the Subject Property were available for interview; however, title records were searched for indications of recognized environmental concerns potentially occurring at the Subject Property, and no indication of potential recognized environmental concerns were found.

8.0 FINDINGS AND CONCLUSIONS

8.1 FINDINGS

No known or suspected recognized environmental conditions associated with the Subject Property were identified through the database search, interviews, reconnaissance survey, or other historical background searches.

8.2 OPINION AND CONCLUSION

Based on the findings presented above and the noted limitations of the reconnaissance survey, it is TRC's opinion that no known recognized environmental conditions exist that would pose an environmental concern or threat to the Subject Property.

8.3 STATEMENT AND SIGNATURE OF ENVIRONMENTAL PROFESSIONAL

I declare that, to the best of my professional knowledge and belief, I meet the definition of Environmental Professional as defined in §312.10 of 40 *Code of Federal Regulations* Part 312 and I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the Subject Property. I have supervised the development and performance of all appropriate inquiries in conformance with the standards and practices set forth in 40 C.F.R. Part 312.

I have reviewed this Phase I ESA in conformance with the scope and limitations of ASTM Practice E:2247-08 (ASTM 2008) for approximately 11,415 acres composed of 46 tracts of land located in Morton and Stark counties, North Dakota--the Subject Property. Any exceptions to, or deletions from, this practice are described in Section 2.4. This assessment has revealed no evidence of recognized environmental conditions in connection with the Subject Property.



Scott W. Kamber
Environmental Professional and
Certified Environmental Inspector #73548
November 15, 2016

8.4 DEVIATIONS

This Phase I ESA adheres to ASTM Standard E 2247-08 (ASTM 2008) without any deviations.

8.5 QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONALS

TRC has conducted numerous Phase I ESAs and has the corporate and individual experience and qualifications to conduct the contracted Phase I ESA at the Subject Property. Procedures completed by TRC personnel include project management, reconnaissance survey, background research, interviewing, reporting, report preparation, and quality assurance. The computer database search of federal and state regulatory databases was conducted by EDR. Data produced as a result of the EDR search were reviewed by TRC personnel and incorporated into this report.

The property title review, document and map review, site inspection, personal interviews, review of soil reports, review of the aerial photographs, and report preparation were conducted by Ms. Diane Thomas, who has a Master's degree in Zoology and Physiology from the University of Wyoming and more than 26 years of professional environmental experience. Ms. Thomas has conducted approximately 20 Phase I ESAs and has supervised an additional two.

Quality assurance/quality control for the project, including peer review of this Phase I ESA report, was provided by Mr. Scott Kamber. Mr. Kamber has a Master's degree in Environmental Management from the University of Wyoming and more than 30 years of professional environmental experience. He has conducted approximately 25 Phase I ESAs over the past 24 years. He is also a Certified Environmental Inspector through the Environmental Assessment Association.

8.6 ADDITIONAL SERVICES

No additional services relative to this Phase I ESA were requested by Sunflower Wind Project, LLC or undertaken by TRC for this project.

9.0 REFERENCES

American Society for Testing and Materials. 2008. Standard practice for environmental site assessments: Phase I environmental site assessment process for forestland or rural property. E 2247-08. American Society of Testing and Materials, West Conshohocken, Pennsylvania. 43 pp.

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Natural Resources Conservation Service. 2016. Custom soil resource report for Morton County, North Dakota, and Stark County, North Dakota, Sunflower Wind Project, LLC, October 2016. 263 pp.

Tetra Tech, Inc. 2014. Final Phase I environmental site assessment, Sunflower Wind Project, Morton and Stark counties, North Dakota. Prepared for Sunflower Wind Project, LLC, Santa Barbara, California. June 2014.

TRC Environmental Corporation. 2016. Update to Phase I environmental site assessment, Sunflower Wind Project, Morton and Stark counties, North Dakota. Prepared for Sunflower Wind Project, LLC, Santa Barbara, California. January 2016. 11 pp. + appendices.

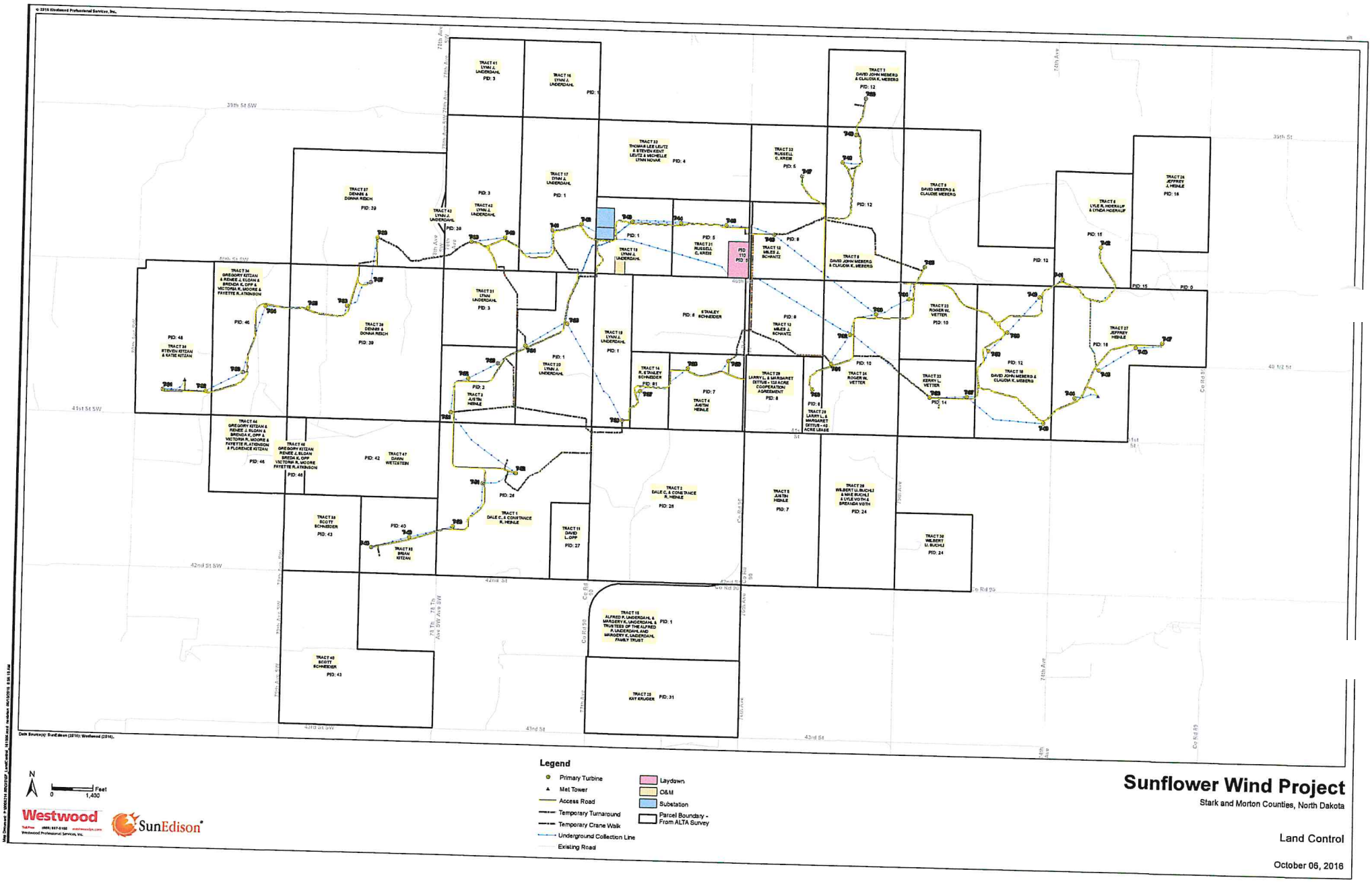
_____. 2015. Final update to Phase I environmental site assessment, Sunflower Wind Project, Morton and Stark counties, North Dakota. Prepared for Sunflower Wind Project, LLC, Santa Barbara, California. August 2015. 11 pp. + appendices.

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Western Area Power Administration. 2014. Sunflower Wind Project final environmental assessment, DOE/EA 1966. U.S. Department of Energy, WAPA.

APPENDIX A:

SUNFLOWER WIND PROJECT, LLC,
MAP OF LANDOWNERS, TRACTS, AND FACILITY LOCATIONS
WITHIN THE SUBJECT PROPERTY
(Note: Since the preparation of this map by SunEdison on October 6, 2016, two tracts have been removed from the Subject Property--Tract 25 in the south central portion and Tract 33 in the north-central portion of the mapped area.)

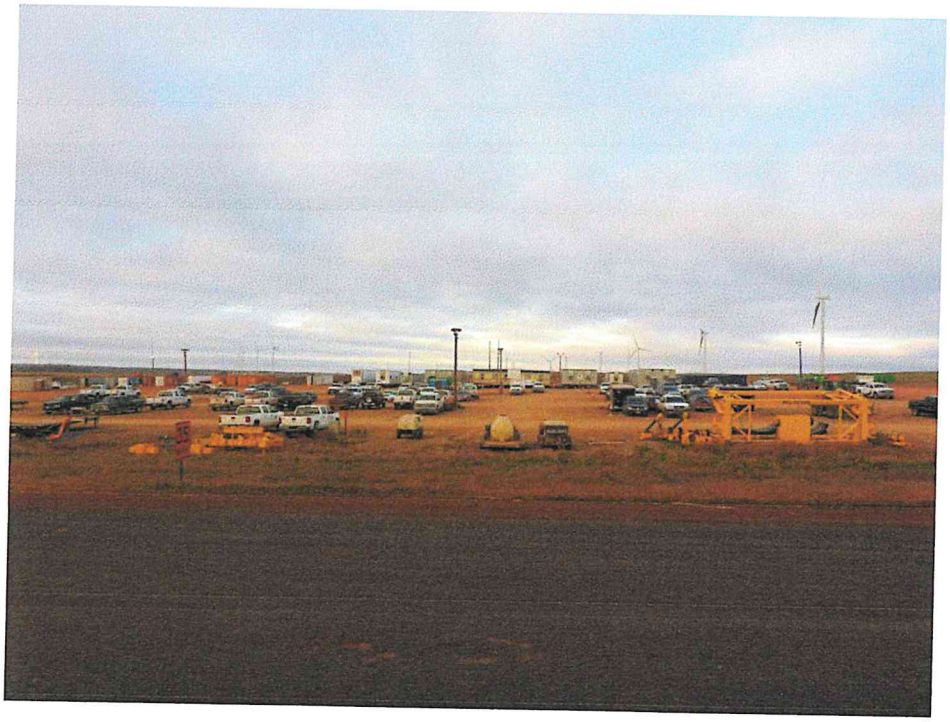

Legend
Primary Turbine
Met Tower
Access Road
Temporary Turnaround
Temporary Crane Walk
Underground Collection Line
Existing Road
Laydown
O&M
Substation
Parcel Boundary - From ALTA Survey
N
0
Feet
1,400
Sunflower Wind Project
Stark and Morton Counties, North Dakota
Land Control
October 06, 2016
Westwood
SunEdison

APPENDIX B:

REPRESENTATIVE PHOTOGRAPHS OF THE SUBJECT PROPERTY
AND ADJOINING PROPERTIES
(Provided by TRC, taken on November 1-2, 2016)



Photograph B.1 Fuel Tanks in the Sunflower Laydown Yard (note secondary containment).



Photograph B.2 Overview of the Laydown Yard, Looking West.



Photograph B.3 Meteorological Tower Near Turbine 44.



Photograph B.4 Transformer in the SE Corner of Tract 4, Looking South.



Photograph B.5 Hebron Switchyard Adjacent to the Substation, Looking North.



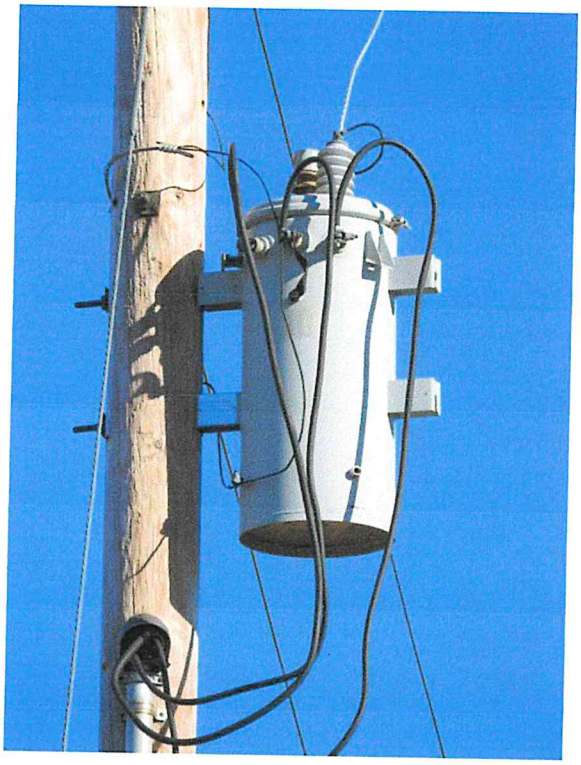
Photograph B.6 Substation on the Subject Property, Looking West-northwest.



Photograph B.7 Northwest Corner of the O&M Building, Looking East.



Photograph B.8 Southeastern Corner of the O&M Building, Looking North-northwest.



Photograph B.9 Transformer at 78th Avenue SW and 39th Street SW Intersection.



Photograph B.10 Looking Southwest at Tract 28 from Turbine 30 at Farm Equipment and Outbuildings.



Photograph B.11 Abandoned Residence in the Southwest of Tract 18 West of O&M Building.



Photograph B.12 Erosion Control on Temporary Disturbance Adjacent to the Turbine Access Road Near Turbine 3.



Photograph B.13 Overview of the Southern Project Area Looking Northwest Towards Tract 11.



Photograph B.14 Subject Property Looking West from the Northwest Portion of Tract 23 Towards Tract 24.



Photograph B.15 Turbine 19 Location.



Photograph B.16 Looking Northeast at Turbines 38-42 from Turbine 37.

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ONSITE SEWAGE TREATMENT SYSTEM
PERMIT FOR CONSTRUCTION/USE

Custer Health requires an inspection of the open system before it is covered. Please call 24-48 hours in advance of system completion to set up inspection.

DATE OF ISSUANCE: 10/27/2015 **PERMIT NUMBER:** 2015150

APPLICANT INFORMATION
Sunflower Wind Farm
7687 40th St
Hebron, ND 58638

PROPERTY INFORMATION
7687 40th St
Hebron, ND 58638

COUNTY: MortonTOWNSHIP: 139 **RANGE:** 90 **SECTION:** 20 **LOT:** # **BLOCK:** #

NUMBER OF BEDROOMS: NA **WORK TYPE:** NEW

LICENSED INSTALLER: Glaser Welding and Excavation

SYSTEM DESIGN REQUIREMENTS:
1250 working capacity septic tank and 1960 square feet of drain field approved. For worksite shop and office area. (rewrite of permit issued in October 2015) Due to ND regulations an oil interceptor with separate holding must be installed to handle truck shop/wash area. The holding can be a tank within the oil interceptor, an outside holding tank OR an outside berm.

Permission is hereby granted to the above applicant to install, alter, or replace the onsite sewage treatment system on the above property. The system must be installed in compliance with ND State Plumbing Code Chapter 62-03.1-03 and the regulations of Custer Health. This permit does not carry any warrantee or guarantee, stated or implied, that the system will function but certifies the system meets prescriptive standards contained in the aforementioned code and regulations for construction parameters.

ISSUED BY: Lana Schmidt **DATE:** 7/15/2016

SIGNATURE: Lana Schmidt

INSPECTION NOTES

INSPECTION DATE: 11/10/16 **APPROVED FOR USE:** ☒ YES ☐ NO

INSPECTION NOTES: 1250 gal working capacity tank installed to 2 distribution boxes - 5 runs of biodome: 4@120' & 1@150' see as built for details of layout - inspection ports on (S) end of 3 trenches

INSPECTOR SIGNATURE: Lana Schmidt

Modification of system fully complies with Custer Health Code.

APPENDIX C:

EDR DATABASE SEARCH RESULTS
(*Provided on CD on inside of report cover*)

Sunflower Wind Farm
Hebron, ND 58638

Inquiry Number: 4756166.5s
October 20, 2016

EDR DataMap™ Area Study

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

TARGET PROPERTY INFORMATION

ADDRESS

HEBRON, ND 58638
HEBRON, ND 58638

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records within the requested search area for the following databases:

FEDERAL RECORDS

NPL	National Priority List
Proposed NPL	Proposed National Priority List Sites
Delisted NPL	National Priority List Deletions
NPL LIENS	Federal Superfund Liens
SEMS	Superfund Enterprise Management System
SEMS-ARCHIVE	Superfund Enterprise Management System Archive
LIENS 2	CERCLA Lien Information
CORRACTS	Corrective Action Report
RCRA-TSDF	RCRA - Treatment, Storage and Disposal
RCRA-LQG	RCRA - Large Quantity Generators
RCRA-SQG	RCRA - Small Quantity Generators
RCRA-CESQG	RCRA - Conditionally Exempt Small Quantity Generator
RCRA NonGen / NLR	RCRA - Non Generators / No Longer Regulated
US ENG CONTROLS	Engineering Controls Sites List
US INST CONTROL	Sites with Institutional Controls
ERNS	Emergency Response Notification System
HMIRS	Hazardous Materials Information Reporting System
DOT OPS	Incident and Accident Data
US CDL	National Clandestine Laboratory Register
US BROWNFIELDS	A Listing of Brownfields Sites
DOD	Department of Defense Sites
FUDS	Formerly Used Defense Sites
LUCIS	Land Use Control Information System
CONSENT	Superfund (CERCLA) Consent Decrees
ROD	Records Of Decision
UMTRA	Uranium Mill Tailings Sites
DEBRIS REGION 9	Torres Martinez Reservation Illegal Dump Site Locations
ODI	Open Dump Inventory
US MINES	Mines Master Index File
TRIS	Toxic Chemical Release Inventory System
TSCA	Toxic Substances Control Act
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
SSTS	Section 7 Tracking Systems

EXECUTIVE SUMMARY

ICIS	Integrated Compliance Information System
PADS	PCB Activity Database System
MLTS	Material Licensing Tracking System
RADINFO	Radiation Information Database
FINDS	Facility Index System/Facility Registry System
RAATS	RCRA Administrative Action Tracking System
RMP	Risk Management Plans
US AIRS	Aerometric Information Retrieval System Facility Subsystem
SCRD DRYCLEANERS	State Coalition for Remediation of Drycleaners Listing
US HIST CDL	Delisted National Clandestine Laboratory Register
PCB TRANSFORMER	PCB Transformer Registration Database
US FIN ASSUR	Financial Assurance Information
EPA WATCH LIST	EPA WATCH LIST
PRP	Potentially Responsible Parties
2020 COR ACTION	2020 Corrective Action Program List
COAL ASH DOE	Steam-Electric Plant Operation Data
FUSRAP	Formerly Utilized Sites Remedial Action Program
UXO	Unexploded Ordnance Sites
COAL ASH EPA	Coal Combustion Residues Surface Impoundments List
DOCKET HWC	Hazardous Waste Compliance Docket Listing
FUELS PROGRAM	EPA Fuels Program Registered Listing
ECHO	Enforcement & Compliance History Information
FEMA UST	Underground Storage Tank Listing
FEDERAL FACILITY	Federal Facility Site Information listing
LEAD SMELTERS	Lead Smelter Sites

STATE AND LOCAL RECORDS

SHWS	This state does not maintain a SHWS list. See the Federal CERCLIS list and Federal NPL list.
SWF/LF	Solid Waste Landfills/Special Use Landfills
AUL	Land Use Controls Listing
UIC	Underground Injection Wells
SWRCY	Recycling Centers
LUST	Leaking Underground Storage Tank List
UST	Underground Storage Tank Data
AST	Aboveground Storage Tank Listing
SPILLS	State Spills
DRYCLEANERS	Drycleaner Facility Listing
BROWNFIELDS	List of Brownfields Sites
CDL	Clandestine Drug Lab Location Listing
NPDES	Wastewater Facility Listing
AIRS	Permitted Airs Facility Listing
TIER 2	Tier 2 Information Listing

TRIBAL RECORDS

INDIAN RESERV	Indian Reservations
INDIAN ODI	Report on the Status of Open Dumps on Indian Lands
INDIAN LUST	Leaking Underground Storage Tanks on Indian Land
INDIAN UST	Underground Storage Tanks on Indian Land
INDIAN VCP	Voluntary Cleanup Priority Listing

EDR PROPRIETARY RECORDS

EDR MGP	EDR Proprietary Manufactured Gas Plants

EXECUTIVE SUMMARY

EDR Hist Auto..... EDR Exclusive Historic Gas Stations
EDR Hist Cleaner..... EDR Exclusive Historic Dry Cleaners
RGA LUST..... Recovered Government Archive Leaking Underground Storage Tank

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were not identified.

Unmappable (orphan) sites are not considered in the foregoing analysis.

EXECUTIVE SUMMARY

Please refer to the end of the findings report for unmapped orphan sites due to poor or inadequate address information.

MAP FINDINGS SUMMARY

Database	Total Plotted
FEDERAL RECORDS	
NPL	0
Proposed NPL	0
Delisted NPL	0
NPL LIENS	0
SEMS	0
SEMS-ARCHIVE	0
LIENS 2	0
CORRACTS	0
RCRA-TSDF	0
RCRA-LQG	0
RCRA-SQG	0
RCRA-CESQG	0
RCRA NonGen / NLR	0
US ENG CONTROLS	0
US INST CONTROL	0
ERNS	0
HMIRS	0
DOT OPS	0
US CDL	0
US BROWNFIELDS	0
DOD	0
FUDS	0
LUCIS	0
CONSENT	0
ROD	0
UMTRA	0
DEBRIS REGION 9	0
ODI	0
US MINES	0
TRIS	0
TSCA	0
FTTS	0
HIST FTTS	0
SSTS	0
ICIS	0
PADS	0
MLTS	0
RADINFO	0
FINDS	0
RAATS	0
RMP	0
US AIRS	0
SCRD DRYCLEANERS	0
US HIST CDL	0
PCB TRANSFORMER	0
US FIN ASSUR	0
EPA WATCH LIST	0
PRP	0

MAP FINDINGS SUMMARY

Database	Total Plotted
2020 COR ACTION	0
COAL ASH DOE	0
FUSRAP	0
UXO	0
COAL ASH EPA	0
DOCKET HWC	0
FUELS PROGRAM	0
ECHO	0
FEMA UST	0
FEDERAL FACILITY	0
LEAD SMELTERS	0
STATE AND LOCAL RECORDS	
SHWS	N/A
SWF/LF	0
AUL	0
UIC	0
SWRCY	0
LUST	0
UST	0
AST	0
SPILLS	0
DRYCLEANERS	0
BROWNFIELDS	0
CDL	0
NPDES	0
AIRS	0
TIER 2	0
TRIBAL RECORDS	
INDIAN RESERV	0
INDIAN ODI	0
INDIAN LUST	0
INDIAN UST	0
INDIAN VCP	0
EDR PROPRIETARY RECORDS	
EDR MGP	0
EDR Hist Auto	0
EDR Hist Cleaner	0
RGA LUST	0

NOTES:

Sites may be listed in more than one database

N/A = This State does not maintain a SHWS list. See the Federal CERCLIS list.

MAP FINDINGS

Map ID Direction Distance Distance (ft.)	Site	Database(s)	EDR ID Number EPA ID Number

NO SITES FOUND

Count: 4 records

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
HEBRON	1011836752	SCHMALENBERGER FARM	ND HIGHWAY #10, 3 MILES W OF HEBRON	58638	RMP
HEBRON	1011836751	SCHMALENBERGER FARM	ND HIGHWAY #10 3 MILES WEST OF HEBR	58638	RMP
HEBRON	U003301486	BURLINGTON NORTHERN RAILROAD COMPANY	I-94	58638	UST
RICHARDTON	1016662035	GEORGE MESSER FARM	UNKNOWN	58652	FINDS, ECHO

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

FEDERAL RECORDS

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 03/07/2016
Date Data Arrived at EDR: 04/05/2016
Date Made Active in Reports: 04/15/2016
Number of Days to Update: 10

Source: EPA
Telephone: N/A
Last EDR Contact: 10/05/2016
Next Scheduled EDR Contact: 01/16/2017
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 3
Telephone 215-814-5418

EPA Region 4
Telephone 404-562-8033

EPA Region 5
Telephone 312-886-6686

EPA Region 10
Telephone 206-553-8665

EPA Region 6
Telephone: 214-655-6659

EPA Region 7
Telephone: 913-551-7247

EPA Region 8
Telephone: 303-312-6774

EPA Region 9
Telephone: 415-947-4246

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 03/07/2016
Date Data Arrived at EDR: 04/05/2016
Date Made Active in Reports: 04/15/2016
Number of Days to Update: 10

Source: EPA
Telephone: N/A
Last EDR Contact: 10/05/2016
Next Scheduled EDR Contact: 01/16/2017
Data Release Frequency: Quarterly

Delisted NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 03/07/2016
Date Data Arrived at EDR: 04/05/2016
Date Made Active in Reports: 04/15/2016
Number of Days to Update: 10

Source: EPA
Telephone: N/A
Last EDR Contact: 10/05/2016
Next Scheduled EDR Contact: 01/16/2017
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

SEMS: Superfund Enterprise Management System

SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 03/07/2016
Date Data Arrived at EDR: 04/05/2016
Date Made Active in Reports: 04/15/2016
Number of Days to Update: 10

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 07/22/2016
Next Scheduled EDR Contact: 10/31/2016
Data Release Frequency: Quarterly

SEMS-ARCHIVE: Superfund Enterprise Management System Archive

SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that. based upon available information, the location is not judged to be potential NPL site.

