United States Department of Agriculture

Natural Resources Conservation Service

In cooperation with North Dakota Agricultural Experiment Station, North Dakota Cooperative Extension Service, USDA-Forest Service, USDI-National Park Service, and North Dakota State Soil Conservation Committee

Soil Survey of Billings County, North Dakota

The soil properties and interpretations included in this survey were current as of 1998. The most current information is available through the Natural Resources Conservation Service Soil Data Mart Website at http://soildatamart.nrcs.usda.gov/ and/or the Natural Resources Conservation Service Web Soil Survey at http://websoilsurvey.nrcs.usda.gov/app.

How To Use This Soil Survey

General Soil Map

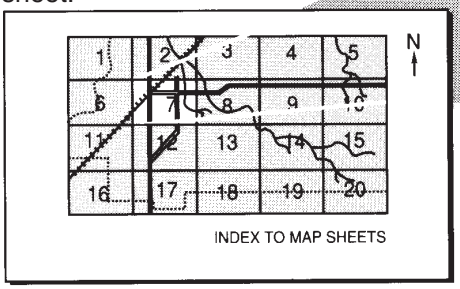
The general soil map, which is a color map, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

Detailed Soil Maps

The detailed soil maps can be useful in planning the use and management of small areas. (Seelig, 1993) (Broderson, 1991)

To find information about your area of interest, locate that area on the **Index to Map Sheets**. Note the number of the map sheet and turn to that sheet.



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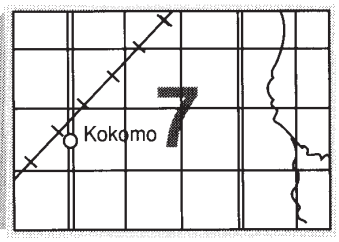
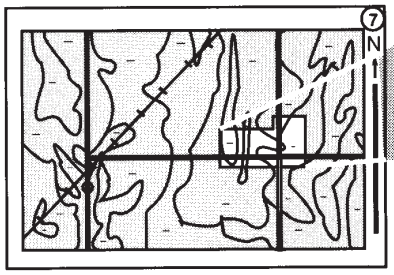


MAP SHEET

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Contents**, which lists the map units by symbol and name and shows the page where each map unit is described.



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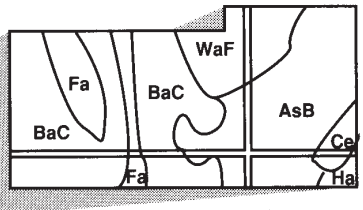

AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Contents** shows which table has data on a specific land use for each detailed soil map unit. Also see the **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication 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 Station, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the federal part of the National Cooperative Soil Survey. This survey was made cooperatively by the Natural Resources Conservation Service, USDA - Forest Service, and USDI - National Park Service, the North Dakota Agricultural Experiment Station, North Dakota Cooperative Extension Service, North Dakota State Soil Conservation Committee, and the North Dakota State Department of Transportation. It is part of the technical assistance furnished to the Western Soil Conservation District and the Golden Valley County Soil Conservation District. Financial assistance was provided by USDA- Forest Service, USDI-National Park Service, and the Western Soil Conservation District

Major fieldwork for this soil survey was completed in 1997. Soil names and descriptions were approved in 1998. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1987 to 1997. The most current official data are available through the NRCS Soil Data Mart Website at http://soildatamart.nrcs.usda.gov.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. Maps may not show the small areas of contrasting soils that could have been shown at a larger scale.

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Cover: A typical landscape in western Billings County along the Little Missouri River. The hayed area is an area of Glendive fine sandy loam, 0 to 3 percent slopes. The wooded floodplains and drainageways provide diverse habitat for wildlife and protection for livestock. An area of Badland, outcrop, Arikara-Cabbart complex, 15 to 70 percent slopes, is in the background.

Additional information about the Nation's natural resources is available online from the Natural Resources Conservation Service at http://www.nrcs.usda.gov.

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Foreword

This soil survey contains information that can be used in land-planning programs in Billings County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. 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.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

J.R. Flores
State Conservationist
Natural Resources Conservation Service

Where To Get Updated Information

The soil properties and interpretations included in this survey were current as of October 2005. The most current information is available through the Natural Resources Conservation Service Soil Data Mart Website as http://soildatamart.nrcs.usda.gov/ and/or the Natural Resources Conservation Service Web Soil Survey at http://websoilsurvey.nrcs.usda.gov/app.

Additional information is available from the Natural Resources Conservation Service Field Office Technical Guide at Beach and Dickinson, North Dakota, or online at www.nrcs.usda.gov/technical/efotg. The data in the Field Office Technical Guide are updated periodically.

Additional information about soils and about NRCS is available through the North Dakota NRCS Web page at www.nd.nrcs.usda.gov.

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Soil Survey of Billings County, North Dakota

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United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with
United States Department of Agriculture - Forest Service, United States Department of Interior - National Park Service, North Dakota Agricultural Experiment Station, North Dakota Cooperative Extension Service, North Dakota State Soil Conservation Committee, North Dakota State Department of Transportation, and the Western Soil Conservation District and Golden Valley County Soil Conservation District. Financial assistance was provided by United States Department of Agriculture, Forest Service, United States Department of Interior, National Park Service and Western Soil Conservation District.

General Nature of the Area

Billings County is in the southwestern part of North Dakota (fig. 1). It has a total area of 737,000 acres or 1,152 square miles. The county is bounded on the west by Golden Valley County, on the north by McKenzie and Dunn Counties, on the east by

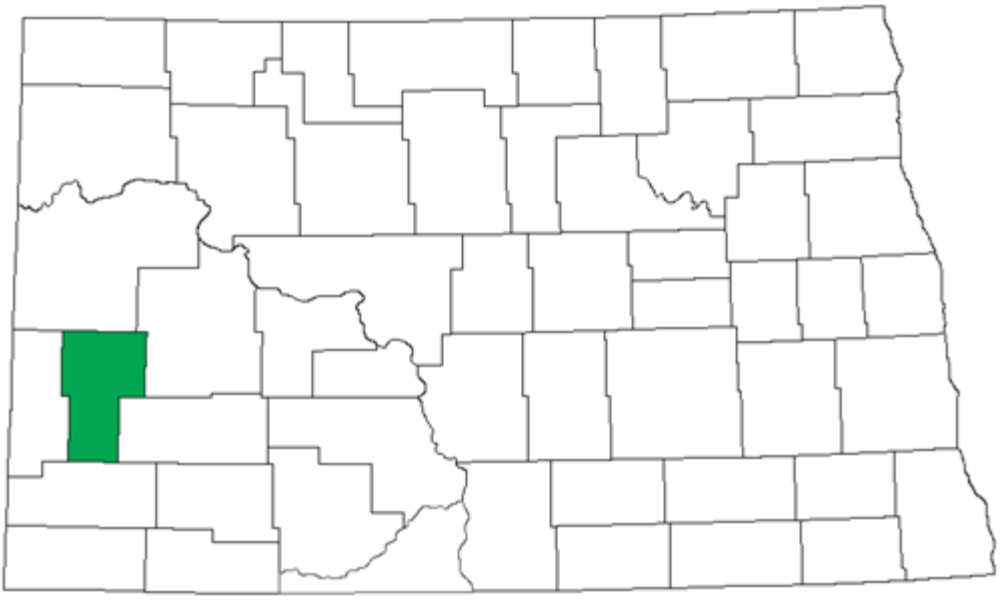

Figure 1. Location of Billings County in North Dakota.

Dunn and Stark Counties, and on the south by Slope County. The county seat is Medora.

The first recorded settlements in the area were established in the 1880's. Additional information concerning the history and development of Billings County has been published by the Billings County Historical Society (1979).

The eastern portion of the county lies in the Rolling Soft Shale Plains (MLRA 54) and the western portion lies in the Northern High Plains, Northeastern Part (MLRA 58C) of the Northern Great Plains Spring Wheat Region (USDA-SCS, 1981). All of Billings County lies within the unglaciated section of the Missouri Plateau of the Great Plains Regions.

Elevation in the county ranges from 3,358 feet in the southwestern part (Bullion Butte) to 2,100 feet in the northwestern part. Local relief rarely exceeds 100 feet/mile in the eastern part (MLRA 54) of the county and can be as much as 300 to 400 feet/mile in the western part (MLRA 58C). In MLRA 54 the drainage flows eastward and southeastward. In MLRA 58C the drainage flows westward and northward.