Date of Government Version: 03/07/2016
Date Data Arrived at EDR: 04/05/2016
Date Made Active in Reports: 04/15/2016
Number of Days to Update: 10

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 07/22/2016
Next Scheduled EDR Contact: 10/31/2016
Data Release Frequency: Quarterly

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 02/18/2014
Date Data Arrived at EDR: 03/18/2014
Date Made Active in Reports: 04/24/2014
Number of Days to Update: 37

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 07/29/2016
Next Scheduled EDR Contact: 11/07/2016
Data Release Frequency: Varies

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 06/27/2016
Date Data Arrived at EDR: 06/30/2016
Date Made Active in Reports: 09/02/2016
Number of Days to Update: 64

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 09/28/2016
Next Scheduled EDR Contact: 01/09/2017
Data Release Frequency: Quarterly

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 06/21/2016
Date Data Arrived at EDR: 06/30/2016
Date Made Active in Reports: 09/02/2016
Number of Days to Update: 64

Source: Environmental Protection Agency
Telephone: 303-312-6149
Last EDR Contact: 09/28/2016
Next Scheduled EDR Contact: 01/09/2017
Data Release Frequency: Quarterly

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 06/21/2016
Date Data Arrived at EDR: 06/30/2016
Date Made Active in Reports: 09/02/2016
Number of Days to Update: 64

Source: Environmental Protection Agency
Telephone: 303-312-6149
Last EDR Contact: 09/28/2016
Next Scheduled EDR Contact: 01/09/2017
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 06/21/2016
Date Data Arrived at EDR: 06/30/2016
Date Made Active in Reports: 09/02/2016
Number of Days to Update: 64

Source: Environmental Protection Agency
Telephone: 303-312-6149
Last EDR Contact: 09/28/2016
Next Scheduled EDR Contact: 01/09/2017
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 06/21/2016
Date Data Arrived at EDR: 06/30/2016
Date Made Active in Reports: 09/02/2016
Number of Days to Update: 64

Source: Environmental Protection Agency
Telephone: 303-312-6149
Last EDR Contact: 09/28/2016
Next Scheduled EDR Contact: 01/09/2017
Data Release Frequency: Varies

RCRA NonGen / NLR: RCRA - Non Generators / No Longer Regulated

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 06/21/2016
Date Data Arrived at EDR: 06/30/2016
Date Made Active in Reports: 09/02/2016
Number of Days to Update: 64

Source: Environmental Protection Agency
Telephone: 303-312-6149
Last EDR Contact: 09/28/2016
Next Scheduled EDR Contact: 01/09/2017
Data Release Frequency: Varies

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 05/09/2016
Date Data Arrived at EDR: 06/01/2016
Date Made Active in Reports: 09/02/2016
Number of Days to Update: 93

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 08/31/2016
Next Scheduled EDR Contact: 12/12/2016
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 05/09/2016
Date Data Arrived at EDR: 06/01/2016
Date Made Active in Reports: 09/02/2016
Number of Days to Update: 93

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 08/31/2016
Next Scheduled EDR Contact: 12/12/2016
Data Release Frequency: Varies

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 03/28/2016
Date Data Arrived at EDR: 03/30/2016
Date Made Active in Reports: 05/20/2016
Number of Days to Update: 51

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 09/29/2016
Next Scheduled EDR Contact: 01/09/2017
Data Release Frequency: Annually

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 06/27/2016
Date Data Arrived at EDR: 06/28/2016
Date Made Active in Reports: 09/23/2016
Number of Days to Update: 87

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 09/27/2016
Next Scheduled EDR Contact: 01/09/2017
Data Release Frequency: Annually

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/07/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 42

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 08/02/2016
Next Scheduled EDR Contact: 11/14/2016
Data Release Frequency: Varies

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 08/30/2016
Date Data Arrived at EDR: 09/06/2016
Date Made Active in Reports: 09/23/2016
Number of Days to Update: 17

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 08/31/2016
Next Scheduled EDR Contact: 12/12/2016
Data Release Frequency: Quarterly

US BROWNFIELDS: A Listing of Brownfields Sites

Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 06/21/2016
Date Data Arrived at EDR: 06/22/2016
Date Made Active in Reports: 09/02/2016
Number of Days to Update: 72

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 09/21/2016
Next Scheduled EDR Contact: 01/02/2017
Data Release Frequency: Semi-Annually

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 10/14/2016
Next Scheduled EDR Contact: 01/23/2017
Data Release Frequency: Semi-Annually

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 01/31/2015
Date Data Arrived at EDR: 07/08/2015
Date Made Active in Reports: 10/13/2015
Number of Days to Update: 97

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 09/09/2016
Next Scheduled EDR Contact: 12/19/2016
Data Release Frequency: Varies

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 05/28/2015
Date Data Arrived at EDR: 05/29/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 13

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 10/14/2016
Next Scheduled EDR Contact: 11/28/2016
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 03/31/2016
Date Data Arrived at EDR: 08/01/2016
Date Made Active in Reports: 09/23/2016
Number of Days to Update: 53

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 09/26/2016
Next Scheduled EDR Contact: 01/09/2017
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 11/25/2013
Date Data Arrived at EDR: 12/12/2013
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 74

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 09/09/2016
Next Scheduled EDR Contact: 12/19/2016
Data Release Frequency: Annually

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 09/14/2010
Date Data Arrived at EDR: 10/07/2011
Date Made Active in Reports: 03/01/2012
Number of Days to Update: 146

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 09/09/2016
Next Scheduled EDR Contact: 12/05/2016
Data Release Frequency: Varies

ODI: Open Dump Inventory

An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations

A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 07/20/2016
Next Scheduled EDR Contact: 10/07/2016
Data Release Frequency: No Update Planned

US MINES 2: Ferrous and Nonferrous Metal Mines Database Listing

This map layer includes ferrous (ferrous metal mines are facilities that extract ferrous metals, such as iron ore or molybdenum) and nonferrous (Nonferrous metal mines are facilities that extract nonferrous metals, such as gold, silver, copper, zinc, and lead) metal mines in the United States.

Date of Government Version: 12/05/2005
Date Data Arrived at EDR: 02/29/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 49

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 09/02/2016
Next Scheduled EDR Contact: 12/12/2016
Data Release Frequency: Varies

US MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 08/05/2016
Date Data Arrived at EDR: 09/01/2016
Date Made Active in Reports: 09/23/2016
Number of Days to Update: 22

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 09/01/2016
Next Scheduled EDR Contact: 12/12/2016
Data Release Frequency: Semi-Annually

US MINES 3: Active Mines & Mineral Plants Database Listing

Active Mines and Mineral Processing Plant operations for commodities monitored by the Minerals Information Team of the USGS.

Date of Government Version: 04/14/2011
Date Data Arrived at EDR: 06/08/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 97

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 09/02/2016
Next Scheduled EDR Contact: 12/12/2016
Data Release Frequency: Varies

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 11/24/2015
Date Made Active in Reports: 04/05/2016
Number of Days to Update: 133

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 08/26/2016
Next Scheduled EDR Contact: 12/05/2016
Data Release Frequency: Annually

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 01/15/2015
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 14

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 09/23/2016
Next Scheduled EDR Contact: 01/02/2017
Data Release Frequency: Every 4 Years

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 08/17/2016
Next Scheduled EDR Contact: 12/05/2016
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 08/17/2016
Next Scheduled EDR Contact: 12/05/2016
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing

A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing

A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 12/10/2010
Date Made Active in Reports: 02/25/2011
Number of Days to Update: 77

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 07/25/2016
Next Scheduled EDR Contact: 11/07/2016
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 01/23/2015
Date Data Arrived at EDR: 02/06/2015
Date Made Active in Reports: 03/09/2015
Number of Days to Update: 31

Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 10/11/2016
Next Scheduled EDR Contact: 01/23/2017
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 01/20/2016
Date Data Arrived at EDR: 04/28/2016
Date Made Active in Reports: 09/02/2016
Number of Days to Update: 127

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 10/14/2016
Next Scheduled EDR Contact: 01/23/2017
Data Release Frequency: Annually

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 03/07/2016
Date Data Arrived at EDR: 03/18/2016
Date Made Active in Reports: 04/15/2016
Number of Days to Update: 28

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 09/05/2016
Next Scheduled EDR Contact: 11/21/2016
Data Release Frequency: Quarterly

RADINFO: Radiation Information Database

The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 07/07/2015
Date Data Arrived at EDR: 07/09/2015
Date Made Active in Reports: 09/16/2015
Number of Days to Update: 69

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 10/05/2016
Next Scheduled EDR Contact: 01/16/2017
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 07/20/2015
Date Data Arrived at EDR: 09/09/2015
Date Made Active in Reports: 11/03/2015
Number of Days to Update: 55

Source: EPA
Telephone: (303) 312-6312
Last EDR Contact: 09/07/2016
Next Scheduled EDR Contact: 12/19/2016
Data Release Frequency: Quarterly

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 05/01/2016
Date Data Arrived at EDR: 05/26/2016
Date Made Active in Reports: 09/02/2016
Number of Days to Update: 99

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 07/25/2016
Next Scheduled EDR Contact: 11/07/2016
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 02/24/2015
Date Made Active in Reports: 09/30/2015
Number of Days to Update: 218

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 08/26/2016
Next Scheduled EDR Contact: 12/05/2016
Data Release Frequency: Biennially

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 03/07/2011
Date Data Arrived at EDR: 03/09/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 54

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 10/20/2016
Next Scheduled EDR Contact: 11/28/2016
Data Release Frequency: Varies

FEMA UST: Underground Storage Tank Listing

A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/01/2010
Date Data Arrived at EDR: 02/16/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 55

Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 10/11/2016
Next Scheduled EDR Contact: 01/23/2017
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List

A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 07/01/2014
Date Data Arrived at EDR: 09/10/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 09/06/2016
Next Scheduled EDR Contact: 12/19/2016
Data Release Frequency: Varies

COAL ASH DOE: Steam-Electric Plant Operation Data

A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 09/09/2016
Next Scheduled EDR Contact: 12/19/2016
Data Release Frequency: Varies

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)

The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/20/2015
Date Data Arrived at EDR: 10/27/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 69

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2016
Next Scheduled EDR Contact: 01/09/2017
Data Release Frequency: Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

US AIRS MINOR: Air Facility System Data
A listing of minor source facilities.

Date of Government Version: 10/20/2015
Date Data Arrived at EDR: 10/27/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 69

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2016
Next Scheduled EDR Contact: 01/09/2017
Data Release Frequency: Annually

2020 COR ACTION: 2020 Corrective Action Program List
The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 04/22/2013
Date Data Arrived at EDR: 03/03/2015
Date Made Active in Reports: 03/09/2015
Number of Days to Update: 6

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 09/06/2016
Next Scheduled EDR Contact: 11/21/2016
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information
All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 05/08/2016
Date Data Arrived at EDR: 05/18/2016
Date Made Active in Reports: 09/02/2016
Number of Days to Update: 107

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 08/17/2016
Next Scheduled EDR Contact: 11/28/2016
Data Release Frequency: Quarterly

EPA WATCH LIST: EPA WATCH LIST
EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 08/08/2016
Next Scheduled EDR Contact: 11/21/2016
Data Release Frequency: Quarterly

FUSRAP: Formerly Utilized Sites Remedial Action Program
DOE established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations.

Date of Government Version: 07/21/2016
Date Data Arrived at EDR: 07/26/2016
Date Made Active in Reports: 09/23/2016
Number of Days to Update: 59

Source: Department of Energy
Telephone: 202-586-3559
Last EDR Contact: 07/26/2016
Next Scheduled EDR Contact: 11/21/2016
Data Release Frequency: Varies

DOCKET HWC: Hazardous Waste Compliance Docket Listing
A complete list of the Federal Agency Hazardous Waste Compliance Docket Facilities.

Date of Government Version: 06/02/2016
Date Data Arrived at EDR: 06/03/2016
Date Made Active in Reports: 09/02/2016
Number of Days to Update: 91

Source: Environmental Protection Agency
Telephone: 202-564-0527
Last EDR Contact: 08/24/2016
Next Scheduled EDR Contact: 12/12/2016
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 02/01/2011
Date Data Arrived at EDR: 10/19/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 83

Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 07/29/2016
Next Scheduled EDR Contact: 11/07/2016
Data Release Frequency: Varies

FUELS PROGRAM: EPA Fuels Program Registered Listing
This listing includes facilities that are registered under the Part 80 (Code of Federal Regulations) EPA Fuels Programs. All companies now are required to submit new and updated registrations.

Date of Government Version: 05/24/2016
Date Data Arrived at EDR: 05/25/2016
Date Made Active in Reports: 07/13/2016
Number of Days to Update: 49

Source: EPA
Telephone: 800-385-6164
Last EDR Contact: 08/23/2016
Next Scheduled EDR Contact: 12/05/2016
Data Release Frequency: Quarterly

ECHO: Enforcement & Compliance History Information
ECHO provides integrated compliance and enforcement information for about 800,000 regulated facilities nationwide.

Date of Government Version: 09/20/2015
Date Data Arrived at EDR: 09/23/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 103

Source: Environmental Protection Agency
Telephone: 202-564-2280
Last EDR Contact: 09/20/2016
Next Scheduled EDR Contact: 01/02/2017
Data Release Frequency: Quarterly

LEAD SMELTER 1: Lead Smelter Sites
A listing of former lead smelter site locations.

Date of Government Version: 03/07/2016
Date Data Arrived at EDR: 04/07/2016
Date Made Active in Reports: 09/02/2016
Number of Days to Update: 148

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 09/29/2016
Next Scheduled EDR Contact: 01/16/2017
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites
A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

PRP: Potentially Responsible Parties
A listing of verified Potentially Responsible Parties

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 10/17/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 3

Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 08/12/2016
Next Scheduled EDR Contact: 11/21/2016
Data Release Frequency: Quarterly

US HIST CDL: National Clandestine Laboratory Register
A listing of clandestine drug lab locations that have been removed from the DEAs National Clandestine Laboratory Register.

Date of Government Version: 08/31/2016
Date Data Arrived at EDR: 09/06/2016
Date Made Active in Reports: 09/23/2016
Number of Days to Update: 17

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 08/31/2016
Next Scheduled EDR Contact: 10/10/2016
Data Release Frequency: No Update Planned

UXO: Unexploded Ordnance Sites
A listing of unexploded ordnance site locations

Date of Government Version: 10/25/2015
Date Data Arrived at EDR: 01/29/2016
Date Made Active in Reports: 04/05/2016
Number of Days to Update: 67

Source: Department of Defense
Telephone: 571-373-0407
Last EDR Contact: 10/17/2016
Next Scheduled EDR Contact: 01/30/2017
Data Release Frequency: Varies

FEDERAL FACILITY: Federal Facility Site Information listing
A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 11/13/2015
Date Data Arrived at EDR: 01/06/2016
Date Made Active in Reports: 05/20/2016
Number of Days to Update: 135

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 10/04/2016
Next Scheduled EDR Contact: 01/16/2017
Data Release Frequency: Varies

STATE AND LOCAL RECORDS

SHWS: This state does not maintain a SHWS list. See the Federal CERCLIS list and Federal NPL list.
State Hazardous Waste Sites. State hazardous waste site records are the states' equivalent to CERCLIS. These sites may or may not already be listed on the federal CERCLIS list. Priority sites planned for cleanup using state funds (state equivalent of Superfund) are identified along with sites where cleanup will be paid for by potentially responsible parties. Available information varies by state.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: Department of Health
Telephone: 701-328-5166
Last EDR Contact: 08/22/2016
Next Scheduled EDR Contact: 12/05/2016
Data Release Frequency: N/A

SWF/LF: Solid Waste Landfills/Special Use Landfills
Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 07/26/2016
Date Data Arrived at EDR: 07/29/2016
Date Made Active in Reports: 10/04/2016
Number of Days to Update: 67

Source: Department of Health
Telephone: 701-328-5166
Last EDR Contact: 07/29/2016
Next Scheduled EDR Contact: 11/07/2016
Data Release Frequency: Semi-Annually

AUL: Land Use Controls Listing
Land-Use Controls (LUCs) are defined broadly as legal measures that limit human exposure by restricting activity, use, and access to properties with residual contamination.

Date of Government Version: 08/11/2016
Date Data Arrived at EDR: 09/01/2016
Date Made Active in Reports: 09/23/2016
Number of Days to Update: 22

Source: Department of Health
Telephone: 701-328-5158
Last EDR Contact: 09/01/2016
Next Scheduled EDR Contact: 12/12/2016
Data Release Frequency: Varies

UIC: Underground Injection Wells
A listing of underground injection control wells.

Date of Government Version: 03/31/2016
Date Data Arrived at EDR: 05/20/2016
Date Made Active in Reports: 07/18/2016
Number of Days to Update: 59

Source: Department of Health
Telephone: 701-328-5217
Last EDR Contact: 07/29/2016
Next Scheduled EDR Contact: 11/14/2016
Data Release Frequency: Varies

SWRCY: Recycling Centers
A listing of recycling center locations.

Date of Government Version: 04/28/2016
Date Data Arrived at EDR: 06/09/2016
Date Made Active in Reports: 07/18/2016
Number of Days to Update: 39

Source: Department of Health
Telephone: 701-328-5266
Last EDR Contact: 09/09/2016
Next Scheduled EDR Contact: 12/19/2016
Data Release Frequency: Varies

LUST: Leaking Underground Storage Tank List
Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 08/31/2016
Date Data Arrived at EDR: 09/01/2016
Date Made Active in Reports: 10/04/2016
Number of Days to Update: 33

Source: Department of Health
Telephone: 701-328-5166
Last EDR Contact: 09/01/2016
Next Scheduled EDR Contact: 12/12/2016
Data Release Frequency: Quarterly

UST: Underground Storage Tank Data
Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 08/31/2016
Date Data Arrived at EDR: 09/01/2016
Date Made Active in Reports: 10/04/2016
Number of Days to Update: 33

Source: Department of Health
Telephone: 701-328-5166
Last EDR Contact: 09/01/2016
Next Scheduled EDR Contact: 12/12/2016
Data Release Frequency: Quarterly

AST: Aboveground Storage Tank Listing
Registered Aboveground Storage Tanks.

Date of Government Version: 05/10/2016
Date Data Arrived at EDR: 05/24/2016
Date Made Active in Reports: 07/18/2016
Number of Days to Update: 55

Source: Department of Insurance
Telephone: 701-328-3246
Last EDR Contact: 08/05/2016
Next Scheduled EDR Contact: 11/07/2016
Data Release Frequency: Semi-Annually

SPILLS: State Spills
A listing of Department of Health spill records.

Date of Government Version: 08/09/2016
Date Data Arrived at EDR: 08/12/2016
Date Made Active in Reports: 10/04/2016
Number of Days to Update: 53

Source: Dept. of Health
Telephone: 701-328-5150
Last EDR Contact: 10/11/2016
Next Scheduled EDR Contact: 01/23/2017
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

DRYCLEANERS: Drycleaner facilities
A listing of drycleaner facility locations.

Date of Government Version: 07/26/2016
Date Data Arrived at EDR: 07/27/2016
Date Made Active in Reports: 09/23/2016
Number of Days to Update: 58

Source: Department of Health
Telephone: 701-328-5188
Last EDR Contact: 07/27/2016
Next Scheduled EDR Contact: 11/07/2016
Data Release Frequency: Varies

BROWNFIELDS: List of Brownfields Sites
The concept of the Brownfields Program is to take contaminated or potentially contaminated, underdeveloped, unproductive property and convert it into productive real estate. Brownfield sites are defined as abandoned, idled or underused industrial or commercial properties whose redevelopment is complicated by real or perceived environmental contamination.

Date of Government Version: 07/07/2016
Date Data Arrived at EDR: 08/24/2016
Date Made Active in Reports: 09/23/2016
Number of Days to Update: 30

Source: Department of Health
Telephone: 701-328-5166
Last EDR Contact: 08/19/2016
Next Scheduled EDR Contact: 12/05/2016
Data Release Frequency: Varies

CDL: Clandestine Drug Lab Location Listing
A listing of clandestine drug lab locations in North Dakota.

Date of Government Version: 06/07/2016
Date Data Arrived at EDR: 08/29/2016
Date Made Active in Reports: 10/04/2016
Number of Days to Update: 36

Source: Bureau of Criminal Investigation
Telephone: 701-328-8171
Last EDR Contact: 05/31/2016
Next Scheduled EDR Contact: 09/12/2016
Data Release Frequency: Varies

NPDES: Wastewater Facility Listing
A listing of wastewater facility locations.

Date of Government Version: 07/20/2016
Date Data Arrived at EDR: 07/25/2016
Date Made Active in Reports: 10/04/2016
Number of Days to Update: 71

Source: Department of Health
Telephone: 701-328-5260
Last EDR Contact: 10/11/2016
Next Scheduled EDR Contact: 01/23/2017
Data Release Frequency: Varies

AIRS: Permitted Airs Facility Listing
A listing of permitted airs facility locations.

Date of Government Version: 07/25/2016
Date Data Arrived at EDR: 07/26/2016
Date Made Active in Reports: 09/23/2016
Number of Days to Update: 59

Source: Department of Health
Telephone: 701-328-5188
Last EDR Contact: 07/26/2016
Next Scheduled EDR Contact: 11/07/2016
Data Release Frequency: Varies

TIER 2: Tier 2 Information Listing
Tier 2 information listing.