Farming, ranching, and oil are the main economic enterprises in the county. The principal crops are spring wheat, oats, barley, and hay (Hartwig and Meyer, 2001). Western Stark County Soil Conservation District was organized in 1943. It was enlarged in 1957 to include the portion of Billings County east of the Little Missouri River and was named Western Soil Conservation District. The Golden Valley Soil Conservation District was organized in 1948. It was enlarged in 1956 to include the portion of Billings County west of the Little Missouri River.

The soils in the county vary widely in extent and kind. There is one major area within Billings County that is level to gently rolling. The soils are moderately to very deep and have parent materials that are alluvial or residual in origin. They are well suited to cropland. The soils in the Little Missouri River Valley are very deep and well suited to cropland. The soils within the Little Missouri drainage system are shallow to very deep and hilly to very steep. They are best suited to rangeland. They are in complex with the Badlands.

The first soil survey of Billings County was published in the 1910 Soil Survey of Western North Dakota (Lapham, 1911). In 1944 a Soil Survey of Billings County was published at a scale of 1 inch = 1 mile by the U. S. Department of Agriculture, Bureau of Plant Industries, Soils and Agricultural Engineering. A general soil map of the Billings County, at a scale of 1 inch = 2 miles, was published in 1963 and Bulletin No. 473, Soil Survey Report – County General Soils Maps – North Dakota , was authored by D. D. Patterson, G. A. Johnsgard, M. D. Sweeney, and H. W. Omodt in July 1968 (Patterson, et al., 1968). The present detailed soil survey was initiated by the Soil Conservation Service in 1987.

About 18 percent of the county is cropland or pasture, 25 percent is native rangeland, 46 percent is federal land, 2 percent is forestland, and 9 percent is other land. The USDA, Forest Service administers about 40 percent of the federal land and the USDI, National Park Service administers about 6 percent. Additional information related to agriculture in Billings County can be found in the Census of Agriculture (USDA-NASS, 2002).

Climate

The climate of Billings County is semi-arid to subhumid and continental. The area is usually quite warm in summer with frequent spells of hot weather and occasional cool days. It is very cold in winter, when arctic air frequently surges over the area. Most precipitation falls in late spring and early summer.

The table, "Temperature and Precipitation," gives data on temperature and precipitation for the survey area as recorded at Fairfield, North Dakota, in the period

1961 to 1990. The table “Freeze Dates in Spring and Fall,” shows probable dates of the first freeze in fall and the last freeze in spring. The table “Growing Season,” provides data on length of the growing season.

In January, the average temperature is 12 degrees F, and the average daily minimum temperature is 2 degrees F. In July, the average temperature is 69 degrees F and the average daily maximum temperature is 83 degrees F.

Growing degree days are shown in the table “Temperature and Precipitation.” They are equivalent to “heat units.” During the month, growing degree days accumulate by the amount the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The average annual total precipitation in the county is about 16 inches. Of this, about 13 inches, or 82 percent, usually falls in April through September. The growing season for commonly grown crops falls within this period. Rainfall amounts occurring in 2 years out of 10 are also shown on the first table. The information is useful in designing a management system for wet and dry years.

Average annual snowfall is about 32 inches. The average annual relative humidity at midafternoon in July is about 41 percent. The sun shines 76 percent of the possible time in summer and 46 percent of the time in winter. The sun shines an average of about 62 percent of the possible time annually. The prevailing wind is from the northwest. The average windspeed is highest, about 10.8 miles per hour, in spring (Jensen, 1972).

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and a discussion of the suitability, limitations, and management of the soils and miscellaneous areas for specified 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 dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down to the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by biological activity.