Date of Government Version: 12/31/2015
Date Data Arrived at EDR: 07/26/2016
Date Made Active in Reports: 10/04/2016
Number of Days to Update: 70

Source: Department of Emergency Services
Telephone: 701-328-8263
Last EDR Contact: 09/26/2016
Next Scheduled EDR Contact: 01/09/2017
Data Release Frequency: Annually

TRIBAL RECORDS

INDIAN RESERV: Indian Reservations
This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 12/08/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 34

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 10/14/2016
Next Scheduled EDR Contact: 01/23/2017
Data Release Frequency: Semi-Annually

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 08/05/2016
Next Scheduled EDR Contact: 11/14/2016
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 10/13/2015
Date Data Arrived at EDR: 10/23/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 118

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 07/27/2016
Next Scheduled EDR Contact: 11/07/2016
Data Release Frequency: Quarterly

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 10/27/2015
Date Data Arrived at EDR: 10/29/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 67

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 07/29/2016
Next Scheduled EDR Contact: 11/07/2016
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 12/11/2015
Date Data Arrived at EDR: 02/19/2016
Date Made Active in Reports: 06/03/2016
Number of Days to Update: 105

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 07/27/2016
Next Scheduled EDR Contact: 11/07/2016
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 02/05/2016
Date Data Arrived at EDR: 04/29/2016
Date Made Active in Reports: 06/03/2016
Number of Days to Update: 35

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 07/26/2016
Next Scheduled EDR Contact: 11/07/2016
Data Release Frequency: Semi-Annually

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land
Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 02/17/2016
Date Data Arrived at EDR: 04/27/2016
Date Made Active in Reports: 06/03/2016
Number of Days to Update: 37

Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 07/27/2016
Next Scheduled EDR Contact: 11/07/2016
Data Release Frequency: Varies

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 02/25/2016
Date Data Arrived at EDR: 04/27/2016
Date Made Active in Reports: 06/03/2016
Number of Days to Update: 37

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 07/27/2016
Next Scheduled EDR Contact: 11/07/2016
Data Release Frequency: Quarterly

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 01/07/2016
Date Data Arrived at EDR: 01/08/2016
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 41

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 07/27/2016
Next Scheduled EDR Contact: 11/07/2016
Data Release Frequency: Quarterly

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 10/09/2015
Date Data Arrived at EDR: 02/12/2016
Date Made Active in Reports: 06/03/2016
Number of Days to Update: 112

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 07/27/2016
Next Scheduled EDR Contact: 11/07/2016
Data Release Frequency: Varies

INDIAN UST R1: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 10/20/2015
Date Data Arrived at EDR: 10/29/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 67

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 07/29/2016
Next Scheduled EDR Contact: 11/07/2016
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 02/05/2016
Date Data Arrived at EDR: 04/29/2016
Date Made Active in Reports: 06/03/2016
Number of Days to Update: 35

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 07/26/2016
Next Scheduled EDR Contact: 11/07/2016
Data Release Frequency: Semi-Annually

INDIAN UST R5: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 11/05/2015
Date Data Arrived at EDR: 11/13/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 52

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 07/27/2016
Next Scheduled EDR Contact: 11/07/2016
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 12/03/2015
Date Data Arrived at EDR: 02/04/2016
Date Made Active in Reports: 06/03/2016
Number of Days to Update: 120

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 07/27/2016
Next Scheduled EDR Contact: 11/07/2016
Data Release Frequency: Semi-Annually

INDIAN UST R7: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 09/23/2014
Date Data Arrived at EDR: 11/25/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 65

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 07/27/2016
Next Scheduled EDR Contact: 11/07/2016
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 01/26/2016
Date Data Arrived at EDR: 02/05/2016
Date Made Active in Reports: 06/03/2016
Number of Days to Update: 119

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 07/27/2016
Next Scheduled EDR Contact: 11/07/2016
Data Release Frequency: Quarterly

INDIAN UST R9: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 02/25/2016
Date Data Arrived at EDR: 04/27/2016
Date Made Active in Reports: 06/03/2016
Number of Days to Update: 37

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 07/27/2016
Next Scheduled EDR Contact: 11/07/2016
Data Release Frequency: Quarterly

INDIAN UST R10: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 01/07/2016
Date Data Arrived at EDR: 01/08/2016
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 41

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 07/27/2016
Next Scheduled EDR Contact: 11/07/2016
Data Release Frequency: Quarterly

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng

A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

INDIAN VCP R1: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 07/27/2015
Date Data Arrived at EDR: 09/29/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 142

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 09/26/2016
Next Scheduled EDR Contact: 01/09/2017
Data Release Frequency: Varies

EDR PROPRIETARY RECORDS

EDR MGP: EDR Proprietary Manufactured Gas Plants
The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR Hist Auto: EDR Exclusive Historic Gas Stations
EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR Hist Cleaner: EDR Exclusive Historic Dry Cleaners
EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank
The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Health in North Dakota.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/04/2014
Number of Days to Update: 187

Source: Department of Health
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data
Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 07/30/2013
Date Data Arrived at EDR: 08/19/2013
Date Made Active in Reports: 10/03/2013
Number of Days to Update: 45

Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 08/10/2016
Next Scheduled EDR Contact: 11/28/2016
Data Release Frequency: No Update Planned

NY MANIFEST: Facility and Manifest Data
Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 08/01/2016
Date Data Arrived at EDR: 08/03/2016
Date Made Active in Reports: 09/09/2016
Number of Days to Update: 37

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 08/03/2016
Next Scheduled EDR Contact: 11/14/2016
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2015
Date Data Arrived at EDR: 04/14/2016
Date Made Active in Reports: 06/03/2016
Number of Days to Update: 50

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 09/12/2016
Next Scheduled EDR Contact: 12/26/2016
Data Release Frequency: Annually

Oil/Gas Pipelines
Source: PennWell Corporation
Petroleum Bundle (Crude Oil, Refined Products, Petrochemicals, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)) N = Natural Gas Bundle (Natural Gas, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)). This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Electric Power Transmission Line Data
Source: PennWell Corporation
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Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Child Care List
Source: Department of Human Services
Telephone: 701-328-2316

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary faultlines, prepared in 1975 by the United State Geological Survey

STREET AND ADDRESS INFORMATION

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Sunflower Wind Farm
Hebron, ND 58638

Inquiry Number: 4756166.5w
October 20, 2016

EDR DataMap™ Well Search Report

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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GEOCHECK VERSION 2.1
SUMMARY

FEDERAL DATABASE WELL INFORMATION

MAP ID	WELL ID
1	USGS40000916401
2	USGS40000916400
3	USGS40000916164
5	USGS40000915906
6	USGS40000915813
7	USGS40000915791
8	USGS40000915753
9	USGS40000915752
10	USGS40000915751
11	USGS40000915726
12	USGS40000915723
13	USGS40000915699
13	USGS40000915700
14	USGS40000915643
14	USGS40000915644
15	USGS40000915419
16	USGS40000915337
17	USGS40000915311
18	USGS40000915306
18	USGS40000915307
19	USGS40000915121
20	USGS40000915120
21	USGS40000915118
21	USGS40000915119
22	USGS40000915087
23	USGS40000915086
24	USGS40000915041
25	USGS40000914762
26	USGS40000914747
27	USGS40000914711
27	USGS40000914712
27	USGS40000914713
28	USGS40000914667
29	USGS40000914666
30	USGS40000914407
31	USGS40000914389
31	USGS40000914388
32	USGS40000914361
32	USGS40000914360
32	USGS40000914359
32	USGS40000914358
33	USGS40000914204

STATE WATER WELL INFORMATION

MAP ID	WELL ID
3	ND6000000009016
4	ND6000000010588
8	ND6000000009017
34	ND6000000023212

STATE OIL/GAS WELL INFORMATION

MAP ID	WELL ID
1	NDOG60000015710

GEOCHECK VERSION 2.1
SUMMARY

STATE OIL/GAS WELL INFORMATION

MAP ID	WELL ID
2	NDOG60000027901

PUBLIC WATER SUPPLY SYSTEM INFORMATION

NO WELLS FOUND

USGS TOPOGRAPHIC MAP(S)

46101-G8 GLEN ULLIN SW, ND
46102-G1 HEBRON SE, ND
46102-G2 ANTELOPE, ND

AREA RADON INFORMATION

Federal Area Radon Information for Zip Code: 58652

Number of sites tested: 4

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	2.000 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	6.750 pCi/L	25%	75%	0%

Federal Area Radon Information for Zip Code: 58638

Number of sites tested: 6

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.000 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	5.433 pCi/L	33%	67%	0%

Federal EPA Radon Zone for STARK County: 1

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for STARK COUNTY, ND

Number of sites tested: 117

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	5.909 pCi/L	55%	45%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	8.478 pCi/L	38%	57%	5%

GEOCHECK VERSION 2.1
SUMMARY

AREA RADON INFORMATION

Federal EPA Radon Zone for MORTON County: 1

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for MORTON COUNTY, ND

Number of sites tested: 92

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	2.467 pCi/L	89%	11%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	5.804 pCi/L	43%	53%	3%

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Water Well Information:

Map ID:	1		
Org. Identifier:	USGS-ND	Site ID:	USGS40000916401
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-465156102040901		
Monloc name:	139-090-08CDB		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130201	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.8655624
Longitude:	-102.0696087	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19680101	Welldepth:	22
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID:	2		
Org. Identifier:	USGS-ND	Site ID:	USGS40000916400
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-465156102040001		
Monloc name:	139-090-08CDA		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130201	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.8655624
Longitude:	-102.0671086	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		

Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	22
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID:	3		
Org. Identifier:	USGS-ND	Site ID:	USGS40000916164
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-465136102003101		
Monloc name:	139-090-14BBD		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130203	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.8600069
Longitude:	-102.009051	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Lower Tertiary aquifers		
Formation type:	Tongue River Member of Fort Union Formation		
Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	350
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID:	5		
Org. Identifier:	USGS-ND	Site ID:	USGS40000915906
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-465051102062201		
Monloc name:	139-091-24ABB		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130201	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.8475068
Longitude:	-102.1065542	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Lower Tertiary aquifers		
Formation type:	Sentinel Butte Member of Fort Union Formation		

Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	60
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID:	6		
Org. Identifier:	USGS-ND	Site ID:	USGS40000915813
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-465044102032201		
Monloc name:	139-090-20AAD		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130203	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.8455624
Longitude:	-102.0565525	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19620101	Welldepth:	18
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID:	7		
Org. Identifier:	USGS-ND	Site ID:	USGS40000915791
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-465037102032201		
Monloc name:	139-090-20ADA		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130203	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.8436179
Longitude:	-102.0565524	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		

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Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	60
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID:	8		
Org. Identifier:	USGS-ND	Site ID:	USGS40000915753
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-465031102040001		
Monloc name:	139-090-20BDD		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130201	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.8419512
Longitude:	-102.0671083	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Lower Tertiary aquifers		
Formation type:	Tongue River Member of Fort Union Formation		
Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	438
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID:	9		
Org. Identifier:	USGS-ND	Site ID:	USGS40000915752
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-465031102035001		
Monloc name:	139-090-20ACC		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130201	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.8419512
Longitude:	-102.0643305	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		

Aquifer type:	Not Reported		
Construction date:	19660101	Welldepth:	130
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID:	10		
Org. Identifier:	USGS-ND	Site ID:	USGS40000915751
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-465031102014701		
Monloc name:	139-090-22BCD		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130203	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.8419512
Longitude:	-102.0301626	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19600101	Welldepth:	210
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID:	11		
Org. Identifier:	USGS-ND	Site ID:	USGS40000915726
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-465025102055401		
Monloc name:	139-091-24DAA		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130201	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.8402845
Longitude:	-102.098776	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	2448
Vert measure units:	feet	Vertacc measure val:	1.
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		

Aquifer type:	Not Reported		
Construction date:	19570101	Welldepth:	Not Reported
Welldepth units:	Not Reported	Wellholedepth:	16
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

Map ID:	12		
Org. Identifier:	USGS-ND	Site ID:	USGS40000915723
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-465024102041901		
Monloc name:	139-090-20CBA		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130201	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.8400068
Longitude:	-102.0723863	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19290101	Welldepth:	240
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID:	13		
Org. Identifier:	USGS-ND	Site ID:	USGS40000915699
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-465019102065101		
Monloc name:	139-091-24CBD1		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130201	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.8386179
Longitude:	-102.1146099	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Lower Tertiary aquifers		
Formation type:	Sentinel Butte Member of Fort Union Formation		

Aquifer type:	Not Reported		
Construction date:	19200101	Welldepth:	40
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID:	13		
Org. Identifier:	USGS-ND	Site ID:	USGS40000915700
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-465019102065102		
Monloc name:	139-091-24CBD2		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130201	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.8386179
Longitude:	-102.1146099	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	2300
Vert measure units:	feet	Vertacc measure val:	10
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Lower Tertiary aquifers		
Formation type:	Sentinel Butte-Tongue River Members of Fort Union Formation		
Aquifer type:	Not Reported		
Construction date:	19640101	Welldepth:	250
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID:	14		
Org. Identifier:	USGS-ND	Site ID:	USGS40000915643
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-465011101583701		
Monloc name:	139-090-24DCA1		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130203	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.8363955
Longitude:	-101.9773829	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		

Aquifer type:	Not Reported		
Construction date:	19700101	Welldepth:	34
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID:	14		
Org. Identifier:	USGS-ND	Site ID:	USGS40000915644
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-465011101583702		
Monloc name:	139-090-24DCA2		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130203	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.8363955
Longitude:	-101.9773829	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	45
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID:	15		
Org. Identifier:	USGS-ND	Site ID:	USGS40000915419
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-464940102085401		
Monloc name:	139-091-27ACC		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130202	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.8277845
Longitude:	-102.1487776	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	2380
Vert measure units:	feet	Vertacc measure val:	10
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Lower Tertiary aquifers		
Formation type:	Sentinel Butte Member of Fort Union Formation		

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Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	4
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1967-06-01	3.00	

Map ID:	16		
Org. Identifier:	USGS-ND	Site ID:	USGS40000915337
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-464925102005901		
Monloc name:	139-090-27DAC		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130203	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.8236178
Longitude:	-102.0168287	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19690101	Welldepth:	48
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID:	17		
Org. Identifier:	USGS-ND	Site ID:	USGS40000915311
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-464920102091301		
Monloc name:	139-091-27CDB		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130202	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.8222289
Longitude:	-102.1540554	Sourcemap scale:	Not Reported

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Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	2360
Vert measure units:	feet	Vertacc measure val:	10
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19080101	Welldepth:	23
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1967-06-01	16.00	

Map ID:	18		
Org. Identifier:	USGS-ND	Site ID:	USGS40000915306
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-464919102030301		
Monloc name:	139-090-28CCA1		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130203	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.8219511
Longitude:	-102.0512742	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19000101	Welldepth:	40
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID: 18

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Org. Identifier:	USGS-ND	Site ID:	USGS40000915307
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-464919102030302		
Monloc name:	139-090-28CCA2		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130203	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.8219511
Longitude:	-102.0512742	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19700101	Welldepth:	150
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID:	19		
Org. Identifier:	USGS-ND	Site ID:	USGS40000915121
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-464854102082501		
Monloc name:	139-091-34ADA		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130202	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.8150067
Longitude:	-102.1407215	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	2370
Vert measure units:	feet	Vertacc measure val:	10
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Lower Tertiary aquifers		
Formation type:	Sentinel Butte Member of Fort Union Formation		
Aquifer type:	Not Reported		
Construction date:	18900101	Welldepth:	34
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1967-06-01	22.00	

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Map ID:	20		
Org. Identifier:	USGS-ND	Site ID:	USGS40000915120
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-464854102074701		
Monloc name:	139-091-35BDA		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130202	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.8150067
Longitude:	-102.1301656	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	2390
Vert measure units:	feet	Vertacc measure val:	10
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Lower Tertiary aquifers		
Formation type:	Sentinel Butte-Tongue River Members of Fort Union Formation		
Aquifer type:	Not Reported		
Construction date:	19610101	Welldepth:	214
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID:	21		
Org. Identifier:	USGS-ND	Site ID:	USGS40000915118
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-464854102072901		
Monloc name:	139-091-35ACA1		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130202	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.8150067
Longitude:	-102.1251655	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Lower Tertiary aquifers		
Formation type:	Sentinel Butte Member of Fort Union Formation		
Aquifer type:	Not Reported		
Construction date:	19120101	Welldepth:	30
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Map ID:	21		
Org. Identifier:	USGS-ND	Site ID:	USGS40000915119
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-464854102072902		
Monloc name:	139-091-35ACA2		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130202	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.8150067
Longitude:	-102.1251655	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Lower Tertiary aquifers		
Formation type:	Sentinel Butte Member of Fort Union Formation		
Aquifer type:	Not Reported		
Construction date:	19660101	Welldepth:	8
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID:	22		
Org. Identifier:	USGS-ND	Site ID:	USGS40000915087
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-464846102040901		
Monloc name:	139-090-32BDC		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130203	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.8127844
Longitude:	-102.069608	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19520101	Welldepth:	25
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Map ID:	23		
Org. Identifier:	USGS-ND	Site ID:	USGS40000915086
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-464846102040001		
Monloc name:	139-090-32BDD		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130203	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.8127844
Longitude:	-102.067108	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19200101	Welldepth:	15
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID:	24		
Org. Identifier:	USGS-ND	Site ID:	USGS40000915041
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-464840102032201		
Monloc name:	139-090-32DAA		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130203	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.8111178
Longitude:	-102.056552	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19540101	Welldepth:	35
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Map ID:	25		
Org. Identifier:	USGS-ND	Site ID:	USGS40000914762
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-464804102002701		
Monloc name:	138-090-02B		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130203	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.8011177
Longitude:	-102.0079393	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	50
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID:	26		
Org. Identifier:	USGS-ND	Site ID:	USGS40000914747
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-464801102004201		
Monloc name:	138-090-02BCB		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130203	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.8002844
Longitude:	-102.012106	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19670101	Welldepth:	90
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Map ID:	27		
Org. Identifier:	USGS-ND	Site ID:	USGS40000914711
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-464755102051801		
Monloc name:	138-090-06BDD1		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130202	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.7986177
Longitude:	-102.0887752	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19520101	Welldepth:	46
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID:	27		
Org. Identifier:	USGS-ND	Site ID:	USGS40000914712
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-464755102051802		
Monloc name:	138-090-06BDD2		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130202	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.7986177
Longitude:	-102.0887752	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19590101	Welldepth:	60
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Map ID:	27		
Org. Identifier:	USGS-ND	Site ID:	USGS40000914713
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-464755102051803		
Monloc name:	138-090-06BDD3		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130202	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.7986177
Longitude:	-102.0887752	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19680101	Welldepth:	56
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID:	28		
Org. Identifier:	USGS-ND	Site ID:	USGS40000914667
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-464749102074901		
Monloc name:	138-091-02CAA		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130202	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.7969511
Longitude:	-102.130721	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	2355
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Lower Tertiary aquifers		
Formation type:	Sentinel Butte-Tongue River Members of Fort Union Formation		
Aquifer type:	Not Reported		
Construction date:	19500101	Welldepth:	160
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Map ID:	29		
Org. Identifier:	USGS-ND	Site ID:	USGS40000914666
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-464749102051801		
Monloc name:	138-090-06CAA		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130202	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.7969511
Longitude:	-102.0887752	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19450101	Welldepth:	60
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID:	30		
Org. Identifier:	USGS-ND	Site ID:	USGS40000914407
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-464716102035201		
Monloc name:	138-090-08ABC		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130202	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.7877843
Longitude:	-102.0648854	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19620101	Welldepth:	70
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Map ID:	31		
Org. Identifier:	USGS-ND	Site ID:	USGS40000914389
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-464710102062402		
Monloc name:	138-091-12ACB2		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130202	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.7861177
Longitude:	-102.1071089	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Lower Tertiary aquifers		
Formation type:	Sentinel Butte Member of Fort Union Formation		
Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	15
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID:	31		
Org. Identifier:	USGS-ND	Site ID:	USGS40000914388
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-464710102062401		
Monloc name:	138-091-12ACB1		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130202	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.7861177
Longitude:	-102.1071089	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Lower Tertiary aquifers		
Formation type:	Sentinel Butte Member of Fort Union Formation		
Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	30
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Map ID:	32		
Org. Identifier:	USGS-ND	Site ID:	USGS40000914361
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-464703102070204		
Monloc name:	138-091-12BCC4		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130202	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.7841733
Longitude:	-102.1176648	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Lower Tertiary aquifers		
Formation type:	Sentinel Butte Member of Fort Union Formation		
Aquifer type:	Not Reported		
Construction date:	19650101	Welldepth:	50
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID:	32		
Org. Identifier:	USGS-ND	Site ID:	USGS40000914360
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-464703102070203		
Monloc name:	138-091-12BCC3		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130202	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.7841733
Longitude:	-102.1176648	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Lower Tertiary aquifers		
Formation type:	Sentinel Butte Member of Fort Union Formation		
Aquifer type:	Not Reported		
Construction date:	19650101	Welldepth:	28
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Map ID:	32		
Org. Identifier:	USGS-ND	Site ID:	USGS40000914359
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-464703102070202		
Monloc name:	138-091-12BCC2		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130202	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.7841733
Longitude:	-102.1176648	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Lower Tertiary aquifers		
Formation type:	Sentinel Butte Member of Fort Union Formation		
Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	25
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID:	32		
Org. Identifier:	USGS-ND	Site ID:	USGS40000914358
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-464703102070201		
Monloc name:	138-091-12BCC1		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130202	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.7841733
Longitude:	-102.1176648	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	2400
Vert measure units:	feet	Vertacc measure val:	10
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Lower Tertiary aquifers		
Formation type:	Sentinel Butte Member of Fort Union Formation		
Aquifer type:	Not Reported		
Construction date:	19120101	Welldepth:	12
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Map ID:	33		
Org. Identifier:	USGS-ND	Site ID:	USGS40000914204
Formal name:	USGS North Dakota Water Science Center		
Monloc Identifier:	USGS-464637102071101		
Monloc name:	138-091-11DDD		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10130202	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	46.776951
Longitude:	-102.1201648	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	2415
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Altimeter		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19690101	Welldepth:	Not Reported
Welldepth units:	Not Reported	Wellholedepth:	300
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Water Well Information:

Map ID:	3
Fid:	9015
Site index:	9016
Location:	13909014BBD
Swc well n:	Not Reported
County:	Morton
Basin:	Not Reported
Aquifer:	Unknown
Purpose:	Unknown
Casing:	Not Reported
Diameter:	0
Measuring :	0
Land surfa:	0
Elev type:	Not Reported
Date drill:	00/00/0000
Total dept:	0
Bedrock de:	0
Top screen:	0
Bottom scr:	0
Longitude:	-102.00866
Latitude:	46.85982
Site id:	ND6000000009016

Map ID:	4
Fid:	10587
Site index:	10588
Location:	13909114
Swc well n:	Not Reported
County:	Stark
Basin:	Knife River
Aquifer:	Fox Hills
Purpose:	Unknown
Casing:	Unknown
Diameter:	0
Measuring :	0
Land surfa:	0
Elev type:	Not Reported
Date drill:	00/00/0000
Total dept:	0
Bedrock de:	0
Top screen:	0
Bottom scr:	1910
Longitude:	-102.12825
Latitude:	46.85528

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Site id: ND6000000010588

Map ID:	8
Fid:	9016
Site index:	9017
Location:	13909020BDD
Swc well n:	Not Reported
County:	Morton
Basin:	Knife River
Aquifer:	Tongue River
Purpose:	Stock Well
Casing:	Not Reported
Diameter:	438
Measuring :	0
Land surfa:	0
Elev type:	Not Reported
Date drill:	00/00/0000
Total dept:	438
Bedrock de:	0
Top screen:	0
Bottom scr:	438
Longitude:	-102.06661
Latitude:	46.84173
Site id:	ND6000000009017

Map ID:	34
Fid:	23211
Site index:	23212
Location:	13809111DDD
Swc well n:	3704
County:	Stark
Basin:	Heart River
Aquifer:	No Obs Well Installed
Purpose:	Test Hole
Casing:	None
Diameter:	0
Measuring :	0
Land surfa:	2415
Elev type:	Elevation Derived from Topo Map
Date drill:	06/04/1969
Total dept:	300
Bedrock de:	0
Top screen:	0
Bottom scr:	0
Longitude:	-102.11877
Latitude:	46.77666

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Site id: ND6000000023212

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Oil/Gas Well Information:

Map ID:	1		
Fid:	15710	File no:	10386
Api no:	33-059-00036-00-00	Operator:	AMOCO PRODUCTION CO.
Well name:	AMOCO KREIS 1		
Td:	8054	Spud date:	04-NOV-83
Field name:	WILDCAT	Qq:	NENE
Sec:	20	Twp:	139
Rng:	90	Feet ns:	595
Fnsl:	N	Feet ew:	820
Fewl:	E		
Latitude:	46.846423		
Longitude:	-102.057669		
Well type:	OG	Status:	DRY
Symbol:	DRY	Api:	33059000360000
Datecreate:	Not Reported	Datemodifi:	Not Reported
Scribe:	Not Reported	County:	MORTON
Site id:	NDOG60000015710		

Map ID:	2		
Fid:	27901	File no:	1620
Api no:	33-059-00007-00-00	Operator:	PAN AMERICAN PETROLEUM CORP.
Well name:	RAYMOND VETTER 1		
Td:	11210	Spud date:	30-NOV-57
Field name:	WILDCAT	Qq:	NESW
Sec:	27	Twp:	139
Rng:	90	Feet ns:	1980
Fnsl:	S	Feet ew:	1880
Fewl:	W		
Latitude:	46.824479		
Longitude:	-102.025482		
Well type:	OG	Status:	DRY
Symbol:	DRY	Api:	33059000070000
Datecreate:	Not Reported	Datemodifi:	Not Reported
Scribe:	Not Reported	County:	MORTON
Site id:	NDOG60000027901		

NORTH DAKOTA GOVERNMENT WELL RECORDS SEARCHED

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

Water Well Locations
Source: State Water Commission
Telephone: 701-328-2754

Oil and Gas Well Locations Listing
Source: North Dakota Industrial Commission
Telephone: 701-328-8020
A listing of oil and gas well locations in the state.

STREET AND ADDRESS INFORMATION

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APPENDIX D:

NRCS SOILS REPORT
(Provided on CD on inside of report cover)

United States Department of Agriculture

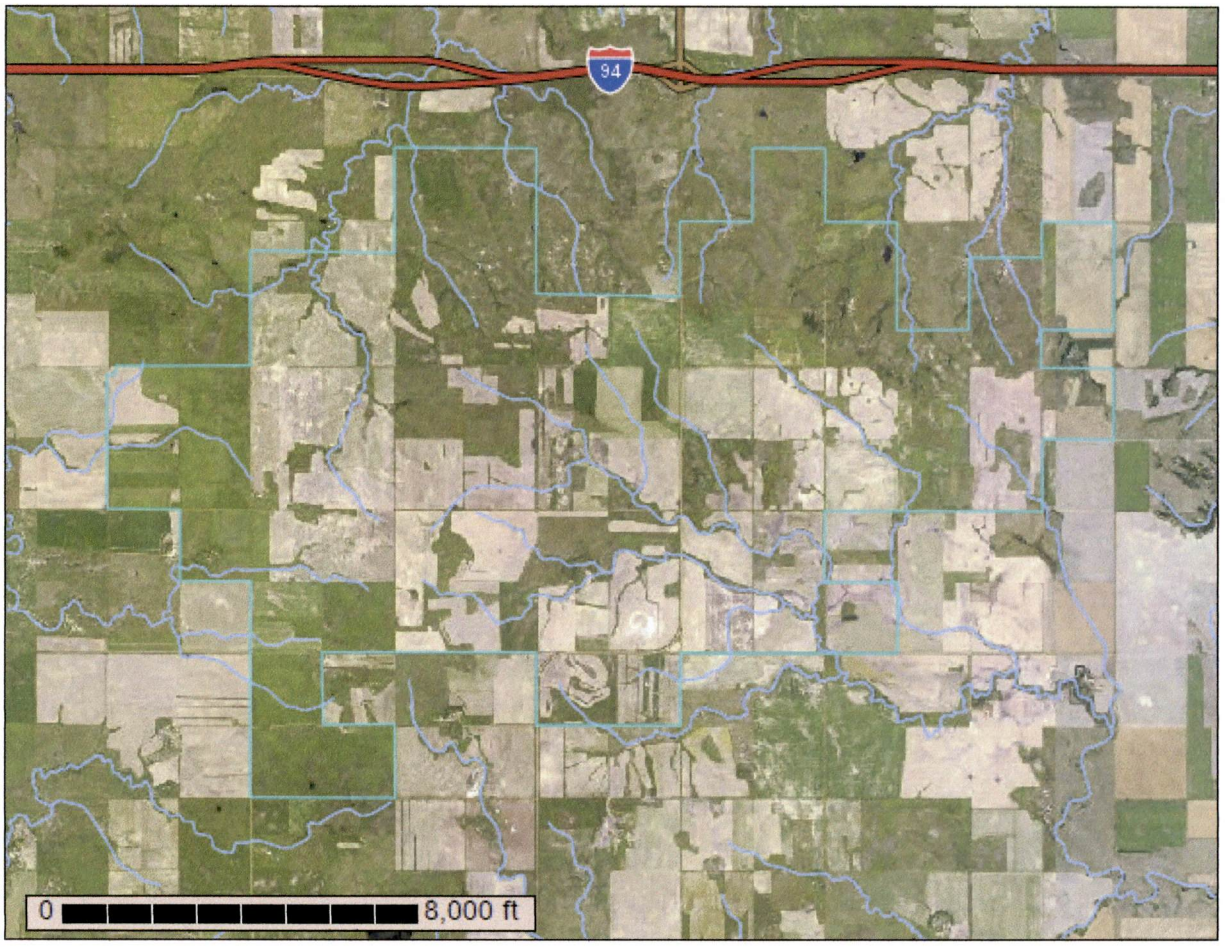
NRCS

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 Morton County, North Dakota, and Stark County, North Dakota

Sunflower Wind, LLC October 2016



October 20, 2016

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 (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

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

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

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

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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.

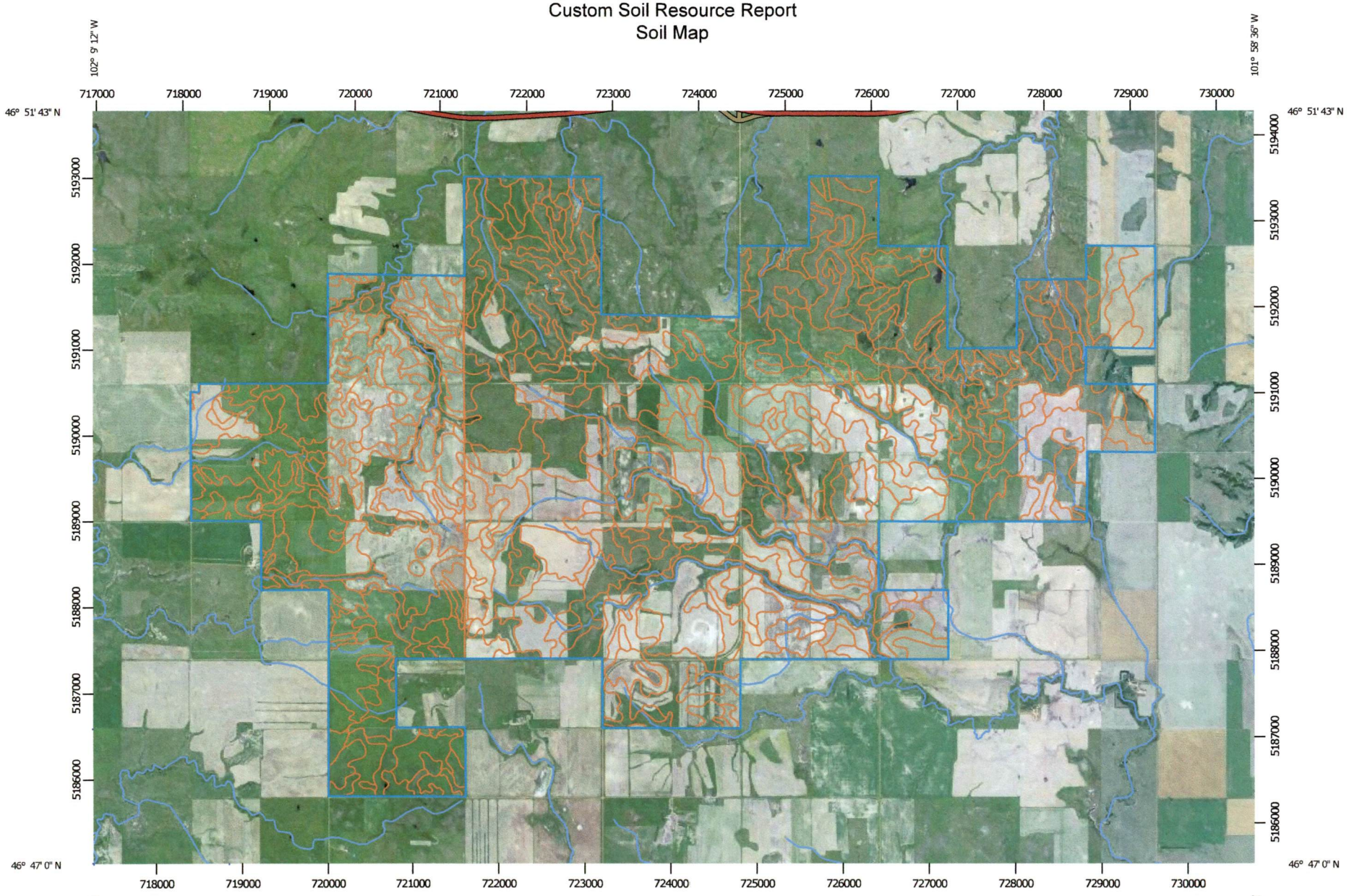
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree 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 Scale: 1:61,600 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 500 1000 2000 3000

Feet
0 2500 5000 10000 15000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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: Morton County, North Dakota
Survey Area Data: Version 18, Sep 25, 2015

Soil Survey Area: Stark County, North Dakota
Survey Area Data: Version 15, Sep 25, 2015

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

Date(s) aerial images were photographed: Jul 16, 2010—Jun 28, 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

Morton County, North Dakota (ND059)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
E0415A	Belfield-Daglum complex, 0 to 2 percent slopes	353.5	3.1%
E0454B	Daglum-Rhoades complex, 0 to 6 percent slopes	580.8	5.1%
E0454C	Daglum-Rhoades complex, 6 to 9 percent slopes	161.1	1.4%
E0457C	Rhoades-Daglum-Ekalaka fine sandy loams, 0 to 9 percent slopes	17.7	0.2%
E0541C	Rhoades-Daglum-Rhoades, severely eroded complex, 0 to 9 percent slopes	439.7	3.9%
E0559B	Dogtooth-Janesburg silt loams, 0 to 6 percent slopes	148.8	1.3%
E0605A	Belfield-Grail clay loams, 0 to 2 percent slopes	533.9	4.7%
E0617B	Belfield-Savage-Daglum complex, 2 to 6 percent slopes	206.7	1.8%
E0623B	Grail-Belfield clay loams, 2 to 6 percent slopes	57.0	0.5%
E0651B	Regent-Janesburg complex, 3 to 6 percent slopes	850.4	7.5%
E0651C	Regent-Janesburg complex, 6 to 9 percent slopes	201.2	1.8%
E0701F	Dogtooth-Janesburg-Cabba complex, 6 to 35 percent slopes	323.5	2.8%
E0727B	Barkof-Janesburg complex, 3 to 6 percent slopes	1.0	0.0%
E0727C	Barkof-Janesburg complex, 6 to 9 percent slopes	16.2	0.1%
E0811A	Grail silty clay loam, 0 to 2 percent slopes	0.6	0.0%
E0821A	Lawther silty clay, 0 to 2 percent slopes	53.3	0.5%
E0835A	Savage-Grail silty clay loams, 0 to 2 percent slopes	7.6	0.1%
E0837B	Savage silty clay loam, 2 to 6 percent slopes	102.8	0.9%
E0837C	Savage silty clay loam, 6 to 9 percent slopes	0.2	0.0%
E0913D	Moreau-Wayden silty clays, 9 to 15 percent slopes	65.8	0.6%
E1009B	Moreau-Barkof silty clays, 3 to 6 percent slopes	186.4	1.6%

Morton County, North Dakota (ND059)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
E1025B	Regent-Savage silty clay loams, 3 to 6 percent slopes	75.8	0.7%
E1227B	Desart-Ekalaka-Telfer complex, 0 to 6 percent slopes	9.7	0.1%
E1333C	Vebar-Cohagen fine sandy loams, 6 to 9 percent slopes	385.2	3.4%
E1355D	Vebar-Flasher-Tally complex, 9 to 15 percent slopes	124.0	1.1%
E1403D	Beisigl-Flasher-Telfer loamy fine sands, 6 to 15 percent slopes	444.7	3.9%
E1423F	Flasher-Vebar-Parshall complex, 9 to 35 percent slopes	373.2	3.3%
E1475F	Flasher-Rock outcrop-Vebar complex, 9 to 70 percent slopes	20.1	0.2%
E1601B	Beisigl-Lihen loamy fine sands, 0 to 6 percent slopes	54.1	0.5%
E1625A	Vebar-Parshall fine sandy loams, 0 to 3 percent slopes	21.3	0.2%
E1625B	Vebar-Parshall fine sandy loams, 3 to 6 percent slopes	117.6	1.0%
E1823A	Parshall fine sandy loam, 0 to 2 percent slopes	18.4	0.2%
E1865C	Tally-Parshall fine sandy loams, 6 to 9 percent slopes	11.1	0.1%
E2107A	Arnegard loam, 0 to 2 percent slopes	11.8	0.1%
E2145A	Shambo loam, 0 to 2 percent slopes	24.4	0.2%
E2601C	Amor-Cabba loams, 6 to 9 percent slopes	222.0	1.9%
E2601D	Amor-Cabba loams, 9 to 15 percent slopes	126.2	1.1%
E2617F	Cabba-Chama-Shambo loams, 9 to 50 percent slopes	396.5	3.5%
E2737C	Chama-Cabba-Sen silt loams, 6 to 9 percent slopes	650.7	5.7%
E2741D	Cabba-Chama-Sen silt loams, 9 to 15 percent slopes	461.3	4.0%
E2803B	Amor-Shambo loams, 3 to 6 percent slopes	85.1	0.7%
E2819B	Reeder-Farnuf loams, 3 to 6 percent slopes	18.6	0.2%
E2913B	Chama-Sen-Cabba silt loams, 3 to 6 percent slopes	32.3	0.3%
E2927B	Morton-Farland silt loams, 3 to 6 percent slopes	34.3	0.3%

Morton County, North Dakota (ND059)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
E2987B	Sen-Chama silt loams, 3 to 6 percent slopes	1.7	0.0%
E3011F	Brandenburg-Cabba-Savage complex, 6 to 70 percent slopes	62.0	0.5%
E3101F	Badland-Cabba complex, 9 to 70 percent slopes	30.6	0.3%
E4005A	Harriet loam, 0 to 2 percent slopes, occasionally flooded	87.4	0.8%
E4139A	Korchea-Fluvaquents complex, channeled, 0 to 2 percent slopes, frequently flooded	105.4	0.9%
E4180A	Korell-Daglum-Fluvaquents complex, channeled, 0 to 2 percent slopes, frequently flooded	2.9	0.0%
E4569F	Wabek-Cabba-Shambo complex, 6 to 35 percent slopes	29.7	0.3%
E4575A	Wanagan loam, 0 to 2 percent slopes	25.3	0.2%
Subtotals for Soil Survey Area		**8,371.5**	**73.4%**
Totals for Area of Interest		**11,409.7**	**100.0%**

Stark County, North Dakota (ND089)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
E0415A	Belfield-Daglum complex, 0 to 2 percent slopes	93.4	0.8%
E0454B	Daglum-Rhoades complex, 0 to 6 percent slopes	130.9	1.1%
E0515B	Rhoades-Daglum complex, 0 to 6 percent slopes	32.1	0.3%
E0605A	Belfield-Grail clay loams, 0 to 2 percent slopes	81.0	0.7%
E0609A	Belfield-Grail-Arnegard complex, saline, 0 to 2 percent slopes	0.8	0.0%
E0617B	Belfield-Savage-Daglum complex, 2 to 6 percent slopes	66.9	0.6%
E0634A	Lawther-Daglum complex, 0 to 2 percent slopes	133.2	1.2%
E0634B	Lawther-Daglum complex, 2 to 6 percent slopes	99.7	0.9%
E0651A	Regent-Janesburg complex, 0 to 3 percent slopes	42.3	0.4%
E0651B	Regent-Janesburg complex, 3 to 6 percent slopes	262.0	2.3%
E0651C	Regent-Janesburg complex, 6 to 9 percent slopes	101.8	0.9%

Stark County, North Dakota (ND089)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
E0727B	Barkof-Janesburg complex, 3 to 6 percent slopes	56.3	0.5%
E0727C	Barkof-Janesburg complex, 6 to 9 percent slopes	9.1	0.1%
E0811A	Grail silty clay loam, 0 to 2 percent slopes	28.6	0.3%
E0813B	Grail-Savage silty clay loams, 2 to 6 percent slopes	104.1	0.9%
E0821A	Lawther silty clay, 0 to 2 percent slopes	23.6	0.2%
E0821B	Lawther silty clay, 2 to 6 percent slopes	77.4	0.7%
E0837C	Savage silty clay loam, 6 to 9 percent slopes	12.9	0.1%
E0913C	Moreau-Wayden silty clays, 6 to 9 percent slopes	146.6	1.3%
E1009A	Moreau-Barkof silty clays, 0 to 3 percent slopes	0.5	0.0%
E1009B	Moreau-Barkof silty clays, 3 to 6 percent slopes	199.0	1.7%
E1025A	Regent-Savage silty clay loams, 0 to 3 percent slopes	8.9	0.1%
E1025B	Regent-Savage silty clay loams, 3 to 6 percent slopes	69.2	0.6%
E1333C	Vebar-Cohagen fine sandy loams, 6 to 9 percent slopes	17.6	0.2%
E2203B	Farland silt loam, 2 to 6 percent slopes	5.2	0.0%
E2439C	Sen-Janesburg silt loams, 6 to 9 percent slopes	16.9	0.1%
E2601C	Amor-Cabba loams, 6 to 9 percent slopes	11.6	0.1%
E2601D	Amor-Cabba loams, 9 to 15 percent slopes	17.6	0.2%
E2617F	Cabba-Chama-Shambo loams, 9 to 50 percent slopes	145.3	1.3%
E2737C	Chama-Cabba-Sen silt loams, 6 to 9 percent slopes	328.6	2.9%
E2741D	Cabba-Chama-Sen silt loams, 9 to 15 percent slopes	437.3	3.8%
E2801A	Amor-Arnegard loams, 0 to 3 percent slopes	13.6	0.1%
E2803B	Amor-Shambo loams, 3 to 6 percent slopes	32.4	0.3%
E2913B	Chama-Sen-Cabba silt loams, 3 to 6 percent slopes	54.5	0.5%
E2927B	Morton-Farland silt loams, 3 to 6 percent slopes	16.7	0.1%

Stark County, North Dakota (ND089)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
E3003E	Amor-Brandenburg complex, 3 to 25 percent slopes	2.6	0.0%
E3021F	Dogtooth-Janesburg-Brandenburg complex, 9 to 35 percent slopes	27.4	0.2%
E4139A	Korchea-Fluvaquents complex, channeled, 0 to 2 percent slopes, frequently flooded	27.9	0.2%
E4180A	Korell-Daglum-Fluvaquents complex, channeled, 0 to 2 percent slopes, frequently flooded	102.6	0.9%
Subtotals for Soil Survey Area		**3,038.2**	**26.6%**
Totals for Area of Interest		**11,409.7**	**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.

Morton County, North Dakota

E0415A—Belfield-Daglum complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1vzr1
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Belfield and similar soils: 45 percent
Daglum and similar soils: 32 percent
Minor components: 23 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Belfield

Setting

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

Typical profile

Ap - 0 to 9 inches: silt loam
E/B - 9 to 12 inches: silty clay loam
Btn1 - 12 to 17 inches: silty clay
Btn2 - 17 to 24 inches: silty clay loam
Bk - 24 to 43 inches: silty clay loam
C - 43 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: 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 42 to 60 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: Slightly saline to moderately saline (5.0 to 15.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: C

Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Description of Daglum

Setting

Landform: Alluvial flats
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Clayey alluvium

Typical profile

Ap - 0 to 7 inches: clay loam
E - 7 to 8 inches: silt loam
Btn - 8 to 18 inches: clay
Bky - 18 to 32 inches: clay loam
BCk - 32 to 47 inches: clay loam
C - 47 to 60 inches: clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 4 to 20 inches to natric
Natural drainage class: Moderately well drained
Runoff class: 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: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Gypsum, maximum in profile: 10 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Very low (about 1.3 inches)

Interpretive groups

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

Minor Components

Daglum

Percent of map unit: 8 percent
Landform: Alluvial flats
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: Claypan (R054XY021ND)
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

Savage

Percent of map unit: 5 percent
Landform: Alluvial flats
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Grail

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

Rhoades

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

Regent

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

E0454B—Daglum-Rhoades complex, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2r4g8
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Daglum and similar soils: 48 percent
Rhoades and similar soils: 35 percent

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

Description of Daglum

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 shale and siltstone

Typical profile

Ap - 0 to 7 inches: silt loam
E - 7 to 8 inches: silt loam
Btn - 8 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: 6 to 10 inches to natric
Natural 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 in profile: 25 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 25.0
Available water storage in profile: Very low (about 1.7 inches)

Interpretive groups

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

Description of Rhoades

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope
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

Ap - 0 to 5 inches: clay loam
Btn - 5 to 10 inches: clay loam
Btknyz - 10 to 14 inches: clay loam
Bky - 14 to 46 inches: clay loam
C - 46 to 79 inches: clay

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: 3 to 6 inches to natric
Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 25.0
Available water storage in profile: Very low (about 0.9 inches)

Interpretive groups

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

Minor Components

Belfield

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Savage

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: Convex
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
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: Convex
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

E0454C—Daglum-Rhoades complex, 6 to 9 percent slopes

Map Unit Setting

National map unit symbol: cdp5
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Daglum and similar soils: 48 percent
Rhoades and similar soils: 35 percent
Minor components: 17 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Daglum

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 shale and siltstone

Typical profile

A - 0 to 3 inches: loam
E - 3 to 4 inches: loam
Btn - 4 to 18 inches: clay loam
Btnky - 18 to 31 inches: clay loam
BCky - 31 to 41 inches: clay loam
C - 41 to 52 inches: clay
Cr - 52 to 79 inches: bedrock

Properties and qualities

Slope: 6 to 9 percent

Depth to restrictive feature: 2 to 8 inches to natric; 39 to 60 inches to paralithic bedrock
Natural 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 in profile: 25 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 25.0
Available water storage in profile: Very low (about 0.9 inches)

Interpretive groups

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

Description of Rhoades

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope
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: clay loam
Btknyz - 7 to 13 inches: clay loam
Bky - 13 to 39 inches: clay loam
C - 39 to 48 inches: clay
Cr - 48 to 79 inches: bedrock

Properties and qualities

Slope: 6 to 9 percent
Depth to restrictive feature: 1 to 4 inches to natric; 39 to 60 inches to paralithic bedrock
Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent

Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 25.0
Available water storage in profile: 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: Thin Claypan (R054XY033ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Minor Components

Barkof

Percent of map unit: 7 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Savage

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: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Belfield

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

Cabba

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: Shallow Loamy (R054XY030ND)
Other vegetative classification: Not suited (G054XY000ND)

Hydric soil rating: No

E0457C—Rhoades-Daglum-Ekalaka fine sandy loams, 0 to 9 percent slopes

Map Unit Setting

National map unit symbol: cdp6
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Rhoades and similar soils: 35 percent
Daglum and similar soils: 31 percent
Ekalaka and similar soils: 18 percent
Minor components: 16 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rhoades

Setting

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

Typical profile

E - 0 to 3 inches: fine sandy loam
Btn - 3 to 8 inches: silty clay
Btknyz - 8 to 14 inches: silty clay
Bky - 14 to 46 inches: silty clay
C - 46 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: 1 to 5 inches to natric
Natural drainage class: Moderately 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: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Slightly saline to moderately saline (5.0 to 15.0 mmhos/cm)

Sodium adsorption ratio, maximum in profile: 25.0
Available water storage in profile: Very low (about 0.5 inches)

Interpretive groups

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

Description of Daglum

Setting

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

Typical profile

A - 0 to 7 inches: fine sandy loam
E - 7 to 8 inches: silt loam
Btn - 8 to 18 inches: clay
Bky - 18 to 32 inches: clay loam
BCk - 32 to 47 inches: clay loam
C - 47 to 60 inches: clay

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: 4 to 20 inches to natric
Natural drainage class: Moderately 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: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Slightly saline to moderately saline (5.0 to 15.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Very low (about 1.3 inches)

Interpretive groups

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

Description of Ekalaka

Setting

Landform: Alluvial fans, alluvial flats, ridges, hills
Landform position (two-dimensional): Footslope

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

Typical profile

Ap - 0 to 6 inches: fine sandy loam
E - 6 to 12 inches: fine sandy loam
Btn - 12 to 17 inches: fine sandy loam
Bz - 17 to 33 inches: fine sandy loam
C - 33 to 60 inches: loamy fine sand

Properties and qualities

Slope: 0 to 9 percent
Depth to restrictive feature: 5 to 20 inches to natric
Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Slightly saline to strongly saline (4.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 30.0
Available water storage in profile: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: Sandy Claypan (R054XY027ND)
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

Minor Components

Desart

Percent of map unit: 7 percent
Landform: Alluvial fans, alluvial flats
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Sandy (R054XY026ND)
Other vegetative classification: Very Droughty Loam (G054XY130ND)
Hydric soil rating: No

Glenross, occasionally flooded

Percent of map unit: 4 percent
Landform: Drainageways on flood plains on river valleys
Landform position (two-dimensional): Toeslope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Saline Lowland (R054XY024ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: Yes

Banks, occasionally flooded

Percent of map unit: 3 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Sands (R054XY025ND)
Other vegetative classification: Sand (G054XY300ND)
Hydric soil rating: No

Rhoades, barren

Percent of map unit: 2 percent
Landform: Alluvial fans, alluvial flats
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: Non-site (R054XY999ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

E0541C—Rhoades-Daglum-Rhoades, severely eroded complex, 0 to 9 percent slopes

Map Unit Setting

National map unit symbol: d1xx
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Rhoades and similar soils: 38 percent
Daglum and similar soils: 22 percent
Rhoades, severely eroded, and similar soils: 20 percent
Rhoades, moderately sloping, and similar soils: 12 percent
Minor components: 8 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rhoades

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 and shale

Typical profile

E - 0 to 3 inches: loam
Btn - 3 to 8 inches: clay loam
Btknyz - 8 to 14 inches: clay loam
Bky - 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
Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 25.0
Available water storage in profile: 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: Thin Claypan (R054XY033ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Description of Daglum

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 sandstone and shale

Typical profile

A - 0 to 3 inches: loam
E - 3 to 5 inches: loam
Btn - 5 to 18 inches: clay loam
Btnky - 18 to 32 inches: clay loam
BCky - 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
Natural 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 in profile: 25 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 25.0
Available water storage in profile: Very low (about 0.9 inches)

Interpretive groups

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

Description of Rhoades, Severely Eroded

Setting

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

Typical profile

E - 0 to 0 inches: loam
Btn - 0 to 6 inches: clay loam
Btnkyz - 6 to 13 inches: clay loam
Bkyz - 13 to 44 inches: clay loam
C - 44 to 79 inches: clay loam

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: 0 to 1 inches to natric
Natural 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 in profile: 25 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 30.0
Available water storage in profile: Very low (about 0.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s

Hydrologic Soil Group: D
Ecological site: Non-site (R054XY999ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Description of Rhoades, Moderately Sloping