Soils and miscellaneous areas in the survey area are 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 or segment of the landscape. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landscape, soil scientists develop a concept, or model, of how the soils were formed. Thus, during mapping, this model enables soil scientists to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Individual soils on the landscape commonly merge into one another as their characteristics gradually change. To construct an accurate map, however, soil scientists must determine 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 relationships, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded characteristics of the soil profiles they studied. They noted color, texture, size, and shape of soil aggregates, kind and amount of rock

fragments, distribution of plant roots, soil reaction, and other features that enable them to identify soils (fig. 2). 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 and to classify soils systematically. Soil Taxonomy (Soil Survey Staff, 1999), 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 soil scientists classified and named the soils in the survey area, they compared individual soils with similar soils in the same taxonomic class in other areas so they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area are collected for laboratory analyses and for engineering tests. Soil scientists interpret data from these analyses and tests as well as field-observed characteristics and soil properties to determine expected behavior of soils under different uses. Interpretations for the soils are field tested through observation of the soils in

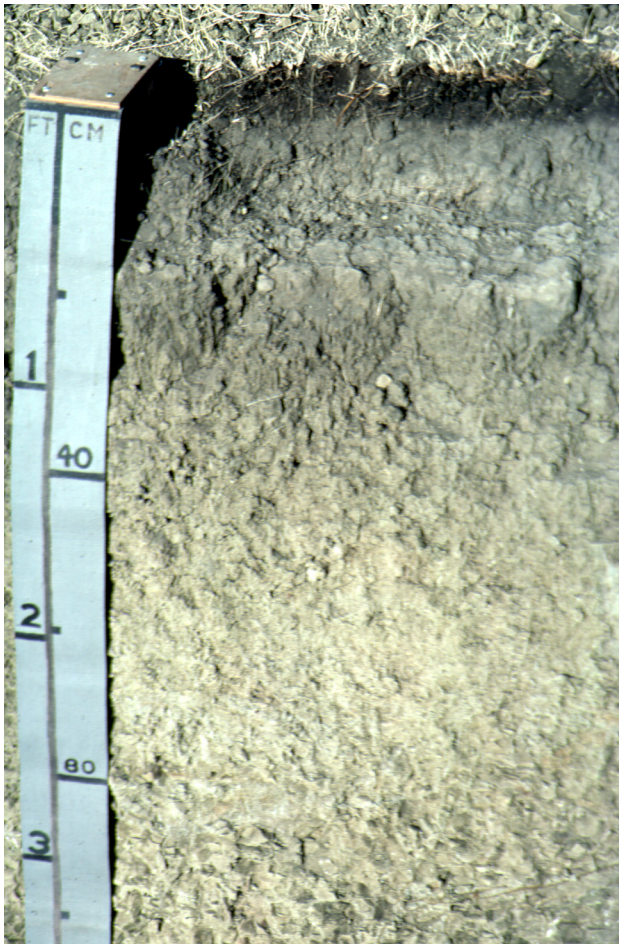

Figure 2. Profile of Janesburg silt loam. The dark brown and gray surface layers are underllain by a brown, dense, sodic subsoil.

different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations may be 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 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.

The descriptions, names, and delineations of the soils in this survey area do not fully agree with those of the soils in adjacent survey areas. Differences are the result of a better knowledge of soils, modifications in series concepts, or variations in the intensity of mapping or in the extent of the soils in the survey areas.

Survey Procedures

The general procedures used to make this survey are described in the National Soil Survey Handbook (Soil Survey Staff, 1996) and the Soil Survey Manual (Soil Survey Staff, 1993). The Major Soils of North Dakota (Omodt et al., 1968), Soil Taxonomy (Soil Survey Staff, 1999), and Land Resource Regions and Major Land Resource Areas of the United States (USDA-SCS, 1981), were among the references used. The procedures used in determining the nature and characteristics of the soils are described under the heading “How This Survey Was Made.”

All soil mapping was done on field sheets developed from high-altitude black and white aerial photographs from the National High Altitude Photography (NHAP) Program. The scale of the field sheets was 1:24,000 or 2.64 inches to the mile. Details on these field sheets were checked with older aerial photography, color infrared photography, and in some instances, topographic maps. The soil maps are published on full quadrangle orthophotography.

Soil delineations were drawn on field sheets by traversing the land on foot, by pickup with mounted hydraulic soil probe, or by all-terrain vehicle. Traverses were planned to cross all major landforms and were at intervals close enough to locate contrasting soil areas of about 3 to 5 acres. Soils were examined to a depth of 3 to 5 feet, depending on the kind of soil. Soil properties, including color, texture, structure, horizonation, and presence of salts and stones were examined.