Setting

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

Typical profile

E - 0 to 2 inches: loam
Btn - 2 to 7 inches: clay loam
Btknyz - 7 to 13 inches: clay loam
Bky - 13 to 39 inches: clay loam
C - 39 to 48 inches: clay
Cr - 48 to 79 inches: bedrock

Properties and qualities

Slope: 6 to 9 percent
Depth to restrictive feature: 1 to 4 inches to natric; 39 to 79 inches to paralithic bedrock
Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 25.0
Available water storage in profile: 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: Thin Claypan (R054XY033ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Minor Components

Belfield

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: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Harriet, occasionally flooded

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: Saline Lowland (R054XY024ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: Yes

E0559B—Dogtooth-Janesburg silt loams, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2r4gh
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Dogtooth and similar soils: 58 percent
Janesburg and similar soils: 32 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dogtooth

Setting

Landform: Pediments
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Clayey residuum weathered from shale

Typical profile

E - 0 to 2 inches: silt loam
Btn - 2 to 8 inches: silty clay
Btkn - 8 to 13 inches: silty clay
Bky - 13 to 21 inches: silty clay
Cr - 21 to 60 inches: bedrock

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: 2 to 4 inches to natric; 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Slightly saline to strongly saline (5.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 25.0
Available water storage in profile: 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: Thin Claypan (R054XY033ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Description of Janesburg

Setting

Landform: Pediments
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Clayey residuum weathered from shale

Typical profile

Ap - 0 to 8 inches: silt loam
E - 8 to 10 inches: silt loam
Btn - 10 to 21 inches: silty clay
BCk - 21 to 26 inches: silt loam
Cr - 26 to 60 inches: bedrock

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: 2 to 13 inches to natric; 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Slightly saline to moderately saline (5.0 to 15.0 mmhos/cm)

Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: 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: Claypan (R054XY021ND)
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

Minor Components

Dogtooth, barren

Percent of map unit: 2 percent
Landform: Pediments
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: Non-site (R054XY999ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Regent

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

Chama

Percent of map unit: 2 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Thin Loamy (R054XY038ND)
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

Wayden

Percent of map unit: 2 percent
Landform: Ridges, rises on pediments
Landform position (two-dimensional): Shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Shallow Clayey (R054XY028ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Savage

Percent of map unit: 2 percent
Landform: Alluvial flats
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)

Hydric soil rating: No

E0605A—Belfield-Grail clay loams, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2r4h0
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Belfield and similar soils: 50 percent
Grail and similar soils: 26 percent
Minor components: 24 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Belfield

Setting

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

Typical profile

Ap - 0 to 9 inches: clay loam
E/B - 9 to 12 inches: silty clay loam
Btn1 - 12 to 17 inches: silty clay
Btn2 - 17 to 24 inches: silty clay loam
Bk - 24 to 43 inches: silty clay loam
C - 43 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: 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 42 to 60 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: Slightly saline to moderately saline (5.0 to 15.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0

Available water storage in profile: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Description of Grail

Setting

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

Typical profile

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

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.14 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: High (about 10.4 inches)

Interpretive groups

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

Minor Components

Savage

Percent of map unit: 10 percent
Landform: Alluvial flats
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)

Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Daglum

Percent of map unit: 6 percent
Landform: Alluvial flats
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: Claypan (R054XY021ND)
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

Arnegard

Percent of map unit: 4 percent
Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Loamy Overflow (R054XY023ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Regent

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

Lawther

Percent of map unit: 2 percent
Landform: Alluvial flats
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

E0617B—Belfield-Savage-Daglum complex, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2r4h1
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Belfield and similar soils: 32 percent
Savage and similar soils: 28 percent
Daglum and similar soils: 18 percent
Minor components: 22 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Belfield

Setting

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

Typical profile

Ap - 0 to 9 inches: silt loam
E/B - 9 to 12 inches: silty clay loam
Btn1 - 12 to 17 inches: silty clay
Btn2 - 17 to 24 inches: silty clay loam
Bk - 24 to 43 inches: silty clay loam
C - 43 to 60 inches: clay loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.14 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Slightly saline to moderately saline (5.0 to 15.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Description of Savage

Setting

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

Typical profile

Ap - 0 to 7 inches: silty clay loam
Bt - 7 to 25 inches: silty clay
Bk - 25 to 51 inches: silty clay loam
C - 51 to 80 inches: silty clay loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: High (about 11.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Description of Daglum

Setting

Landform: Alluvial fans
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Clayey alluvium

Typical profile

Ap - 0 to 7 inches: clay loam
E - 7 to 8 inches: silt loam
Btn - 8 to 18 inches: clay
Bky - 18 to 32 inches: clay loam
BCk - 32 to 47 inches: clay loam
C - 47 to 60 inches: clay

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: 4 to 20 inches to natric
Natural drainage class: Moderately 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: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent

Gypsum, maximum in profile: 10 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Very low (about 1.3 inches)

Interpretive groups

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

Minor Components

Regent

Percent of map unit: 8 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Farnuf

Percent of map unit: 8 percent
Landform: Alluvial fans, terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Rhoades

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

Grail

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

E0623B—Grail-Belfield clay loams, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: d1xg
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Grail and similar soils: 33 percent
Belfield and similar soils: 33 percent
Minor components: 34 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Grail

Setting

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

Typical profile

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

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.01 to 1.42 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Description of Belfield

Setting

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

Typical profile

Ap - 0 to 9 inches: clay loam
E/B - 9 to 12 inches: clay loam
Btn1 - 12 to 17 inches: silty clay
Btn2 - 17 to 24 inches: silty clay loam
Bk - 24 to 43 inches: silty clay loam
C - 43 to 60 inches: clay loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.01 to 1.42 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Slightly saline to moderately saline (5.0 to 15.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Minor Components

Savage

Percent of map unit: 11 percent
Landform: Alluvial fans
Down-slope shape: Convex
Across-slope shape: Linear

Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Farnuf

Percent of map unit: 10 percent
Landform: Alluvial fans, terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Daglum

Percent of map unit: 10 percent
Landform: Alluvial fans
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: Claypan (R054XY021ND)
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

Regent

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

E0651B—Regent-Janesburg complex, 3 to 6 percent slopes

Map Unit Setting

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

Map Unit Composition

Regent and similar soils: 38 percent
Janesburg and similar soils: 28 percent
Minor components: 34 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Regent

Setting

Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from shale

Typical profile

Ap - 0 to 10 inches: silty clay loam
Bt - 10 to 26 inches: silty clay
Bk - 26 to 39 inches: silty clay loam
Cr - 39 to 60 inches: bedrock

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to moderately saline (0.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Description of Janesburg

Setting

Landform: Pediments
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Clayey residuum weathered from shale

Typical profile

Ap - 0 to 8 inches: silt loam
E - 8 to 10 inches: silt loam
Btn - 10 to 21 inches: silty clay
BCk - 21 to 26 inches: silt loam
Cr - 26 to 60 inches: bedrock

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: 2 to 13 inches to natric; 20 to 40 inches to paralithic bedrock

Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Slightly saline to moderately saline (5.0 to 15.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: 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: Claypan (R054XY021ND)
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

Minor Components

Reeder

Percent of map unit: 10 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Droughty Loam (G054XY120ND)
Hydric soil rating: No

Dogtooth

Percent of map unit: 9 percent
Landform: Pediments
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: Thin Claypan (R054XY033ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Belfield

Percent of map unit: 7 percent
Landform: Flats
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Barkof

Percent of map unit: 5 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Clayey (R054XY020ND)

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

Savage

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

E0651C—Regent-Janesburg complex, 6 to 9 percent slopes

Map Unit Setting

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

Map Unit Composition

Regent, moderately sloping, and similar soils: 36 percent
Janesburg and similar soils: 32 percent
Minor components: 32 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Regent, Moderately Sloping

Setting

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

Typical profile

Ap - 0 to 10 inches: silty clay loam
Bt - 10 to 26 inches: silty clay
Bk - 26 to 39 inches: silty clay loam
Cr - 39 to 60 inches: bedrock

Properties and qualities

Slope: 6 to 9 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to moderately saline (0.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Description of Janesburg

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey residuum weathered from shale

Typical profile

Ap - 0 to 8 inches: silt loam
E - 8 to 10 inches: silt loam
Btn - 10 to 21 inches: silty clay
BCk - 21 to 26 inches: silt loam
Cr - 26 to 60 inches: bedrock

Properties and qualities

Slope: 6 to 9 percent
Depth to restrictive feature: 2 to 13 inches to natric; 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Slightly saline to moderately saline (5.0 to 15.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Very low (about 2.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: Claypan (R054XY021ND)
Other vegetative classification: Claypan (G054XY800ND)

Hydric soil rating: No

Minor Components

Regent, gently sloping

Percent of map unit: 10 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Savage

Percent of map unit: 8 percent
Landform: Alluvial fans
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Dogtooth

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

Barkof

Percent of map unit: 4 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Chama

Percent of map unit: 3 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Thin Loamy (R054XY038ND)
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

Wayden

Percent of map unit: 2 percent
Landform: Ridges, rises on pediments
Landform position (two-dimensional): Shoulder
Down-slope shape: Convex
Across-slope shape: Convex

Ecological site: Shallow Clayey (R054XY028ND)
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: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

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: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Clayey residuum weathered from shale

Typical profile

E - 0 to 2 inches: silt loam
Btn - 2 to 8 inches: silty clay
Btkn - 8 to 13 inches: silty clay
Bky - 13 to 21 inches: silty clay
Cr - 21 to 60 inches: bedrock

Properties and qualities

Slope: 6 to 25 percent
Depth to restrictive feature: 2 to 4 inches to natric; 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 15 percent

Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Slightly saline to strongly saline (5.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 25.0
Available water storage in profile: 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: Thin Claypan (R054XY033ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Description of Janesburg

Setting

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

Typical profile

A - 0 to 8 inches: silt loam
E - 8 to 10 inches: silt loam
Btn - 10 to 21 inches: silty clay
BCk - 21 to 26 inches: silt loam
Cr - 26 to 60 inches: bedrock

Properties and qualities

Slope: 6 to 25 percent
Depth to restrictive feature: 2 to 13 inches to natric; 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Slightly saline to moderately saline (5.0 to 15.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Very low (about 2.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: Claypan (R054XY021ND)
Other vegetative classification: Claypan (G054XY800ND)
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 35 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (1.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: 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: Shallow Loamy (R054XY030ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Minor Components

Barkof

Percent of map unit: 7 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Not suited (G054XY000ND)
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: Loamy (R054XY031ND)

Other vegetative classification: Droughty Loam (G054XY120ND)
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: Thin Loamy (R054XY038ND)
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

Harriet, occasionally flooded

Percent of map unit: 3 percent
Landform: Alluvial flats, drainageways
Down-slope shape: Linear
Across-slope shape: Linear, concave
Ecological site: Saline Lowland (R054XY024ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: Yes

E0727B—Barkof-Janesburg complex, 3 to 6 percent slopes

Map Unit Setting

National map unit symbol: 1vzs1
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Barkof and similar soils: 40 percent
Janesburg and similar soils: 27 percent
Minor components: 33 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Barkof

Setting

Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from shale

Typical profile

Ap - 0 to 7 inches: silty clay

Bss - 7 to 24 inches: silty clay
BC - 24 to 28 inches: silty clay
Cr - 28 to 60 inches: bedrock

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 20 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Very slightly saline to strongly saline (2.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: D
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Description of Janesburg

Setting

Landform: Pediments
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Clayey residuum weathered from shale

Typical profile

Ap - 0 to 8 inches: silty clay loam
E - 8 to 10 inches: silt loam
Btn - 10 to 21 inches: silty clay
BCk - 21 to 26 inches: silt loam
Cr - 26 to 60 inches: bedrock

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: 2 to 13 inches to natric; 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent

Salinity, maximum in profile: Slightly saline to moderately saline (5.0 to 15.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Very low (about 2.0 inches)

Interpretive groups

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

Minor Components

Regent

Percent of map unit: 9 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Dogtooth

Percent of map unit: 8 percent
Landform: Pediments
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: Thin Claypan (R054XY033ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Wayden

Percent of map unit: 7 percent
Landform: Rises on pediments
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Shallow Clayey (R054XY028ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Lawther

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

Savage

Percent of map unit: 4 percent
Landform: Alluvial fans
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)

Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

E0727C—Barkof-Janesburg complex, 6 to 9 percent slopes

Map Unit Setting

National map unit symbol: 1vzs2
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Barkof and similar soils: 38 percent
Janesburg and similar soils: 25 percent
Minor components: 37 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Barkof

Setting

Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from shale

Typical profile

Ap - 0 to 7 inches: silty clay
Bss - 7 to 24 inches: silty clay
BC - 24 to 28 inches: silty clay
Cr - 28 to 60 inches: bedrock

Properties and qualities

Slope: 6 to 9 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 20 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Very slightly saline to strongly saline (2.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Description of Janesburg

Setting

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

Typical profile

Ap - 0 to 8 inches: silty clay loam
E - 8 to 10 inches: silt loam
Btn - 10 to 21 inches: silty clay
BCk - 21 to 26 inches: silt loam
Cr - 26 to 60 inches: bedrock

Properties and qualities

Slope: 6 to 9 percent
Depth to restrictive feature: 2 to 13 inches to natric; 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Slightly saline to moderately saline (5.0 to 15.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Very low (about 2.0 inches)

Interpretive groups

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

Minor Components

Wayden

Percent of map unit: 12 percent
Landform: Ridges, rises on pediments
Landform position (two-dimensional): Shoulder

Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Shallow Clayey (R054XY028ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Regent

Percent of map unit: 11 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Dogtooth

Percent of map unit: 9 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: Thin Claypan (R054XY033ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Savage

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

Lawther

Percent of map unit: 2 percent
Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

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

Map Unit Setting

National map unit symbol: 1vzs4
Elevation: 1,650 to 3,600 feet

Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: All areas are prime farmland

Map Unit Composition

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

Description of Grail

Setting

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

Typical profile

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

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.01 to 1.42 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: High (about 10.6 inches)

Interpretive groups

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

Minor Components

Savage

Percent of map unit: 11 percent
Landform: Alluvial flats
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)

Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Belfield

Percent of map unit: 9 percent
Landform: Flats
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Grail

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

Lawther

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

Farland

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

Regent

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

E0821A—Lawther silty clay, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1vzs6
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Lawther and similar soils: 77 percent
Minor components: 23 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lawther

Setting

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

Typical profile

Ap - 0 to 4 inches: silty clay
A - 4 to 10 inches: silty clay
Bss - 10 to 33 inches: silty clay
Bk - 33 to 47 inches: silty clay
C - 47 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (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 in profile: 15 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Minor Components

Savage
Percent of map unit: 11 percent
Landform: Alluvial flats
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Moreau
Percent of map unit: 5 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Belfield
Percent of map unit: 4 percent
Landform: Flats
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Daglum
Percent of map unit: 3 percent
Landform: Alluvial flats
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: Claypan (R054XY021ND)
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

E0835A—Savage-Grail silty clay loams, 0 to 2 percent slopes

Map Unit Setting
National map unit symbol: 1vzs8
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Savage and similar soils: 62 percent
Grail and similar soils: 18 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Savage

Setting

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

Typical profile

Ap - 0 to 7 inches: silty clay loam
Bt - 7 to 25 inches: silty clay
Bk - 25 to 51 inches: silty clay loam
C - 51 to 80 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.01 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: High (about 11.0 inches)

Interpretive groups

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

Description of Grail

Setting

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

Typical profile

Ap - 0 to 5 inches: silty clay loam
A - 5 to 10 inches: silty clay loam
Bt - 10 to 24 inches: silty clay

Bk - 24 to 52 inches: silty clay loam
C - 52 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.01 to 1.42 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: High (about 10.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2c
Hydrologic Soil Group: C
Ecological site: Loamy Overflow (R054XY023ND)
Other vegetative classification: Overflow (G054XY500ND)
Hydric soil rating: No

Minor Components

Belfield

Percent of map unit: 8 percent
Landform: Flats
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Farland

Percent of map unit: 5 percent
Landform: Alluvial flats
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Regent

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

Daglum

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

Lawther

Percent of map unit: 2 percent
Landform: Alluvial flats
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

E0837B—Savage silty clay loam, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 1vzs9
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Savage and similar soils: 70 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Savage

Setting

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

Typical profile

Ap - 0 to 7 inches: silty clay loam
Bt - 7 to 25 inches: silty clay
Bk - 25 to 51 inches: silty clay loam
C - 51 to 80 inches: silty clay loam

Properties and qualities

Slope: 2 to 6 percent

Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.01 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: High (about 11.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Minor Components

Grail

Percent of map unit: 10 percent
Landform: Swales
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Loamy Overflow (R054XY023ND)
Other vegetative classification: Overflow (G054XY500ND)
Hydric soil rating: No

Farland

Percent of map unit: 7 percent
Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Shambo

Percent of map unit: 5 percent
Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Regent

Percent of map unit: 3 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)

Hydric soil rating: No

Daglum

Percent of map unit: 3 percent
Landform: Alluvial fans
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: Claypan (R054XY021ND)
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

Amor

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

E0837C—Savage silty clay loam, 6 to 9 percent slopes

Map Unit Setting

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

Map Unit Composition

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

Description of Savage

Setting

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

Typical profile

Ap - 0 to 7 inches: silty clay loam
Bt - 7 to 25 inches: silty clay
Bk - 25 to 51 inches: silty clay loam
C - 51 to 80 inches: silty clay loam

Properties and qualities

Slope: 6 to 9 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.01 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: High (about 11.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Minor Components

Farland

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

Regent

Percent of map unit: 6 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Daglum

Percent of map unit: 6 percent
Landform: Ridges, hills
Landform position (two-dimensional): Footslope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Claypan (R054XY021ND)
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

Reeder

Percent of map unit: 5 percent

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

Grail

Percent of map unit: 4 percent
Landform: Swales
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Loamy Overflow (R054XY023ND)
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: Thin Loamy (R054XY038ND)
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

E0913D—Moreau-Wayden silty clays, 9 to 15 percent slopes

Map Unit Setting

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

Map Unit Composition

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

Description of Moreau

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear

Parent material: Clayey residuum weathered from calcareous shale

Typical profile

A - 0 to 6 inches: silty clay
Bw - 6 to 13 inches: silty clay
Bk - 13 to 35 inches: silty clay
Cr - 35 to 60 inches: bedrock

Properties and qualities

Slope: 9 to 15 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 20 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Description of Wayden

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from shale

Typical profile

A - 0 to 3 inches: silty clay
Bk - 3 to 7 inches: silty clay
By - 7 to 15 inches: silty clay
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
Natural 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 in profile: 30 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Very slightly saline to strongly saline (2.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: Shallow Clayey (R054XY028ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Minor Components

Regent

Percent of map unit: 10 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Janesburg

Percent of map unit: 8 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: Claypan (R054XY021ND)
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

Cabba

Percent of map unit: 7 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Shallow Loamy (R054XY030ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Reeder

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Droughty Loam (G054XY120ND)
Hydric soil rating: No

Lawther

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

E1009B—Moreau-Barkof silty clays, 3 to 6 percent slopes

Map Unit Setting

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

Map Unit Composition

Moreau and similar soils: 53 percent
Barkof and similar soils: 16 percent
Minor components: 31 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Moreau

Setting

Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from calcareous shale

Typical profile

Ap - 0 to 6 inches: silty clay
Bw - 6 to 13 inches: silty clay
Bk - 13 to 35 inches: silty clay
Cr - 35 to 60 inches: bedrock

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 20 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Description of Barkof

Setting

Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from shale

Typical profile

Ap - 0 to 7 inches: silty clay
Bss - 7 to 24 inches: silty clay
BC - 24 to 28 inches: silty clay
Cr - 28 to 60 inches: bedrock

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 20 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Very slightly saline to strongly saline (2.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: D
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Minor Components

Lawther

Percent of map unit: 9 percent
Landform: Alluvial fans, alluvial flats
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Wayden

Percent of map unit: 7 percent
Landform: Ridges, rises on pediments
Landform position (two-dimensional): Shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Shallow Clayey (R054XY028ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Regent

Percent of map unit: 7 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Janesburg

Percent of map unit: 5 percent
Landform: Pediments
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: Claypan (R054XY021ND)
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

Savage

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

E1025B—Regent-Savage silty clay loams, 3 to 6 percent slopes

Map Unit Setting

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

Map Unit Composition

Regent and similar soils: 68 percent
Savage and similar soils: 16 percent
Minor components: 16 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Regent

Setting

Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from shale

Typical profile

Ap - 0 to 10 inches: silty clay loam
Bt - 10 to 26 inches: silty clay
Bk - 26 to 39 inches: silty clay loam
Cr - 39 to 60 inches: bedrock

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to moderately saline (0.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Description of Savage

Setting

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

Typical profile

Ap - 0 to 7 inches: silty clay loam
Bt - 7 to 25 inches: silty clay
Bk - 25 to 51 inches: silty clay loam
C - 51 to 80 inches: silty clay loam

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: High (about 11.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Minor Components

Moreau

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

Grail

Percent of map unit: 4 percent
Landform: Swales
Down-slope shape: Linear

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

Cabba

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

Janesburg

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

Chama

Percent of map unit: 2 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Thin Loamy (R054XY038ND)
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

E1227B—Desart-Ekalaka-Telfer complex, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: cdk7
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Desart and similar soils: 43 percent
Ekalaka and similar soils: 25 percent
Telfer and similar soils: 15 percent
Minor components: 17 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Desart

Setting

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

Typical profile

A - 0 to 20 inches: fine sandy loam
E - 20 to 24 inches: loamy fine sand
Btn - 24 to 31 inches: fine sandy loam
C - 31 to 60 inches: loamy fine sand

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: 20 to 30 inches to natric
Natural 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 in profile: 5 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Slightly saline to strongly saline (4.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 25.0
Available water storage in profile: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: C
Ecological site: Sandy (R054XY026ND)
Other vegetative classification: Very Droughty Loam (G054XY130ND)
Hydric soil rating: No

Description of Ekalaka

Setting

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

Typical profile

Ap - 0 to 6 inches: fine sandy loam
E - 6 to 12 inches: fine sandy loam
Btn - 12 to 17 inches: fine sandy loam
Bz - 17 to 33 inches: fine sandy loam
C - 33 to 60 inches: loamy fine sand

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: 5 to 20 inches to natric

Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Slightly saline to strongly saline (4.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 30.0
Available water storage in profile: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: C
Ecological site: Sandy Claypan (R054XY027ND)
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

Description of Telfer

Setting

Landform: Alluvial fans, alluvial flats
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: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural 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 in profile: 3 percent
Available water storage in profile: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: Sands (R054XY025ND)
Other vegetative classification: Sand (G054XY300ND)
Hydric soil rating: No

Minor Components

Parshall

Percent of map unit: 6 percent
Landform: Swales
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Loamy Overflow (R054XY023ND)
Other vegetative classification: Overflow (G054XY500ND)
Hydric soil rating: No

Lihen

Percent of map unit: 5 percent
Landform: Alluvial fans, alluvial flats
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Sands (R054XY025ND)
Other vegetative classification: Sand (G054XY300ND)
Hydric soil rating: No

Lakota

Percent of map unit: 4 percent
Landform: Pediments
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: Thin Claypan (R054XY033ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Daglum

Percent of map unit: 2 percent
Landform: Alluvial fans, alluvial flats
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: Claypan (R054XY021ND)
Other vegetative classification: Claypan (G054XY800ND)
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: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

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
Natural 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 in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: Sandy (R054XY026ND)
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 5 inches: fine sandy loam
C - 5 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
Natural 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 in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: 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: Shallow Sandy (R054XY043ND)
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: Sandy (R054XY026ND)
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: Limy Sands (R054XY045ND)
Other vegetative classification: Sand (G054XY300ND)
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: Loamy (R054XY031ND)
Other vegetative classification: Droughty Loam (G054XY120ND)
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: Loamy Overflow (R054XY023ND)
Other vegetative classification: Overflow (G054XY500ND)
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: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

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
Natural 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 in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: Sandy (R054XY026ND)
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
Natural 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 in profile: 30 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: 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: Shallow Sandy (R054XY043ND)
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
Natural 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 in profile: 15 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: Sandy (R054XY026ND)
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: Loamy Overflow (R054XY023ND)
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: Loamy (R054XY031ND)
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: Sands (R054XY025ND)
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: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

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: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
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
Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: 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: Limy Sands (R054XY045ND)
Other vegetative classification: Sand (G054XY300ND)
Hydric soil rating: No

Description of Flasher

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Summit, shoulder
Down-slope shape: Linear, convex
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
Natural 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 in profile: 10 percent
Gypsum, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: 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: Shallow Sandy (R054XY043ND)
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
Natural 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 in profile: 3 percent
Available water storage in profile: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: Sands (R054XY025ND)
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: Sandy (R054XY026ND)
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: Loamy Overflow (R054XY023ND)
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: Shallow Sandy (R054XY043ND)
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: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