All map units were characterized for soil variability by transecting representative areas. A transect is a series of detailed soil examinations done in a map unit delineation to determine the range of composition of various kinds of soil and soil properties. One transect was required for each 1,000 acres of the unit mapped.

Data collected from the transects were used to determine map unit names and establish the range of composition of soil in each map unit. A statistical method explained by Brubaker and Hallmark (1991) was used for the analyses. This method predicts, at a 90 percent confidence level, the average composition in the county for each named map unit component and similar soil will be between the range given in the map unit description.

Each soil map unit was documented by at least one pedon description for each soil series identified in its name. Soil pedons were sampled for soil characterization or engineering test data. The soil analyses were made by the Natural Resources Conservation Service's Soil Survey Laboratory at Lincoln, Nebraska and the North Dakota State Department of Transportation's Materials and Research Laboratory.

Temperature and Precipitation

(Recorded in the period 1961-90 at Fairfield, North Dakota.)

Month	Temperature						Precipitation			
	avg daily max	avg daily min	avg	2 years in 10 will have max temp. >than	2 years in 10 will have min temp. <than	avg no. of growing degree days*	avg (in.)	2 yrs in 10 will have less than (in.)	2 yrs in 10 will have more than (in.)	average number of days with 0.10 inch or more
January	21.3	2.1	11.7	50	-31	1	0.34	0.11	0.54	1
February	27.7	7.9	17.8	55	-26	3	0.28	0.09	0.45	0
March	38.1	17.6	27.8	69	-14	22	0.56	0.20	0.85	1
April	53.5	29.8	41.7	85	5	141	1.60	0.43	2.63	4
May	65.8	41.2	53.5	91	22	425	2.45	0.98	3.69	5
June	75.1	50.6	62.9	95	35	670	3.39	1.96	4.67	6
July	82.5	55.9	69.2	101	42	894	2.06	0.90	3.04	4
August	81.4	54.0	67.7	99	40	855	1.62	0.65	2.44	3
September	68.7	43.7	56.2	95	24	487	1.60	0.52	2.48	3
October	57.2	33.5	45.3	82	11	218	0.87	0.31	1.51	2
November	38.4	19.0	28.7	68	-11	28	0.43	0.13	0.67	1
December	24.7	5.7	15.2	54	-29	2	0.35	0.10	0.55	1
Yearly :										
Average	52.9	30.1	41.5	—	—	—	—	—	—	—
Extreme	109	-38	—	102	-33	—	—	—	—	—
Total	—	—	—	—	—	3745	15.55	11.75	18.76	31

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures,dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (Threshold: 40.0 deg. F)

Freeze Dates in Spring and Fall

(Recorded in the period 1961-90 at Fairfield, North Dakota.)

Probability	Temperature		
	24F or lower	28F or lower	32F or lower
Last freezing temperature in spring :			
1 year in 10 later than—	May 9	May 17	May 29
2 year in 10 later than—	May 4	May 12	May 24
5 year in 10 later than—	April 24	May 4	May 13
First freezing temperature in fall :			
1 yr in 10 earlier than—	September 26	September 15	September 7
2 yr in 10 earlier than—	October 1	September 21	September 13
5 yr in 10 earlier than—	October 12	October 3	September 24

Growing Season

(Recorded in the period 1961-90 at Fairfield, North Dakota.)

Probability	Daily Minimum Temperature		
	# days > 24F	# days > 28F	# days > 32F
9 years in 10	142	122	109
8 years in 10	149	131	117
5 years in 10	162	146	132
2 years in 10	175	162	146
1 year in 10	181	170	154

General Soil Map Units (STATSGO)

The general soil map which precedes the detailed soil maps was derived from STATSGO (State Soil Geographic Data Base). STATSGO (USDA-NRCS, 1994) is a small scale digital general soil map of North Dakota and an accompanying data base. It shows broad areas that have a distinctive pattern of soils, relief, and drainage. These similar areas are delineated into general soil map units or soil associations. Each soil association is a unique natural landscape. Typically, they consist of one or more major soils or components and some minor soils or components. The soils making up an association can occur in another association but in a different pattern. The STATSGO map can be used to compare the suitability of large areas for general land uses. Areas of soils suitable for a practice or use can be identified on the map. Likewise, areas that are not suitable can be identified. Broad interpretive groupings can be developed using STATSGO data. STATSGO maps are designed to be used primarily for multi-county and state resource evaluation and planning. Interpretive tables and maps can be prepared for North Dakota, or for smaller areas within the state. STATSGO maps can be used as part of a geographic information system (GIS).

The STATSGO map was compiled by generalizing more detailed soil survey maps. Information on the geology, topography, vegetation, and climate was also considered in the development of this map. The data base contains information on each association's acreage and composition. It also contains soil properties and interpretive data.

Maps were compiled at a scale of 1:250,000 (1 inch=4 miles). The smallest delineations are about 1,500 acres in size. STATSGO maps are prepared nationwide at the same scale and join across county and state boundaries. The maps meet national standards for mapping conventions and scale. Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Descriptions for STATSGO associations in Billings County begin on page 10. The composition of the named components in the association description includes soils that are similar in properties and behavioral patterns. Not all minor components are listed.

The North Dakota STATSGO map and data base are maintained by the USDA-NRCS Soils Staff in Bismarck, North Dakota. For more information on the use of STATSGO, or on the availability of interpretive tables and maps, contact the state NRCS office.

100—Cabba-Dogtooth-Amor Association, level to very steep

	SURFACE TEXTURE*	SLOPE PERCENT	DRAINAGE**	PERCENT COMPOSITION
MAJOR COMPONENTS				
Cabba	L	9-70	W	30-35
Dogtooth	SIL	0-25	W	25-30
Amor	L	3-25	W	15-20
MINOR COMPONENTS				
Farnuf	L	1-15	W	5-10
Badland, outcrop	--	9-150	--	1-5
Havrelon	SIL	0-6	W	1-5
Belfield	SICL	0-6	W	1-5

* L, loam; SIL, silt loam; SICL, silty clay loam
** W, well

Description

These soil areas consist of level to very steep rises and ridges, with some flood plains, flats, and fans. The dominant soils formed in medium to fine textured residuum. Most areas are used for rangeland. Lesser sloping areas are used for cropland.

Cabba soils occur on rises and shoulder slopes on ridges. Amor and Dogtooth soils occur on pediments and backslopes of ridges. Belfield, and Farnuf soils occur on fans, flats, and footslopes of ridges. Dogtooth and Belfield soils have a dense, sodium-affected subsoil that restricts root growth. Badland, outcrop occurs on barren side slopes of ridges. Havrelon soils occur on flood plains.

Major Limitations for Agricultural Use

Water erosion is a concern on steeper areas. Droughtiness, due to restricted root growth, is a concern on sodium affected soils. For additional information concerning these soils see "Detailed Map Unit Descriptions" and "Series Descriptions." For information concerning the limitations for agriculture see the “Potential Cropland Limitations and Hazards” table.

115—Straw-Velva Association, level to undulating

	SURFACE TEXTURE*	SLOPE PERCENT	DRAINAGE**	PERCENT COMPOSITION
MAJOR COMPONENTS				
Straw	L	0-3	W	50-55
Velva	FSL	1-6	W	5-10
MINOR COMPONENTS				
Belfield	SIL	1-3	W	5-10
Parshall	FSL	1-6	W	5-10
Vebar	FSL	6-15	W	5-10
Cabba	L	3-45	W	1-5

*FSL, fine sandy loam; L, loam, SIL, silt loam
** W, well

Description

These soil areas consist of level to undulating stream terraces and flood plains and adjacent fans, flats, and escarpments. The dominant soils formed in moderately coarse to medium textured fluvial deposits. Most areas of this association are used for cultivated crops with steeper escarpments used for rangeland.

Straw and Velva soils occur on stream terraces and flood plains. Belfield soils occur on flats. Parshall soils occur on terraces and fans. Vebar soils occur on backslopes of ridges. Cabba soils occur on shoulders of ridges.

Major Limitations for Agricultural Use

Wind erosion is a concern on moderately coarse textured soils. Water erosion is a concern on steeper areas. For additional information concerning these soils see "Detailed Map Unit Descriptions" and "Series Descriptions." For information concerning the limitations for agriculture see the “Potential Cropland Limitations and Hazards” table.