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
Natural 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 in profile: 30 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: 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: Shallow Sandy (R054XY043ND)
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
Natural 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 in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: Sandy (R054XY026ND)
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
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: Sandy (R054XY026ND)
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: Limy Sands (R054XY045ND)
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: Sands (R054XY025ND)
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: Loamy (R054XY031ND)
Other vegetative classification: Steep Loam (G054XY109ND)
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: Non-site (R054XY999ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

E1475F—Flasher-Rock outcrop-Vebar complex, 9 to 70 percent slopes

Map Unit Setting

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

Map Unit Composition

Flasher and similar soils: 39 percent
Rock outcrop: 22 percent
Vebar and similar soils: 19 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Flasher

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Summit, shoulder
Down-slope shape: Linear, convex
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: 15 to 70 percent
Depth to restrictive feature: 7 to 20 inches to paralithic bedrock
Natural 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 in profile: 10 percent
Gypsum, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Very low (about 1.1 inches)

Interpretive groups

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

Description of Rock Outcrop

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Summit, shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sedimentary rock

Interpretive groups

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

Description of Vebar

Setting

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

Typical profile

A - 0 to 5 inches: fine sandy loam
Bw - 5 to 26 inches: fine sandy loam
BCk - 26 to 32 inches: fine sandy loam
Cr - 32 to 60 inches: bedrock

Properties and qualities

Slope: 9 to 25 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 10 percent
Gypsum, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 5.1 inches)

Interpretive groups

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

Hydrologic Soil Group: B
Ecological site: Sandy (R054XY026ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Minor Components

Beisigl

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

Telfer

Percent of map unit: 4 percent
Landform: Ridges, hills
Landform position (two-dimensional): Footslope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Sands (R054XY025ND)
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: Loamy (R054XY031ND)
Other vegetative classification: Steep Loam (G054XY109ND)
Hydric soil rating: No

Cabba

Percent of map unit: 2 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Shallow Loamy (R054XY030ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

E1601B—Beisigl-Lihen loamy fine sands, 0 to 6 percent slopes

Map Unit Setting

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

Map Unit Composition

Beisigl and similar soils: 46 percent
Lihen and similar soils: 29 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Beisigl

Setting

Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy residuum weathered from sandstone

Typical profile

Ap - 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: 0 to 6 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Somewhat excessively drained
Runoff class: Very 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 in profile: 15 percent
Gypsum, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: A
Ecological site: Limy Sands (R054XY045ND)
Other vegetative classification: Sand (G054XY300ND)
Hydric soil rating: No

Description of Lihen

Setting

Landform: Alluvial fans, alluvial flats
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
Natural 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 99.90 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 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: Sands (R054XY025ND)
Other vegetative classification: Sand (G054XY300ND)
Hydric soil rating: No

Minor Components

Seroco

Percent of map unit: 10 percent
Landform: Dunes, knobs, ridges
Landform position (two-dimensional): Summit, shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Thin Sands (R054XY034ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Flasher

Percent of map unit: 9 percent
Landform: Ridges, hills
Landform position (two-dimensional): Shoulder, summit
Down-slope shape: Linear, convex

Across-slope shape: Convex
Ecological site: Shallow Sandy (R054XY043ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Parshall

Percent of map unit: 4 percent
Landform: Swales
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Loamy Overflow (R054XY023ND)
Other vegetative classification: Overflow (G054XY500ND)
Hydric soil rating: No

Vebar

Percent of map unit: 2 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Sandy (R054XY026ND)
Other vegetative classification: Very Droughty Loam (G054XY130ND)
Hydric soil rating: No

E1625A—Vebar-Parshall fine sandy loams, 0 to 3 percent slopes

Map Unit Setting

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

Map Unit Composition

Vebar and similar soils: 50 percent
Parshall 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 13 inches: fine sandy loam
Bw2 - 13 to 28 inches: fine sandy loam
BCk - 28 to 33 inches: fine sandy loam
Cr - 33 to 79 inches: bedrock

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: Very 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 in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: Sandy (R054XY026ND)
Other vegetative classification: Very Droughty Loam (G054XY130ND)
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: Linear
Parent material: Slope alluvium derived from sandstone

Typical profile

Ap - 0 to 6 inches: fine sandy loam
A - 6 to 14 inches: fine sandy loam
Bw1 - 14 to 25 inches: fine sandy loam
Bw2 - 25 to 32 inches: fine sandy loam
Bk - 32 to 49 inches: fine sandy loam
C - 49 to 79 inches: fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very 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 in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: Moderate (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: Sandy (R054XY026ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Minor Components

Tally

Percent of map unit: 15 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Sandy (R054XY026ND)
Other vegetative classification: Droughty Loam (G054XY120ND)
Hydric soil rating: No

Arnegard

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

Cohagen

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: Shallow Sandy (R054XY043ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

E1625B—Vebar-Parshall fine sandy loams, 3 to 6 percent slopes

Map Unit Setting

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

Map Unit Composition

Vebar and similar soils: 58 percent
Parshall and similar soils: 20 percent
Minor components: 22 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 13 inches: fine sandy loam
Bw2 - 13 to 26 inches: fine sandy loam
BCk - 26 to 32 inches: fine sandy loam
Cr - 32 to 79 inches: bedrock

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: 20 to 39 inches to paralithic bedrock
Natural 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 in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: Sandy (R054XY026ND)
Other vegetative classification: Very Droughty Loam (G054XY130ND)
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: Linear
Parent material: Alluvium derived from sandstone

Typical profile

Ap - 0 to 6 inches: fine sandy loam
A - 6 to 12 inches: fine sandy loam
Bw1 - 12 to 24 inches: fine sandy loam
Bw2 - 24 to 30 inches: fine sandy loam
Bk - 30 to 48 inches: fine sandy loam
C - 48 to 79 inches: fine sandy loam

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very 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 in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: Sandy (R054XY026ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Minor Components

Tally

Percent of map unit: 12 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Sandy (R054XY026ND)
Other vegetative classification: Droughty Loam (G054XY120ND)

Hydric soil rating: No

Arnegard

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

Cohagen

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: Shallow Sandy (R054XY043ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

E1823A—Parshall fine sandy loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1vzt2
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Parshall and similar soils: 68 percent
Minor components: 32 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Parshall

Setting

Landform: Alluvial flats
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 2 percent
Depth to restrictive feature: More than 80 inches
Natural 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 in profile: 10 percent
Available water storage in profile: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: Sandy (R054XY026ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Minor Components

Tally

Percent of map unit: 12 percent
Landform: Alluvial flats, terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Sandy (R054XY026ND)
Other vegetative classification: Droughty Loam (G054XY120ND)
Hydric soil rating: No

Arnegard

Percent of map unit: 10 percent
Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Loamy Overflow (R054XY023ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Lihen

Percent of map unit: 5 percent
Landform: Terraces, rises
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Sands (R054XY025ND)
Other vegetative classification: Sand (G054XY300ND)
Hydric soil rating: No

Vebar

Percent of map unit: 3 percent
Landform: Pediments

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

Daglum

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

E1865C—Tally-Parshall fine sandy loams, 6 to 9 percent slopes

Map Unit Setting

National map unit symbol: cdp9
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Tally 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 Tally

Setting

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

Typical profile

Ap - 0 to 6 inches: fine sandy loam
Bw - 6 to 32 inches: fine sandy loam
Bk - 32 to 60 inches: fine sandy loam

Properties and qualities

Slope: 6 to 9 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to 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 in profile: 15 percent
Available water storage in profile: High (about 9.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: Sandy (R054XY026ND)
Other vegetative classification: Droughty Loam (G054XY120ND)
Hydric soil rating: No

Description of Parshall

Setting

Landform: Hills
Landform position (two-dimensional): Footslope
Down-slope shape: Concave
Across-slope shape: Linear
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: 6 to 9 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to 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 in profile: 10 percent
Available water storage in profile: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: Sandy (R054XY026ND)
Other vegetative classification: Loam (G054XY100ND)
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: Sandy (R054XY026ND)
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: Loamy Overflow (R054XY023ND)
Other vegetative classification: Overflow (G054XY500ND)
Hydric soil rating: No

Telfer

Percent of map unit: 4 percent
Landform: Ridges, hills
Landform position (two-dimensional): Footslope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Sands (R054XY025ND)
Other vegetative classification: Sand (G054XY300ND)
Hydric soil rating: No

Livona

Percent of map unit: 2 percent
Landform: Rises
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Sandy (R054XY026ND)
Other vegetative classification: Loam (G054XY100ND)
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: Shallow Sandy (R054XY043ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Williams

Percent of map unit: 2 percent
Landform: Knolls
Landform position (two-dimensional): Backslope, summit
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

E2107A—Arnegard loam, 0 to 2 percent slopes

Map Unit Setting

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

Map Unit Composition

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

Description of Arnegard

Setting

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

Typical profile

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

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 20 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

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

Minor Components

Shambo

Percent of map unit: 12 percent
Landform: Swales
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Grail

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

Belfield

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

E2145A—Shambo loam, 0 to 2 percent slopes

Map Unit Setting

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

Map Unit Composition

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

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 mudstone

Typical profile

Ap - 0 to 6 inches: loam
A - 6 to 8 inches: loam
Bw1 - 8 to 13 inches: loam
Bw2 - 13 to 28 inches: loam
Bk - 28 to 42 inches: loam
BCk - 42 to 48 inches: loam
C - 48 to 79 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 3 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2c
Hydrologic Soil Group: B
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Minor Components

Farnuf

Percent of map unit: 12 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear

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

Arnegard

Percent of map unit: 10 percent
Landform: Swales
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Loamy Overflow (R054XY023ND)
Other vegetative classification: Overflow (G054XY500ND)
Hydric soil rating: No

Amor

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: Linear
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Droughty Loam (G054XY120ND)
Hydric soil rating: No

E2601C—Amor-Cabba loams, 6 to 9 percent slopes

Map Unit Setting

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

Map Unit Composition

Amor and similar soils: 49 percent
Cabba and similar soils: 32 percent
Minor components: 19 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Amor

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 sedimentary rock

Typical profile

Ap - 0 to 5 inches: loam
Bw1 - 5 to 9 inches: loam
Bw2 - 9 to 15 inches: loam
Bk - 15 to 23 inches: loam
BCk - 23 to 30 inches: loam
Cr - 30 to 79 inches: bedrock

Properties and qualities

Slope: 6 to 9 percent
Depth to restrictive feature: 20 to 39 inches to paralithic bedrock
Natural 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 in profile: 30 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Low (about 5.3 inches)

Interpretive groups

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

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

Ap - 0 to 5 inches: loam
Bk - 5 to 15 inches: loam
Cr - 15 to 79 inches: bedrock

Properties and qualities

Slope: 6 to 9 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Natural 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 in profile: 35 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (1.0 to 2.0 mmhos/cm)
Available water storage in profile: Very low (about 2.6 inches)

Interpretive groups

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

Minor Components

Shambo

Percent of map unit: 9 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Chama

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Thin Loamy (R054XY038ND)
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

Regent

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: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

E2601D—Amor-Cabba loams, 9 to 15 percent slopes

Map Unit Setting

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

Map Unit Composition

Amor and similar soils: 51 percent
Cabba and similar soils: 33 percent
Minor components: 16 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Amor

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 sedimentary rock

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 15 percent
Depth to restrictive feature: 20 to 39 inches to paralithic bedrock
Natural 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 in profile: 30 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Low (about 4.2 inches)

Interpretive groups

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

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 4 inches: loam
Bk - 4 to 9 inches: loam
C - 9 to 13 inches: silt loam
Cr - 13 to 79 inches: bedrock

Properties and qualities

Slope: 9 to 15 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Natural 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 in profile: 35 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (1.0 to 2.0 mmhos/cm)
Available water storage in profile: Very low (about 2.3 inches)

Interpretive groups

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

Minor Components

Chama

Percent of map unit: 9 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Linear

Ecological site: Thin Loamy (R054XY038ND)
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

Shambo

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: Loamy (R054XY031ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Arnegard

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Loamy Overflow (R054XY023ND)
Other vegetative classification: Overflow (G054XY500ND)
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: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

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
Natural 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 in profile: 35 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (1.0 to 2.0 mmhos/cm)
Available water storage in profile: 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: Shallow Loamy (R054XY030ND)
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
Natural 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 in profile: 35 percent
Gypsum, maximum in profile: 3 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 3.0
Available water storage in profile: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: Thin Loamy (R054XY038ND)
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
Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 3 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 3.0
Available water storage in profile: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: Loamy (R054XY031ND)

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: Loamy (R054XY031ND)
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: Loamy Overflow (R054XY023ND)
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: Non-site (R054XY999ND)
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: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

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
Natural 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 in profile: 35 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: Thin Loamy (R054XY038ND)
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
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (1.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: 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: Shallow Loamy (R054XY030ND)
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
Natural 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 in profile: 30 percent
Gypsum, maximum in profile: 2 percent

Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 7.3 inches)

Interpretive groups

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

Minor Components

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: Sandy (R054XY026ND)
Other vegetative classification: Very Droughty Loam (G054XY130ND)
Hydric soil rating: No

Golva

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

Grail

Percent of map unit: 3 percent
Landform: Swales
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Loamy Overflow (R054XY023ND)
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: Claypan (R054XY021ND)
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: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

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
Natural 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 in profile: 30 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (1.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: 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: Shallow Loamy (R054XY030ND)
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
Natural 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 in profile: 35 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 6.6 inches)

Interpretive groups

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

Description of Sen

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 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
Natural 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 in profile: 30 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: Loamy (R054XY031ND)
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: Sandy (R054XY026ND)
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: Loamy (R054XY031ND)
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: Claypan (R054XY021ND)
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: Loamy Overflow (R054XY023ND)
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: Thin Loamy (R054XY038ND)
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

E2803B—Amor-Shambo loams, 3 to 6 percent slopes

Map Unit Setting

National map unit symbol: 1vzv0
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Amor and similar soils: 73 percent
Shambo and similar soils: 15 percent
Minor components: 12 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Amor

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
Bw1 - 6 to 13 inches: loam
Bw2 - 13 to 19 inches: loam
Bk - 19 to 31 inches: loam
Cr - 31 to 79 inches: bedrock

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: 20 to 39 inches to paralithic bedrock
Natural 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 in profile: 30 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Droughty Loam (G054XY120ND)
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: Slope alluvium derived from mudstone

Typical profile

Ap - 0 to 6 inches: loam
Bw1 - 6 to 13 inches: loam
Bw2 - 13 to 29 inches: loam
Bk - 29 to 42 inches: loam
BCk - 42 to 48 inches: loam
C - 48 to 79 inches: loam

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 3 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 3.0
Available water storage in profile: High (about 10.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Minor Components

Chama

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: Thin Loamy (R054XY038ND)
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

Cabba

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

Regent

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: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
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: Linear
Ecological site: Loamy Overflow (R054XY023ND)
Other vegetative classification: Overflow (G054XY500ND)
Hydric soil rating: No

E2819B—Reeder-Farnuf loams, 3 to 6 percent slopes

Map Unit Setting

National map unit symbol: 1vzv2
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Reeder and similar soils: 49 percent
Farnuf and similar soils: 20 percent
Minor components: 31 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Reeder

Setting

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

Typical profile

Ap - 0 to 8 inches: loam
Bt - 8 to 17 inches: clay loam
Bk - 17 to 36 inches: loam
Cr - 36 to 60 inches: bedrock

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 20 percent

Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Moderate (about 6.6 inches)

Interpretive groups

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

Description of Farnuf

Setting

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

Typical profile

Ap - 0 to 9 inches: loam
Bt - 9 to 23 inches: clay loam
Bk - 23 to 34 inches: loam
C - 34 to 60 inches: loam

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 10.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Minor Components

Amor

Percent of map unit: 14 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)

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

Regent

Percent of map unit: 9 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Daglum

Percent of map unit: 4 percent
Landform: Alluvial fans, alluvial flats
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: Claypan (R054XY021ND)
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

Vebar

Percent of map unit: 2 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Sandy (R054XY026ND)
Other vegetative classification: Very Droughty Loam (G054XY130ND)
Hydric soil rating: No

Cabba

Percent of map unit: 2 percent
Landform: Rises
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Shallow Loamy (R054XY030ND)
Other vegetative classification: Not suited (G054XY000ND)
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: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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
Natural 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 in profile: 35 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: Thin Loamy (R054XY038ND)
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
Natural 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 in profile: 30 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Loamy (R054XY031ND)
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
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (1.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: 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: Shallow Loamy (R054XY030ND)
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: Loamy (R054XY031ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Maschetah

Percent of map unit: 2 percent
Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Thin Loamy (R054XY038ND)
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

Janesburg

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

E2927B—Morton-Farland silt loams, 3 to 6 percent slopes

Map Unit Setting

National map unit symbol: 1vzv5
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Morton and similar soils: 63 percent
Farland and similar soils: 19 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Morton

Setting

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

Typical profile

Ap - 0 to 5 inches: silt loam
Bt - 5 to 15 inches: silty clay loam
Bk - 15 to 33 inches: loam
Cr - 33 to 60 inches: bedrock

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 20 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 6.2 inches)

Interpretive groups

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

Description of Farland

Setting

Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-silty alluvium

Typical profile

Ap - 0 to 8 inches: silt loam
Bt - 8 to 18 inches: silty clay loam
Bk - 18 to 31 inches: silty clay loam

C - 31 to 60 inches: silt loam

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately 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 in profile: 20 percent
Available water storage in profile: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Minor Components

Chama

Percent of map unit: 5 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Thin Loamy (R054XY038ND)
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

Belfield

Percent of map unit: 4 percent
Landform: Flats
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Cedarpan

Percent of map unit: 4 percent
Landform: Divides
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Claypan (R054XY021ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Janesburg

Percent of map unit: 3 percent
Landform: Pediments
Down-slope shape: Linear
Across-slope shape: Convex

Ecological site: Claypan (R054XY021ND)
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

Grassna

Percent of map unit: 2 percent
Landform: Swales
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Loamy Overflow (R054XY023ND)
Other vegetative classification: Overflow (G054XY500ND)
Hydric soil rating: No

E2987B—Sen-Chama silt loams, 3 to 6 percent slopes

Map Unit Setting

National map unit symbol: cdn4
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Sen and similar soils: 47 percent
Chama and similar soils: 22 percent
Minor components: 31 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

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
Natural 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 in profile: 30 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 7.3 inches)

Interpretive groups

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

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
Natural 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 in profile: 35 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 6.6 inches)

Interpretive groups

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

Minor Components

Amor

Percent of map unit: 12 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Droughty Loam (G054XY120ND)
Hydric soil rating: No

Cabba

Percent of map unit: 8 percent
Landform: Rises
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Shallow Loamy (R054XY030ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Farland

Percent of map unit: 6 percent
Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Grassna

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

Moreau

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

E3011F—Brandenburg-Cabba-Savage complex, 6 to 70 percent slopes

Map Unit Setting

National map unit symbol: cdn2
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Brandenburg, channery loam, and similar soils: 36 percent
Cabba and similar soils: 22 percent
Savage and similar soils: 15 percent
Minor components: 27 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Brandenburg, Channery Loam

Setting

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

Typical profile

A - 0 to 4 inches: channery loam
C1 - 4 to 10 inches: very channery loam
C2 - 10 to 60 inches: channers

Properties and qualities

Slope: 6 to 70 percent
Percent of area covered with surface fragments: 1.5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: High
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 in profile: 15 percent
Available water storage in profile: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A

Ecological site: Very Shallow (R054XY035ND)
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: 6 to 70 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (1.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: 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: Shallow Loamy (R054XY030ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Description of Savage

Setting

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

Typical profile

A - 0 to 7 inches: silty clay loam
Bt - 7 to 25 inches: silty clay
Bk - 25 to 51 inches: silty clay loam
C - 51 to 80 inches: silty clay loam

Properties and qualities

Slope: 6 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: High (about 11.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Minor Components

Searing

Percent of map unit: 9 percent
Landform: Ridges, hills
Landform position (two-dimensional): Footslope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Droughty Loam (G054XY120ND)
Hydric soil rating: No

Amor

Percent of map unit: 8 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Steep Loam (G054XY109ND)
Hydric soil rating: No

Dogtooth

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

Chama

Percent of map unit: 3 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Thin Loamy (R054XY038ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Rock outcrop, porcelanite

Percent of map unit: 2 percent
Landform: Knobs, ridges
Landform position (two-dimensional): Shoulder
Down-slope shape: Convex
Across-slope shape: Convex, linear
Ecological site: Non-site (R054XY999ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

E3101F—Badland-Cabba complex, 9 to 70 percent slopes

Map Unit Setting

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

Map Unit Composition

Badland: 51 percent
Cabba and similar soils: 32 percent
Minor components: 17 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Badland

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder, backslope
Down-slope shape: Convex
Across-slope shape: Convex, linear
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 in profile: 15 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Very low (about 0.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8e
Ecological site: Non-site (R054XY999ND)
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: 9 to 70 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (1.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: 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: Shallow Loamy (R054XY030ND)
Other vegetative classification: Not suited (G054XY000ND)

Hydric soil rating: No

Minor Components

Dogtooth

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

Brandenburg, very channery loam

Percent of map unit: 4 percent
Landform: Knobs, ridges
Landform position (two-dimensional): Shoulder
Down-slope shape: Convex
Across-slope shape: Convex, linear
Ecological site: Very Shallow (R054XY035ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Lambert, occasionally flooded

Percent of map unit: 3 percent
Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: Thin Loamy (R054XY038ND)
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

Chama

Percent of map unit: 3 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Thin Loamy (R054XY038ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Rock outcrop

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

E4005A—Harriet loam, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting

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

Map Unit Composition

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

Description of Harriet, Occasionally Flooded

Setting

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

Typical profile

E - 0 to 2 inches: loam
Btn - 2 to 18 inches: clay loam
Bz1 - 18 to 28 inches: loam
2Bz2 - 28 to 38 inches: very fine sandy loam
3Ab - 38 to 40 inches: clay loam
3C - 40 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 0 to 5 inches to natric
Natural 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: Occasional
Frequency of ponding: Rare
Calcium carbonate, maximum in profile: 25 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 25.0
Available water storage in profile: 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: Saline Lowland (R054XY024ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: Yes

Minor Components

Regan, occasionally flooded

Percent of map unit: 6 percent
Landform: Drainageways
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Wet Meadow (R054XY037ND)
Other vegetative classification: Wet (G054XY900ND)
Hydric soil rating: Yes

Glenross, occasionally flooded

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

Vanda, high precipitation

Percent of map unit: 5 percent
Landform: Alluvial flats, terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Thin Claypan (R054XY033ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Rhoades

Percent of map unit: 4 percent
Landform: Alluvial flats
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: Thin Claypan (R054XY033ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Heil

Percent of map unit: 3 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: Closed Depression (R054XY022ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: Yes

Daglum

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

E4139A—Korchea-Fluvaquents complex, channeled, 0 to 2 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: d33b
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Korchea, channeled,frequently flooded, and similar soils: 52 percent
Fluvaquents, channeled, frequently flooded, and similar soils: 40 percent
Minor components: 8 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Korchea, Channeled,frequently Flooded

Setting

Landform: Flood plains on river valleys
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified fine-loamy alluvium derived from sedimentary rock

Typical profile

A - 0 to 6 inches: loam
C - 6 to 60 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water storage in profile: High (about 10.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: B
Ecological site: Loamy Overflow (R054XY023ND)
Other vegetative classification: Overflow (G054XY500ND)
Hydric soil rating: No

Description of Fluvaquents, Channeled, Frequently Flooded

Setting

Landform: Channels on flood plains
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium

Typical profile

A - 0 to 10 inches: fine sandy loam
Cg - 10 to 80 inches: stratified loamy sand to silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (0.60 to 20.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: A
Ecological site: Non-site (R054XY999ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: Yes

Minor Components

Velva, channeled,frequently flooded

Percent of map unit: 5 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Loamy Overflow (R054XY023ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Lallie, frequently flooded

Percent of map unit: 3 percent
Landform: Oxbows on flood plains

Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Wet Land (R054XY036ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: Yes

E4180A—Korell-Daglum-Fluvaquents complex, channeled, 0 to 2 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 1vzw3
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Fluvaquents, channeled, frequently flooded, and similar soils: 40 percent
Korell, channeled,frequently flooded, and similar soils: 28 percent
Daglum, channeled,occasionally flooded, and similar soils: 18 percent
Minor components: 14 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fluvaquents, Channeled, Frequently Flooded

Setting

Landform: Channels on flood plains
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium

Typical profile

A - 0 to 10 inches: fine sandy loam
Cg - 10 to 80 inches: stratified loamy sand to silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (0.60 to 20.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: A
Ecological site: Non-site (R054XY999ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: Yes

Description of Korell, Channeled,frequently Flooded

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-loamy alluvium derived from sedimentary rock

Typical profile

A - 0 to 8 inches: loam
Bw - 8 to 15 inches: loam
Bk - 15 to 48 inches: loam
C - 48 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Calcium carbonate, maximum in profile: 20 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: B
Ecological site: Loamy Overflow (R054XY023ND)
Other vegetative classification: Overflow (G054XY500ND)
Hydric soil rating: No