117—Shambo-Stady-Tally Association, nearly level to undulating

	SURFACE TEXTURE*	SLOPE PERCENT	DRAINAGE**	PERCENT COMPOSITION
MAJOR COMPONENTS				
Shambo	L	1-6	W	20-25
Stady	L	1-6	W	15-20
Tally	FSL	1-6	W	10-15
MINOR COMPONENTS				
Rhoades	L	1-6	W	10-15
Belfield	SIL	0-6	W	5-10
Lawther	SIC	1-9	W	5-10
Vebar	FSL	1-6	W	5-10

* FSL, fine sandy loam; L, loam; SIL, silt loam; SIC, silty clay
** W, well

Description

These soil areas consist of nearly level to undulating flats, fans, and terraces. The dominant soils formed in moderately coarse to medium textured alluvium. Most areas of this association are used for cultivated crops.

Shambo, Rhoades, Belfield, and Lawther soils occur on flats and fans. Stady soils occur on terraces. They have a gravelly substratum. Tally soils occur on fans. Rhoades soils occupy micro-low and have a dense, sodium affected subsoil that restricts root growth. Vebar soils occur on pediments.

Major Limitations for Agricultural Use

Wind erosion is a concern on moderately coarse and fine textured soils. Droughtiness, due to low water holding capacity, is a concern on the moderately coarse textured soils, soils with gravelly substratums, and sodium affected soils. For additional information concerning these soils see "Detailed Map Unit Descriptions" and "Series Descriptions." For information concerning the limitations for agriculture see the “Potential Cropland Limitations and Hazards” table.

122—Vebar-Parshall Association, level to rolling

	SURFACE TEXTURE*	SLOPE PERCENT	DRAINAGE**	PERCENT COMPOSITION
MAJOR COMPONENTS				
Vebar	FSL	1-15	W	30-35
Parshall	FSL	0-6	W	20-25
MINOR COMPONENTS				
Flasher	LFS	6-15	SE	15-20
Amor	L	3-9	W	15-20
Arnegard	L	0-3	W	5-10
Harriet	L	0-1	P	5-10

* FSL, fine sandy loam; L, loam
** P, poor; W, well; SE, somewhat excessive

Description

These soil areas consist of level to rolling uplands with fans, flats, terraces, rises, ridges, and drainageways. The dominant soils formed in moderately coarse textured alluvium and sandstone residuum (fig. 3). Most areas of this association are used for cultivated crops with steeper areas used for rangeland.

Vebar and Amor soils occur on pediments and backslopes of ridges. Parshall and Arnegard soils occur on fans, flats, and terraces. Flasher soils occur on shoulders of ridges. Harriet soils occupy low-lying drainageways. They have a dense, sodium affected subsoil that restricts root growth.

Major Limitations for Agricultural Use

Water erosion is a concern on steep areas. Wind erosion and droughtiness are concerns on coarse and moderately coarse textured soils. The poorly drained soils generally have periods of wetness and ponding in the spring and after heavy rains. For additional information concerning these soils see "Detailed Map Unit Descriptions" and "Series Descriptions." For information concerning the limitations for agriculture see the “Potential Cropland Limitations and Hazards” table.