Description of Daglum, Channeled,occasionally Flooded

Setting

Landform: Alluvial flats
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Clayey alluvium

Typical profile

A - 0 to 7 inches: silty clay loam
E - 7 to 8 inches: silt loam

Btn - 8 to 18 inches: clay
Bky - 18 to 32 inches: clay loam
BCk - 32 to 47 inches: clay loam
C - 47 to 60 inches: clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 4 to 20 inches to natric
Natural drainage class: Moderately 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: Occasional
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Slightly saline to moderately saline (5.0 to 15.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Very low (about 1.5 inches)

Interpretive groups

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

Minor Components

Rhoades, channeled,occasionally flooded

Percent of map unit: 6 percent
Landform: Terraces
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: Thin Claypan (R054XY033ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Savage, occasionally flooded

Percent of map unit: 6 percent
Landform: Alluvial flats
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Harriet, occasionally flooded

Percent of map unit: 2 percent
Landform: Alluvial flats, drainageways
Down-slope shape: Linear
Across-slope shape: Linear, concave
Ecological site: Saline Lowland (R054XY024ND)
Other vegetative classification: Not suited (G054XY000ND)

Hydric soil rating: Yes

E4569F—Wabek-Cabba-Shambo complex, 6 to 35 percent slopes

Map Unit Setting

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

Map Unit Composition

Wabek, gravelly, and similar soils: 30 percent
Cabba and similar soils: 22 percent
Shambo and similar soils: 19 percent
Minor components: 29 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wabek, Gravelly

Setting

Landform: Escarpments
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: gravelly 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
Natural drainage class: Excessively drained
Runoff class: Low
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 in profile: 15 percent
Available water storage in profile: Very low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: Very Shallow (R054XY035ND)
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 35 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (1.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: 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: Shallow Loamy (R054XY030ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Description of Shambo

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: 6 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 20 percent
Available water storage in profile: High (about 11.2 inches)

Interpretive groups

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

Minor Components

Lehr

Percent of map unit: 10 percent
Landform: Escarpments on terraces
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Shallow Loamy (R054XY030ND)
Other vegetative classification: Very Droughty Loam (G054XY130ND)
Hydric soil rating: No

Vebar

Percent of map unit: 8 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Sandy (R054XY026ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Manning

Percent of map unit: 4 percent
Landform: Escarpments on stream terraces
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Sandy (R054XY026ND)
Other vegetative classification: Very Droughty Loam (G054XY130ND)
Hydric soil rating: No

Schaller

Percent of map unit: 4 percent
Landform: Escarpments on stream terraces
Landform position (two-dimensional): Shoulder, summit
Down-slope shape: Convex
Across-slope shape: Convex, linear
Ecological site: Sands (R054XY025ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Regent

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

E4575A—Wanagan loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2r4fl
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Wanagan and similar soils: 78 percent
Minor components: 22 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wanagan

Setting

Landform: Stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy and gravelly alluvium

Typical profile

A - 0 to 7 inches: loam
Bw - 7 to 14 inches: loam
Bk - 14 to 18 inches: loam

2BCk - 18 to 26 inches: very gravelly sandy clay loam
2C - 26 to 60 inches: extremely gravelly loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 20 percent
Available water storage in profile: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: B
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Droughty Loam (G054XY120ND)
Hydric soil rating: No

Minor Components

Shambo, gravelly substratum

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

Stady

Percent of map unit: 8 percent
Landform: Stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Droughty Loam (G054XY120ND)
Hydric soil rating: No

Lehr

Percent of map unit: 2 percent
Landform: Terraces
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Shallow Gravel (R054XY029ND)
Other vegetative classification: Very Droughty Loam (G054XY130ND)
Hydric soil rating: No

Stark County, North Dakota

E0415A—Belfield-Daglum complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1vzr1
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Belfield and similar soils: 45 percent
Daglum and similar soils: 32 percent
Minor components: 23 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Belfield

Setting

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

Typical profile

Ap - 0 to 9 inches: silt loam
E/B - 9 to 12 inches: silty clay loam
Btn1 - 12 to 17 inches: silty clay
Btn2 - 17 to 24 inches: silty clay loam
Bk - 24 to 43 inches: silty clay loam
C - 43 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: 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 42 to 60 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: Slightly saline to moderately saline (5.0 to 15.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: C

Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Description of Daglum

Setting

Landform: Alluvial flats
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Clayey alluvium

Typical profile

Ap - 0 to 7 inches: clay loam
E - 7 to 8 inches: silt loam
Btn - 8 to 18 inches: clay
Bky - 18 to 32 inches: clay loam
BCk - 32 to 47 inches: clay loam
C - 47 to 60 inches: clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 4 to 20 inches to natric
Natural drainage class: Moderately well drained
Runoff class: 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: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Gypsum, maximum in profile: 10 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Very low (about 1.3 inches)

Interpretive groups

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

Minor Components

Daglum

Percent of map unit: 8 percent
Landform: Alluvial flats
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: Claypan (R054XY021ND)
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

Savage

Percent of map unit: 5 percent
Landform: Alluvial flats
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Grail

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

Rhoades

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

Regent

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

E0454B—Daglum-Rhoades complex, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2r4g8
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Daglum and similar soils: 48 percent
Rhoades and similar soils: 35 percent

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

Description of Daglum

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 shale and siltstone

Typical profile

Ap - 0 to 7 inches: silt loam
E - 7 to 8 inches: silt loam
Btn - 8 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: 6 to 10 inches to natric
Natural 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 in profile: 25 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 25.0
Available water storage in profile: Very low (about 1.7 inches)

Interpretive groups

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

Description of Rhoades

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope
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

Ap - 0 to 5 inches: clay loam
Btn - 5 to 10 inches: clay loam
Btknyz - 10 to 14 inches: clay loam
Bky - 14 to 46 inches: clay loam
C - 46 to 79 inches: clay

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: 3 to 6 inches to natric
Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 25.0
Available water storage in profile: Very low (about 0.9 inches)

Interpretive groups

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

Minor Components

Belfield

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Savage

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: Convex
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
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: Convex
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

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: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

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
Bky - 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
Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 25.0
Available water storage in profile: Very low (about 0.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: Thin Claypan (R054XY033ND)
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
Natural 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 in profile: 25 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 25.0
Available water storage in profile: Very low (about 1.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s

Hydrologic Soil Group: D
Ecological site: Claypan (R054XY021ND)
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: Clayey (R054XY020ND)
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: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
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: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Rhoades, barren

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: Non-site (R054XY999ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

E0605A—Belfield-Grail clay loams, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2r4h0
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Belfield and similar soils: 50 percent
Grail and similar soils: 26 percent
Minor components: 24 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Belfield

Setting

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

Typical profile

Ap - 0 to 9 inches: clay loam
E/B - 9 to 12 inches: silty clay loam
Btn1 - 12 to 17 inches: silty clay
Btn2 - 17 to 24 inches: silty clay loam
Bk - 24 to 43 inches: silty clay loam
C - 43 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: 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 42 to 60 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: Slightly saline to moderately saline (5.0 to 15.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Description of Grail

Setting

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

Typical profile

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

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.14 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: High (about 10.4 inches)

Interpretive groups

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

Minor Components

Savage

Percent of map unit: 10 percent
Landform: Alluvial flats
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)

Hydric soil rating: No

Daglum

Percent of map unit: 6 percent
Landform: Alluvial flats
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: Claypan (R054XY021ND)
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

Arnegard

Percent of map unit: 4 percent
Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Loamy Overflow (R054XY023ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Regent

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

Lawther

Percent of map unit: 2 percent
Landform: Alluvial flats
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

E0609A—Belfield-Grail-Arnegard complex, saline, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1vzs3
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Belfield, saline, and similar soils: 40 percent

Grail, saline, and similar soils: 32 percent
Arnegard, saline, and similar soils: 17 percent
Minor components: 11 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Belfield, Saline

Setting

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

Typical profile

Ap - 0 to 9 inches: clay loam
E/B - 9 to 12 inches: silty clay loam
Btn1 - 12 to 17 inches: silty clay
Btn2 - 17 to 24 inches: silty clay loam
Bk - 24 to 43 inches: silty clay loam
C - 43 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: 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 42 to 60 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: Slightly saline to strongly saline (5.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: C
Ecological site: Saline Lowland (R054XY024ND)
Other vegetative classification: Saline (G054XY895ND)
Hydric soil rating: No

Description of Grail, Saline

Setting

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

Typical profile

Ap - 0 to 5 inches: silty clay loam
A - 5 to 10 inches: silty clay loam

Bt - 10 to 24 inches: silty clay
Bk - 24 to 52 inches: silty clay loam
C - 52 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.14 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 10 percent
Salinity, maximum in profile: Slightly saline to strongly saline (5.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: C
Ecological site: Saline Lowland (R054XY024ND)
Other vegetative classification: Saline (G054XY895ND)
Hydric soil rating: No

Description of Arnegard, Saline

Setting

Landform: Alluvial flats, swales
Down-slope shape: Linear
Across-slope shape: Linear, concave
Parent material: Loamy alluvium derived from sedimentary rock

Typical profile

Ap - 0 to 13 inches: loam
Bw - 13 to 36 inches: loam
Bk - 36 to 60 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 20 percent
Salinity, maximum in profile: Slightly saline to strongly saline (5.0 to 16.0 mmhos/cm)
Available water storage in profile: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: B
Ecological site: Saline Lowland (R054XY024ND)
Other vegetative classification: Saline (G054XY895ND)
Hydric soil rating: No

Minor Components

Daglum, saline

Percent of map unit: 4 percent
Landform: Alluvial flats
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: Saline Lowland (R054XY024ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Harriet, occasionally flooded

Percent of map unit: 4 percent
Landform: Alluvial flats, drainageways
Down-slope shape: Linear
Across-slope shape: Linear, concave
Ecological site: Saline Lowland (R054XY024ND)
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: Thin Claypan (R054XY033ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

E0617B—Belfield-Savage-Daglum complex, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2r4h1
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Belfield and similar soils: 32 percent
Savage and similar soils: 28 percent
Daglum and similar soils: 18 percent
Minor components: 22 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Belfield

Setting

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

Typical profile

Ap - 0 to 9 inches: silt loam
E/B - 9 to 12 inches: silty clay loam
Btn1 - 12 to 17 inches: silty clay
Btn2 - 17 to 24 inches: silty clay loam
Bk - 24 to 43 inches: silty clay loam
C - 43 to 60 inches: clay loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.14 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Slightly saline to moderately saline (5.0 to 15.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Description of Savage

Setting

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

Typical profile

Ap - 0 to 7 inches: silty clay loam
Bt - 7 to 25 inches: silty clay
Bk - 25 to 51 inches: silty clay loam
C - 51 to 80 inches: silty clay loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: High (about 11.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Description of Daglum

Setting

Landform: Alluvial fans
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Clayey alluvium

Typical profile

Ap - 0 to 7 inches: clay loam
E - 7 to 8 inches: silt loam
Btn - 8 to 18 inches: clay
Bky - 18 to 32 inches: clay loam
BCk - 32 to 47 inches: clay loam
C - 47 to 60 inches: clay

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: 4 to 20 inches to natric
Natural drainage class: Moderately 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: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent

Gypsum, maximum in profile: 10 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Very low (about 1.3 inches)

Interpretive groups

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

Minor Components

Regent

Percent of map unit: 8 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Farnuf

Percent of map unit: 8 percent
Landform: Alluvial fans, terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Rhoades

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

Grail

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

E0634A—Lawther-Daglum complex, 0 to 2 percent slopes

Map Unit Setting

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

Map Unit Composition

Lawther and similar soils: 42 percent
Daglum and similar soils: 30 percent
Minor components: 28 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lawther

Setting

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

Typical profile

Ap - 0 to 4 inches: silty clay
A - 4 to 10 inches: silty clay
Bss - 10 to 33 inches: silty clay
Bk - 33 to 47 inches: silty clay
C - 47 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (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 in profile: 15 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Description of Daglum

Setting

Landform: Alluvial flats
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Clayey alluvium

Typical profile

Ap - 0 to 7 inches: silty clay loam
E - 7 to 8 inches: silt loam
Btn - 8 to 18 inches: clay
Bky - 18 to 32 inches: clay loam
BCk - 32 to 47 inches: clay loam
C - 47 to 60 inches: clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 4 to 20 inches to natric
Natural drainage class: Moderately 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: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Gypsum, maximum in profile: 10 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Very low (about 1.5 inches)

Interpretive groups

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

Minor Components

Savage

Percent of map unit: 9 percent
Landform: Alluvial flats
Down-slope shape: Convex
Across-slope shape: Linear

Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Belfield

Percent of map unit: 8 percent
Landform: Flats
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Rhoades

Percent of map unit: 5 percent
Landform: Alluvial flats
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: Thin Claypan (R054XY033ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Grail

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

Barkof

Percent of map unit: 3 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

E0634B—Lawther-Daglum complex, 2 to 6 percent slopes

Map Unit Setting

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

Map Unit Composition

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

Description of Lawther

Setting

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

Typical profile

Ap - 0 to 4 inches: silty clay
A - 4 to 10 inches: silty clay
Bss - 10 to 33 inches: silty clay
Bk - 33 to 47 inches: silty clay
C - 47 to 60 inches: clay loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (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 in profile: 15 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Description of Daglum

Setting

Landform: Alluvial fans
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Clayey alluvium

Typical profile

Ap - 0 to 7 inches: silty clay loam

E - 7 to 8 inches: silt loam
Btn - 8 to 18 inches: clay
Bky - 18 to 32 inches: clay loam
BCk - 32 to 47 inches: clay loam
C - 47 to 60 inches: clay

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: 4 to 20 inches to natric
Natural drainage class: Moderately 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: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Gypsum, maximum in profile: 10 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Very low (about 1.5 inches)

Interpretive groups

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

Minor Components

Savage

Percent of map unit: 11 percent
Landform: Alluvial fans
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Barkof

Percent of map unit: 8 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Belfield

Percent of map unit: 6 percent
Landform: Flats
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)

Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Rhoades

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

Grail

Percent of map unit: 2 percent
Landform: Swales
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Loamy Overflow (R054XY023ND)
Other vegetative classification: Overflow (G054XY500ND)
Hydric soil rating: No

E0651A—Regent-Janesburg complex, 0 to 3 percent slopes

Map Unit Setting

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

Map Unit Composition

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

Description of Regent

Setting

Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from shale

Typical profile

Ap - 0 to 10 inches: silty clay loam
Bt - 10 to 26 inches: silty clay
Bk - 26 to 39 inches: silty clay loam
Cr - 39 to 60 inches: bedrock

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to moderately saline (0.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Description of Janesburg

Setting

Landform: Pediments
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Clayey residuum weathered from shale

Typical profile

Ap - 0 to 8 inches: silt loam
E - 8 to 10 inches: silt loam
Btn - 10 to 21 inches: silty clay
BCk - 21 to 26 inches: silt loam
Cr - 26 to 60 inches: bedrock

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 2 to 13 inches to natric; 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Slightly saline to moderately saline (5.0 to 15.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: 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: Claypan (R054XY021ND)
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

Minor Components

Belfield

Percent of map unit: 9 percent
Landform: Flats
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Dogtooth

Percent of map unit: 7 percent
Landform: Pediments
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: Thin Claypan (R054XY033ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Reeder

Percent of map unit: 6 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Droughty Loam (G054XY120ND)
Hydric soil rating: No

Savage

Percent of map unit: 4 percent
Landform: Alluvial flats
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Barkof

Percent of map unit: 4 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

E0651B—Regent-Janesburg complex, 3 to 6 percent slopes

Map Unit Setting

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

Map Unit Composition

Regent and similar soils: 38 percent
Janesburg and similar soils: 28 percent
Minor components: 34 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Regent

Setting

Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from shale

Typical profile

Ap - 0 to 10 inches: silty clay loam
Bt - 10 to 26 inches: silty clay
Bk - 26 to 39 inches: silty clay loam
Cr - 39 to 60 inches: bedrock

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to moderately saline (0.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Description of Janesburg

Setting

Landform: Pediments
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Clayey residuum weathered from shale

Typical profile

Ap - 0 to 8 inches: silt loam
E - 8 to 10 inches: silt loam
Btn - 10 to 21 inches: silty clay
BCk - 21 to 26 inches: silt loam
Cr - 26 to 60 inches: bedrock

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: 2 to 13 inches to natric; 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Slightly saline to moderately saline (5.0 to 15.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: 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: Claypan (R054XY021ND)
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

Minor Components

Reeder

Percent of map unit: 10 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Droughty Loam (G054XY120ND)
Hydric soil rating: No

Dogtooth

Percent of map unit: 9 percent
Landform: Pediments
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: Thin Claypan (R054XY033ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Belfield

Percent of map unit: 7 percent
Landform: Flats
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Barkof

Percent of map unit: 5 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Savage

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

E0651C—Regent-Janesburg complex, 6 to 9 percent slopes

Map Unit Setting

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

Map Unit Composition

Regent, moderately sloping, and similar soils: 36 percent
Janesburg and similar soils: 32 percent

Minor components: 32 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Regent, Moderately Sloping

Setting

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

Typical profile

Ap - 0 to 10 inches: silty clay loam
Bt - 10 to 26 inches: silty clay
Bk - 26 to 39 inches: silty clay loam
Cr - 39 to 60 inches: bedrock

Properties and qualities

Slope: 6 to 9 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to moderately saline (0.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Description of Janesburg

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey residuum weathered from shale

Typical profile

Ap - 0 to 8 inches: silt loam
E - 8 to 10 inches: silt loam
Btn - 10 to 21 inches: silty clay
BCk - 21 to 26 inches: silt loam
Cr - 26 to 60 inches: bedrock

Properties and qualities

Slope: 6 to 9 percent
Depth to restrictive feature: 2 to 13 inches to natric; 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Slightly saline to moderately saline (5.0 to 15.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Very low (about 2.1 inches)

Interpretive groups

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

Minor Components

Regent, gently sloping

Percent of map unit: 10 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Savage

Percent of map unit: 8 percent
Landform: Alluvial fans
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Dogtooth

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

Barkof

Percent of map unit: 4 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Chama

Percent of map unit: 3 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Thin Loamy (R054XY038ND)
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

Wayden

Percent of map unit: 2 percent
Landform: Ridges, rises on pediments
Landform position (two-dimensional): Shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Shallow Clayey (R054XY028ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

E0727B—Barkof-Janesburg complex, 3 to 6 percent slopes

Map Unit Setting

National map unit symbol: 1vzs1
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Barkof and similar soils: 40 percent
Janesburg and similar soils: 27 percent
Minor components: 33 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Barkof

Setting

Landform: Pediments

Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from shale

Typical profile

Ap - 0 to 7 inches: silty clay
Bss - 7 to 24 inches: silty clay
BC - 24 to 28 inches: silty clay
Cr - 28 to 60 inches: bedrock

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 20 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Very slightly saline to strongly saline (2.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: D
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Description of Janesburg

Setting

Landform: Pediments
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Clayey residuum weathered from shale

Typical profile

Ap - 0 to 8 inches: silty clay loam
E - 8 to 10 inches: silt loam
Btn - 10 to 21 inches: silty clay
BCk - 21 to 26 inches: silt loam
Cr - 26 to 60 inches: bedrock

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: 2 to 13 inches to natric; 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Slightly saline to moderately saline (5.0 to 15.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Very low (about 2.0 inches)

Interpretive groups

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

Minor Components

Regent

Percent of map unit: 9 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Dogtooth

Percent of map unit: 8 percent
Landform: Pediments
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: Thin Claypan (R054XY033ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Wayden

Percent of map unit: 7 percent
Landform: Rises on pediments
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Shallow Clayey (R054XY028ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Lawther

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

Savage

Percent of map unit: 4 percent
Landform: Alluvial fans
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

E0727C—Barkof-Janesburg complex, 6 to 9 percent slopes

Map Unit Setting

National map unit symbol: 1vzs2
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Barkof and similar soils: 38 percent
Janesburg and similar soils: 25 percent
Minor components: 37 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Barkof

Setting

Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from shale

Typical profile

Ap - 0 to 7 inches: silty clay
Bss - 7 to 24 inches: silty clay
BC - 24 to 28 inches: silty clay
Cr - 28 to 60 inches: bedrock

Properties and qualities

Slope: 6 to 9 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 20 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Very slightly saline to strongly saline (2.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Description of Janesburg

Setting

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

Typical profile

Ap - 0 to 8 inches: silty clay loam
E - 8 to 10 inches: silt loam
Btn - 10 to 21 inches: silty clay
BCk - 21 to 26 inches: silt loam
Cr - 26 to 60 inches: bedrock

Properties and qualities

Slope: 6 to 9 percent
Depth to restrictive feature: 2 to 13 inches to natric; 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Slightly saline to moderately saline (5.0 to 15.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Very low (about 2.0 inches)

Interpretive groups

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

Minor Components

Wayden

Percent of map unit: 12 percent
Landform: Ridges, rises on pediments
Landform position (two-dimensional): Shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Shallow Clayey (R054XY028ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Regent

Percent of map unit: 11 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Dogtooth

Percent of map unit: 9 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: Thin Claypan (R054XY033ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Savage

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

Lawther

Percent of map unit: 2 percent
Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

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

Map Unit Setting

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

Map Unit Composition

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

Description of Grail

Setting

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

Typical profile

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

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.01 to 1.42 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: High (about 10.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2c

Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Minor Components

Savage

Percent of map unit: 11 percent
Landform: Alluvial flats
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Belfield

Percent of map unit: 9 percent
Landform: Flats
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Grail

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

Lawther

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

Farland

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

Regent

Percent of map unit: 2 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear

Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

E0813B—Grail-Savage silty clay loams, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: d1xh
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Grail and similar soils: 47 percent
Savage and similar soils: 27 percent
Minor components: 26 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Grail

Setting

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

Typical profile

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

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.01 to 1.42 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: High (about 10.6 inches)

Interpretive groups

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

Description of Savage

Setting

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

Typical profile

Ap - 0 to 7 inches: silty clay loam
Bt - 7 to 25 inches: silty clay
Bk - 25 to 51 inches: silty clay loam
C - 51 to 80 inches: silty clay loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.01 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: High (about 11.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Minor Components

Farland

Percent of map unit: 10 percent
Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Belfield

Percent of map unit: 7 percent
Landform: Flats
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Grassna

Percent of map unit: 4 percent
Landform: Swales
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Loamy Overflow (R054XY023ND)
Other vegetative classification: Overflow (G054XY500ND)
Hydric soil rating: No

Regent

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

Lawther

Percent of map unit: 2 percent
Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

E0821A—Lawther silty clay, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1vzs6
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Lawther and similar soils: 77 percent
Minor components: 23 percent

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

Description of Lawther

Setting

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

Typical profile

Ap - 0 to 4 inches: silty clay
A - 4 to 10 inches: silty clay
Bss - 10 to 33 inches: silty clay
Bk - 33 to 47 inches: silty clay
C - 47 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (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 in profile: 15 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Minor Components

Savage

Percent of map unit: 11 percent
Landform: Alluvial flats
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Moreau

Percent of map unit: 5 percent
Landform: Pediments
Down-slope shape: Convex

Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Belfield

Percent of map unit: 4 percent
Landform: Flats
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Daglum

Percent of map unit: 3 percent
Landform: Alluvial flats
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: Claypan (R054XY021ND)
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

E0821B—Lawther silty clay, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 1vzs7
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Lawther and similar soils: 72 percent
Minor components: 28 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lawther

Setting

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

Typical profile

Ap - 0 to 4 inches: silty clay
A - 4 to 10 inches: silty clay
Bss - 10 to 33 inches: silty clay
Bk - 33 to 47 inches: silty clay

C - 47 to 60 inches: clay loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (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 in profile: 15 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Minor Components

Savage

Percent of map unit: 8 percent
Landform: Alluvial fans
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Belfield

Percent of map unit: 7 percent
Landform: Flats
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Moreau

Percent of map unit: 6 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Daglum

Percent of map unit: 4 percent
Landform: Alluvial fans, alluvial flats
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: Claypan (R054XY021ND)
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

Cabba

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

E0837C—Savage silty clay loam, 6 to 9 percent slopes

Map Unit Setting

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

Map Unit Composition

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

Description of Savage

Setting

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

Typical profile

Ap - 0 to 7 inches: silty clay loam
Bt - 7 to 25 inches: silty clay
Bk - 25 to 51 inches: silty clay loam
C - 51 to 80 inches: silty clay loam

Properties and qualities

Slope: 6 to 9 percent

Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.01 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: High (about 11.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Minor Components

Farland

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

Regent

Percent of map unit: 6 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Daglum

Percent of map unit: 6 percent
Landform: Ridges, hills
Landform position (two-dimensional): Footslope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Claypan (R054XY021ND)
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

Reeder

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Backslope
Down-slope shape: Convex

Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Droughty Loam (G054XY120ND)
Hydric soil rating: No

Grail

Percent of map unit: 4 percent
Landform: Swales
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Loamy Overflow (R054XY023ND)
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: Thin Loamy (R054XY038ND)
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

E0913C—Moreau-Wayden silty clays, 6 to 9 percent slopes

Map Unit Setting

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

Map Unit Composition

Moreau and similar soils: 53 percent
Wayden and similar soils: 17 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Moreau

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from calcareous shale

Typical profile

Ap - 0 to 6 inches: silty clay

Bw - 6 to 13 inches: silty clay
Bk - 13 to 35 inches: silty clay
Cr - 35 to 60 inches: bedrock

Properties and qualities

Slope: 6 to 9 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 20 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Description of Wayden

Setting

Landform: Ridges, rises on pediments
Landform position (two-dimensional): Shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from shale

Typical profile

Ap - 0 to 3 inches: silty clay
Bk - 3 to 7 inches: silty clay
By - 7 to 15 inches: silty clay
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
Natural 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 in profile: 30 percent
Gypsum, maximum in profile: 5 percent

Salinity, maximum in profile: Very slightly saline to strongly saline (2.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: Shallow Clayey (R054XY028ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Minor Components

Lawther

Percent of map unit: 9 percent
Landform: Alluvial fans, alluvial flats
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Regent

Percent of map unit: 9 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Janesburg

Percent of map unit: 6 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: Claypan (R054XY021ND)
Other vegetative classification: Claypan (G054XY800ND)
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: Shallow Loamy (R054XY030ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Savage

Percent of map unit: 3 percent
Landform: Ridges

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

E1009A—Moreau-Barkof silty clays, 0 to 3 percent slopes

Map Unit Setting

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

Map Unit Composition

Moreau and similar soils: 53 percent
Minor components: 47 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Moreau

Setting

Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from calcareous shale

Typical profile

Ap - 0 to 6 inches: silty clay
Bw - 6 to 13 inches: silty clay
Bk - 13 to 35 inches: silty clay
Cr - 35 to 60 inches: bedrock

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 20 percent
Gypsum, maximum in profile: 5 percent

Salinity, maximum in profile: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Minor Components

Barkof

Percent of map unit: 17 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Lawther

Percent of map unit: 12 percent
Landform: Alluvial flats
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Regent

Percent of map unit: 9 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Wayden

Percent of map unit: 4 percent
Landform: Rises on pediments
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Shallow Clayey (R054XY028ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Savage

Percent of map unit: 3 percent
Landform: Alluvial flats
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)

Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Janesburg

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

E1009B—Moreau-Barkof silty clays, 3 to 6 percent slopes

Map Unit Setting

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

Map Unit Composition

Moreau and similar soils: 53 percent
Barkof and similar soils: 16 percent
Minor components: 31 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Moreau

Setting

Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from calcareous shale

Typical profile

Ap - 0 to 6 inches: silty clay
Bw - 6 to 13 inches: silty clay
Bk - 13 to 35 inches: silty clay
Cr - 35 to 60 inches: bedrock

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 20 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Description of Barkof

Setting

Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from shale

Typical profile

Ap - 0 to 7 inches: silty clay
Bss - 7 to 24 inches: silty clay
BC - 24 to 28 inches: silty clay
Cr - 28 to 60 inches: bedrock

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 20 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Very slightly saline to strongly saline (2.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: D
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Minor Components

Lawther

Percent of map unit: 9 percent
Landform: Alluvial fans, alluvial flats
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Wayden

Percent of map unit: 7 percent
Landform: Ridges, rises on pediments
Landform position (two-dimensional): Shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Shallow Clayey (R054XY028ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Regent

Percent of map unit: 7 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Janesburg

Percent of map unit: 5 percent
Landform: Pediments
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: Claypan (R054XY021ND)
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

Savage

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

E1025A—Regent-Savage silty clay loams, 0 to 3 percent slopes

Map Unit Setting

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

Map Unit Composition

Regent and similar soils: 63 percent
Savage and similar soils: 16 percent
Minor components: 21 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Regent

Setting

Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from shale

Typical profile

Ap - 0 to 10 inches: silty clay loam
Bt - 10 to 26 inches: silty clay
Bk - 26 to 39 inches: silty clay loam
Cr - 39 to 60 inches: bedrock

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to moderately saline (0.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s

Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Description of Savage

Setting

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

Typical profile

Ap - 0 to 7 inches: silty clay loam
Bt - 7 to 25 inches: silty clay
Bk - 25 to 51 inches: silty clay loam
C - 51 to 80 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: High (about 11.0 inches)

Interpretive groups

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

Minor Components

Morton

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

Grail

Percent of map unit: 5 percent
Landform: Swales
Down-slope shape: Linear

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

Moreau

Percent of map unit: 4 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Belfield

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

Janesburg

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

E1025B—Regent-Savage silty clay loams, 3 to 6 percent slopes

Map Unit Setting

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

Map Unit Composition

Regent and similar soils: 68 percent
Savage and similar soils: 16 percent
Minor components: 16 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Regent

Setting

Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from shale

Typical profile

Ap - 0 to 10 inches: silty clay loam
Bt - 10 to 26 inches: silty clay
Bk - 26 to 39 inches: silty clay loam
Cr - 39 to 60 inches: bedrock

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to moderately saline (0.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Description of Savage

Setting

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

Typical profile

Ap - 0 to 7 inches: silty clay loam
Bt - 7 to 25 inches: silty clay
Bk - 25 to 51 inches: silty clay loam
C - 51 to 80 inches: silty clay loam

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: High (about 11.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Minor Components

Moreau

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

Grail

Percent of map unit: 4 percent
Landform: Swales
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Loamy Overflow (R054XY023ND)
Other vegetative classification: Overflow (G054XY500ND)
Hydric soil rating: No

Cabba

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

Janesburg

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

Chama

Percent of map unit: 2 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Thin Loamy (R054XY038ND)
Other vegetative classification: Limy Upland (G054XY400ND)
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: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

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
Natural 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 in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: Sandy (R054XY026ND)
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 5 inches: fine sandy loam
C - 5 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
Natural 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 in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: 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: Shallow Sandy (R054XY043ND)
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: Sandy (R054XY026ND)
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: Limy Sands (R054XY045ND)
Other vegetative classification: Sand (G054XY300ND)
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: Loamy (R054XY031ND)
Other vegetative classification: Droughty Loam (G054XY120ND)
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: Loamy Overflow (R054XY023ND)
Other vegetative classification: Overflow (G054XY500ND)
Hydric soil rating: No

E2203B—Farland silt loam, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 1vzth
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 120 to 135 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Farland

Setting

Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-silty alluvium

Typical profile

Ap - 0 to 8 inches: silt loam
Bt - 8 to 18 inches: silty clay loam
Bk - 18 to 31 inches: silty clay loam
C - 31 to 60 inches: silt loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 20 percent
Available water storage in profile: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Minor Components

Farnuf

Percent of map unit: 14 percent
Landform: Alluvial fans, terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Morton

Percent of map unit: 8 percent
Landform: Pediments

Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Droughty Loam (G054XY120ND)
Hydric soil rating: No

Arnegard

Percent of map unit: 7 percent
Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Loamy Overflow (R054XY023ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Grail

Percent of map unit: 4 percent
Landform: Swales
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Loamy Overflow (R054XY023ND)
Other vegetative classification: Overflow (G054XY500ND)
Hydric soil rating: No

Chama

Percent of map unit: 2 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Thin Loamy (R054XY038ND)
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

E2439C—Sen-Janesburg silt loams, 6 to 9 percent slopes

Map Unit Setting

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

Map Unit Composition

Janesburg and similar soils: 29 percent
Sen and similar soils: 22 percent
Minor components: 49 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Janesburg

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey residuum weathered from shale

Typical profile

Ap - 0 to 8 inches: silt loam
E - 8 to 10 inches: silt loam
Btn - 10 to 21 inches: silty clay
BCk - 21 to 26 inches: silt loam
Cr - 26 to 60 inches: bedrock

Properties and qualities

Slope: 6 to 9 percent
Depth to restrictive feature: 2 to 13 inches to natric; 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Slightly saline to moderately saline (5.0 to 15.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Very low (about 2.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: Claypan (R054XY021ND)
Other vegetative classification: Claypan (G054XY800ND)
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
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 7.3 inches)

Interpretive groups

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

Minor Components

Golva

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

Dogtooth

Percent of map unit: 11 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: Thin Claypan (R054XY033ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Regent

Percent of map unit: 10 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Cabba

Percent of map unit: 9 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Shallow Loamy (R054XY030ND)
Other vegetative classification: Not suited (G054XY000ND)
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: Thin Loamy (R054XY038ND)
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

Tally

Percent of map unit: 2 percent
Landform: Ridges, hills
Landform position (two-dimensional): Footslope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Sandy (R054XY026ND)
Other vegetative classification: Droughty Loam (G054XY120ND)
Hydric soil rating: No

E2601C—Amor-Cabba loams, 6 to 9 percent slopes

Map Unit Setting

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

Map Unit Composition

Amor and similar soils: 49 percent
Cabba and similar soils: 32 percent
Minor components: 19 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Amor

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 sedimentary rock

Typical profile

Ap - 0 to 5 inches: loam
Bw1 - 5 to 9 inches: loam
Bw2 - 9 to 15 inches: loam
Bk - 15 to 23 inches: loam
BCk - 23 to 30 inches: loam
Cr - 30 to 79 inches: bedrock

Properties and qualities

Slope: 6 to 9 percent
Depth to restrictive feature: 20 to 39 inches to paralithic bedrock
Natural 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 in profile: 30 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Low (about 5.3 inches)

Interpretive groups

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

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

Ap - 0 to 5 inches: loam
Bk - 5 to 15 inches: loam
Cr - 15 to 79 inches: bedrock

Properties and qualities

Slope: 6 to 9 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Natural 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 in profile: 35 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (1.0 to 2.0 mmhos/cm)
Available water storage in profile: Very low (about 2.6 inches)

Interpretive groups

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

Minor Components

Shambo

Percent of map unit: 9 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Chama

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Thin Loamy (R054XY038ND)
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

Regent

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: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)

Hydric soil rating: No

E2601D—Amor-Cabba loams, 9 to 15 percent slopes

Map Unit Setting

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

Map Unit Composition

Amor and similar soils: 51 percent
Cabba and similar soils: 33 percent
Minor components: 16 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Amor

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 sedimentary rock

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 15 percent
Depth to restrictive feature: 20 to 39 inches to paralithic bedrock
Natural 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 in profile: 30 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0

Available water storage in profile: Low (about 4.2 inches)

Interpretive groups

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

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 4 inches: loam
Bk - 4 to 9 inches: loam
C - 9 to 13 inches: silt loam
Cr - 13 to 79 inches: bedrock

Properties and qualities

Slope: 9 to 15 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Natural 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 in profile: 35 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (1.0 to 2.0 mmhos/cm)
Available water storage in profile: Very low (about 2.3 inches)

Interpretive groups

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

Minor Components

Chama

Percent of map unit: 9 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex

Across-slope shape: Linear
Ecological site: Thin Loamy (R054XY038ND)
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

Shambo

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: Loamy (R054XY031ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Arnegard

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Loamy Overflow (R054XY023ND)
Other vegetative classification: Overflow (G054XY500ND)
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: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

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
Natural 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 in profile: 35 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (1.0 to 2.0 mmhos/cm)
Available water storage in profile: 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: Shallow Loamy (R054XY030ND)
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
Natural 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 in profile: 35 percent
Gypsum, maximum in profile: 3 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 3.0
Available water storage in profile: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: Thin Loamy (R054XY038ND)
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
Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 3 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 3.0
Available water storage in profile: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: B
Ecological site: Loamy (R054XY031ND)
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: Loamy (R054XY031ND)
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: Loamy Overflow (R054XY023ND)
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: Non-site (R054XY999ND)
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: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days

Farmland classification: Not prime farmland

Map Unit Composition

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
Natural 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 in profile: 35 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: Thin Loamy (R054XY038ND)
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
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (1.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: 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: Shallow Loamy (R054XY030ND)
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
Natural 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 in profile: 30 percent
Gypsum, maximum in profile: 2 percent

Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 7.3 inches)

Interpretive groups

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

Minor Components

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: Sandy (R054XY026ND)
Other vegetative classification: Very Droughty Loam (G054XY130ND)
Hydric soil rating: No

Golva

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

Grail

Percent of map unit: 3 percent
Landform: Swales
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Loamy Overflow (R054XY023ND)
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: Claypan (R054XY021ND)
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: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

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
Natural 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 in profile: 30 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (1.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: 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: Shallow Loamy (R054XY030ND)
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
Natural 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 in profile: 35 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 6.6 inches)

Interpretive groups

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

Description of Sen

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 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
Natural 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 in profile: 30 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: Loamy (R054XY031ND)
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: Sandy (R054XY026ND)
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: Loamy (R054XY031ND)
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: Claypan (R054XY021ND)
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: Loamy Overflow (R054XY023ND)
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: Thin Loamy (R054XY038ND)
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

E2801A—Amor-Arnegard loams, 0 to 3 percent slopes

Map Unit Setting

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

Map Unit Composition

Amor and similar soils: 72 percent
Arnegard and similar soils: 10 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Amor

Setting

Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy residuum weathered from mudstone

Typical profile

Ap - 0 to 8 inches: loam
Bw - 8 to 19 inches: loam
Bk - 19 to 31 inches: loam
Cr - 31 to 60 inches: bedrock

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: Low
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 in profile: 30 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Low (about 5.7 inches)

Interpretive groups

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

Description of Arnegard

Setting

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

Typical profile

Ap - 0 to 13 inches: loam
Bw - 13 to 36 inches: loam
Bk - 36 to 60 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately 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 in profile: 20 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 10.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2c
Hydrologic Soil Group: B
Ecological site: Loamy Overflow (R054XY023ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Minor Components

Farnuf

Percent of map unit: 8 percent
Landform: Alluvial flats, terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Vebar

Percent of map unit: 3 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Sandy (R054XY026ND)
Other vegetative classification: Very Droughty Loam (G054XY130ND)
Hydric soil rating: No

Daglum

Percent of map unit: 3 percent
Landform: Alluvial flats
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: Claypan (R054XY021ND)
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

Parshall

Percent of map unit: 2 percent
Landform: Swales
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Loamy Overflow (R054XY023ND)
Other vegetative classification: Overflow (G054XY500ND)
Hydric soil rating: No

Cabba

Percent of map unit: 2 percent
Landform: Rises
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Shallow Loamy (R054XY030ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

E2803B—Amor-Shambo loams, 3 to 6 percent slopes

Map Unit Setting

National map unit symbol: 1vzv0
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Amor and similar soils: 73 percent
Shambo and similar soils: 15 percent
Minor components: 12 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Amor

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
Bw1 - 6 to 13 inches: loam
Bw2 - 13 to 19 inches: loam
Bk - 19 to 31 inches: loam
Cr - 31 to 79 inches: bedrock

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: 20 to 39 inches to paralithic bedrock
Natural 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 in profile: 30 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Droughty Loam (G054XY120ND)
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: Slope alluvium derived from mudstone

Typical profile

Ap - 0 to 6 inches: loam
Bw1 - 6 to 13 inches: loam
Bw2 - 13 to 29 inches: loam
Bk - 29 to 42 inches: loam
BCk - 42 to 48 inches: loam
C - 48 to 79 inches: loam

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 3 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 3.0
Available water storage in profile: High (about 10.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Minor Components

Chama

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: Thin Loamy (R054XY038ND)
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

Cabba

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

Regent

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: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
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: Linear
Ecological site: Loamy Overflow (R054XY023ND)
Other vegetative classification: Overflow (G054XY500ND)
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: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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
Natural 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 in profile: 35 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: Thin Loamy (R054XY038ND)
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
Natural 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 in profile: 30 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Loamy (R054XY031ND)
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
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (1.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: 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: Shallow Loamy (R054XY030ND)
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: Loamy (R054XY031ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Maschetah

Percent of map unit: 2 percent
Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Thin Loamy (R054XY038ND)
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

Janesburg

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

E2927B—Morton-Farland silt loams, 3 to 6 percent slopes

Map Unit Setting

National map unit symbol: 1vzv5
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Morton and similar soils: 63 percent
Farland and similar soils: 19 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Morton

Setting

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

Typical profile

Ap - 0 to 5 inches: silt loam
Bt - 5 to 15 inches: silty clay loam
Bk - 15 to 33 inches: loam
Cr - 33 to 60 inches: bedrock

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 20 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 6.2 inches)

Interpretive groups

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

Description of Farland

Setting

Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-silty alluvium

Typical profile

Ap - 0 to 8 inches: silt loam
Bt - 8 to 18 inches: silty clay loam
Bk - 18 to 31 inches: silty clay loam

C - 31 to 60 inches: silt loam

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately 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 in profile: 20 percent
Available water storage in profile: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Minor Components

Chama

Percent of map unit: 5 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Thin Loamy (R054XY038ND)
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

Belfield

Percent of map unit: 4 percent
Landform: Flats
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Cedarpan

Percent of map unit: 4 percent
Landform: Divides
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Claypan (R054XY021ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Janesburg

Percent of map unit: 3 percent
Landform: Pediments
Down-slope shape: Linear
Across-slope shape: Convex

Ecological site: Claypan (R054XY021ND)
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

Grassna

Percent of map unit: 2 percent
Landform: Swales
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Loamy Overflow (R054XY023ND)
Other vegetative classification: Overflow (G054XY500ND)
Hydric soil rating: No

E3003E—Amor-Brandenburg complex, 3 to 25 percent slopes

Map Unit Setting

National map unit symbol: 1vzv8
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Amor and similar soils: 47 percent
Brandenburg, channery loam, and similar soils: 39 percent
Minor components: 14 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Amor

Setting

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

Typical profile

A - 0 to 8 inches: loam
Bw - 8 to 19 inches: loam
Bk - 19 to 31 inches: loam
Cr - 31 to 60 inches: bedrock

Properties and qualities

Slope: 3 to 15 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Low (about 5.7 inches)

Interpretive groups

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

Description of Brandenburg, Channery Loam

Setting

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

Typical profile

A - 0 to 4 inches: channery loam
C1 - 4 to 10 inches: very channery loam
C2 - 10 to 60 inches: channers

Properties and qualities

Slope: 6 to 25 percent
Percent of area covered with surface fragments: 1.5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): 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 in profile: 15 percent
Available water storage in profile: Very low (about 2.6 inches)

Interpretive groups

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

Minor Components

Cabba

Percent of map unit: 4 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Shallow Loamy (R054XY030ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Savage

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

Daglum

Percent of map unit: 3 percent
Landform: Alluvial flats
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: Claypan (R054XY021ND)
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

Arnegard

Percent of map unit: 2 percent
Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Loamy Overflow (R054XY023ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Rock outcrop, porcelanite

Percent of map unit: 2 percent
Landform: Knobs, ridges
Landform position (two-dimensional): Shoulder
Down-slope shape: Convex
Across-slope shape: Convex, linear
Ecological site: Non-site (R054XY999ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

E3021F—Dogtooth-Janesburg-Brandenburg complex, 9 to 35 percent slopes

Map Unit Setting

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

Map Unit Composition

Dogtooth and similar soils: 23 percent
Janesburg and similar soils: 23 percent
Brandenburg, channery loam, and similar soils: 18 percent
Minor components: 36 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dogtooth

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Clayey residuum weathered from shale

Typical profile

E - 0 to 2 inches: silt loam
Btn - 2 to 8 inches: silty clay
Btkn - 8 to 13 inches: silty clay
Bky - 13 to 21 inches: silty clay
Cr - 21 to 60 inches: bedrock

Properties and qualities

Slope: 9 to 25 percent
Depth to restrictive feature: 2 to 4 inches to natric; 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent

Salinity, maximum in profile: Slightly saline to strongly saline (5.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 25.0
Available water storage in profile: 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: Thin Claypan (R054XY033ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Description of Janesburg

Setting

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

Typical profile

A - 0 to 8 inches: silt loam
E - 8 to 10 inches: silt loam
Btn - 10 to 21 inches: silty clay
BCk - 21 to 26 inches: silt loam
Cr - 26 to 60 inches: bedrock

Properties and qualities

Slope: 9 to 25 percent
Depth to restrictive feature: 2 to 13 inches to natric; 20 to 40 inches to paralithic bedrock
Natural 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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Slightly saline to moderately saline (5.0 to 15.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Very low (about 2.1 inches)

Interpretive groups

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

Description of Brandenburg, Channery Loam

Setting

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

Typical profile

A - 0 to 4 inches: channery loam
C1 - 4 to 10 inches: very channery loam
C2 - 10 to 60 inches: channers

Properties and qualities

Slope: 9 to 35 percent
Percent of area covered with surface fragments: 1.5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: High
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 in profile: 15 percent
Available water storage in profile: Very low (about 2.6 inches)

Interpretive groups

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

Minor Components

Cabba

Percent of map unit: 18 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Shallow Loamy (R054XY030ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Amor

Percent of map unit: 11 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Droughty Loam (G054XY120ND)

Hydric soil rating: No

Harriet, occasionally flooded

Percent of map unit: 3 percent
Landform: Alluvial flats, drainageways
Down-slope shape: Linear
Across-slope shape: Linear, concave
Ecological site: Saline Lowland (R054XY024ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: Yes

Searing

Percent of map unit: 2 percent
Landform: Ridges, hills
Landform position (two-dimensional): Footslope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)
Other vegetative classification: Droughty Loam (G054XY120ND)
Hydric soil rating: No

Wayden

Percent of map unit: 2 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Shallow Clayey (R054XY028ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

E4139A—Korchea-Fluvaquents complex, channeled, 0 to 2 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: d33b
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Korchea, channeled,frequently flooded, and similar soils: 52 percent
Fluvaquents, channeled, frequently flooded, and similar soils: 40 percent
Minor components: 8 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Korchea, Channeled,frequently Flooded

Setting

Landform: Flood plains on river valleys
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified fine-loamy alluvium derived from sedimentary rock

Typical profile

A - 0 to 6 inches: loam
C - 6 to 60 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 10.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: B
Ecological site: Loamy Overflow (R054XY023ND)
Other vegetative classification: Overflow (G054XY500ND)
Hydric soil rating: No

Description of Fluvaquents, Channeled, Frequently Flooded

Setting

Landform: Channels on flood plains
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium

Typical profile

A - 0 to 10 inches: fine sandy loam
Cg - 10 to 80 inches: stratified loamy sand to silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (0.60 to 20.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Calcium carbonate, maximum in profile: 15 percent

Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: A
Ecological site: Non-site (R054XY999ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: Yes

Minor Components

Velva, channeled,frequently flooded

Percent of map unit: 5 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Loamy Overflow (R054XY023ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Lallie, frequently flooded

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

E4180A—Korell-Daglum-Fluvaquents complex, channeled, 0 to 2 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 1vzw3
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Fluvaquents, channeled, frequently flooded, and similar soils: 40 percent
Korell, channeled,frequently flooded, and similar soils: 28 percent
Daglum, channeled,occasionally flooded, and similar soils: 18 percent
Minor components: 14 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fluvaquents, Channeled, Frequently Flooded

Setting

Landform: Channels on flood plains
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium

Typical profile

A - 0 to 10 inches: fine sandy loam
Cg - 10 to 80 inches: stratified loamy sand to silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (0.60 to 20.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: A
Ecological site: Non-site (R054XY999ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: Yes

Description of Korell, Channeled,frequently Flooded

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-loamy alluvium derived from sedimentary rock

Typical profile

A - 0 to 8 inches: loam
Bw - 8 to 15 inches: loam
Bk - 15 to 48 inches: loam
C - 48 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Frequent

Frequency of ponding: None
Calcium carbonate, maximum in profile: 20 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: B
Ecological site: Loamy Overflow (R054XY023ND)
Other vegetative classification: Overflow (G054XY500ND)
Hydric soil rating: No

Description of Daglum, Channeled,occasionally Flooded

Setting

Landform: Alluvial flats
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Clayey alluvium

Typical profile

A - 0 to 7 inches: silty clay loam
E - 7 to 8 inches: silt loam
Btn - 8 to 18 inches: clay
Bky - 18 to 32 inches: clay loam
BCk - 32 to 47 inches: clay loam
C - 47 to 60 inches: clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 4 to 20 inches to natric
Natural drainage class: Moderately 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: Occasional
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Slightly saline to moderately saline (5.0 to 15.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Very low (about 1.5 inches)

Interpretive groups

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

Minor Components

Rhoades, channeled,occasionally flooded

Percent of map unit: 6 percent
Landform: Terraces
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: Thin Claypan (R054XY033ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Savage, occasionally flooded

Percent of map unit: 6 percent
Landform: Alluvial flats
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Harriet, occasionally flooded

Percent of map unit: 2 percent
Landform: Alluvial flats, drainageways
Down-slope shape: Linear
Across-slope shape: Linear, concave
Ecological site: Saline Lowland (R054XY024ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: Yes

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