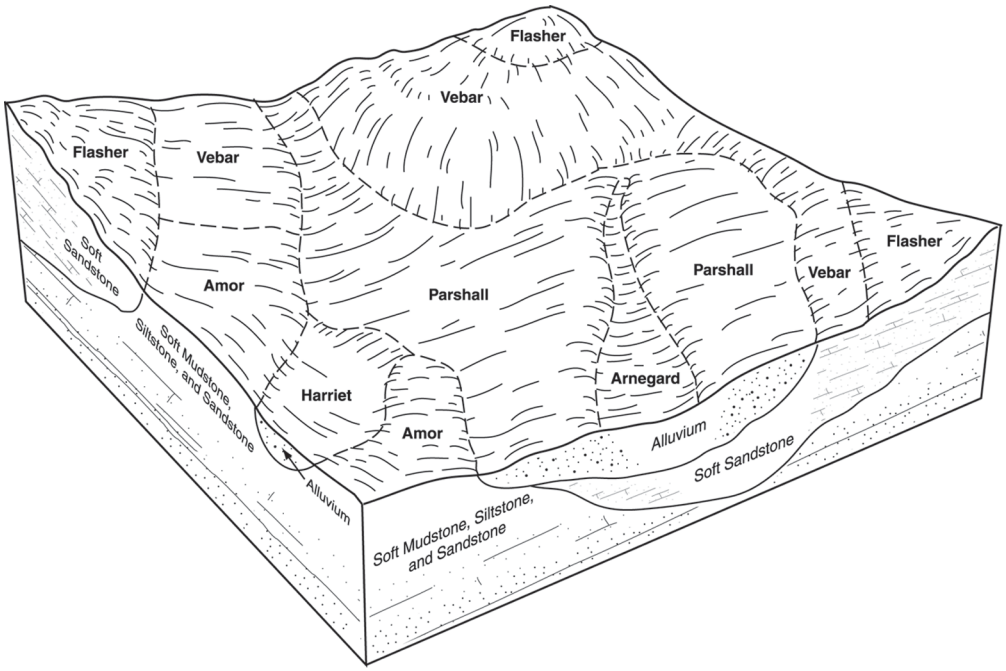

Figure 3. Typical pattern of soils and underlying material in the Vebar-Parshall association.

135—Lonna-Cabbart-Badland, outcrop Association, undulating to very steep

	SURFACE TEXTURE*	SLOPE PERCENT	DRAINAGE**	PERCENT COMPOSITION
MAJOR COMPONENTS				
Lonna	SIL	3-25	W	35-40
Cabbart	SIL	6-70	W	30-35
Badland, outcrop	--	9-150	--	10-15
MINOR COMPONENTS				
Boxwell	L	1-15	W	5-10
Scairt	SIL	0-15	W	1-5
Rhame	FSL	6-50	W	1-5
Havre	SIL	0-3	W	1-5

* FSL, fine sandy loam; L, loam; SIL, silt loam
** W, well

Description

These soil areas consist of undulating to very steep flats, fans, hills, and ridges with some flood plains. The dominant soils formed in medium textured alluvium and residuum. Most areas of this association are used for rangeland. Lesser sloping areas are used for cultivated crops.

Lonna soils occur on footslopes of hills and on fans. Cabbart soils occur on shoulders of ridges. Badland, outcrop occurs on barren side slopes of ridges. Boxwell and Rhame soils occur on backslopes on ridges and hills and on pediments. Scairt soils occupy micro-lows on pediments. They have a dense, sodium affected suboil that restricts root growth. Havre soils occur on flood plains.

Major Limitations for Agricultural Use

Water erosion is a concern on steeper areas. Wind erosion is a concern on moderately coarse textured soils. Droughtiness, due to restricted root growth, is a concern on sodium affected soils. For additional information concerning these soils see "Detailed Map Unit Descriptions" and "Series Descriptions." For information concerning the limitations for agriculture see the “Potential Cropland Limitations and Hazards” table.

138—Glendive-Havre-Hanly Association, level to undulating

	SURFACE TEXTURE*	SLOPE PERCENT	DRAINAGE**	PERCENT COMPOSITION
MAJOR COMPONENTS				
Glendive	FSL	0-6	W	20-25
Havre	SIL	0-3	W	20-25
Hanly	FSL	0-6	SE	10-15
MINOR COMPONENTS				
Chanta	L	1-6	W	10-15
Lonna	SIL	1-9	W	10-15
Cabbart	SIL	9-50	W	10-15
Badland, outcrop	--	9-150	--	1-5

* FSL, fine sandy loam; L, loam; SIL, silt loam
** W, well; SE, somewhat excessive

Description

These soil areas consist of level to undulating flood plains with some fans, terraces, and ridges found along the Little Missouri River (fig. 4). The dominant soils formed in moderately coarse to medium textured alluvium. Most areas of this association are used for rangeland or hayland.

Glendive, Havre, and Hanly soils occur on flood plains. Chanta soils occur on terraces. Lonna soils occur on fans. Cabbart soils occur on shoulders of ridges. Badland outcrop occurs on barren side slopes of ridges.

Major Limitations for Agricultural Use

Wind erosion is a concern on the moderately coarse textured soils. Water erosion is a concern on steeper areas. Flooding is a concern on the dominant soils. For additional information concerning these soils see "Detailed Map Unit Descriptions" and "Series Descriptions." For information concerning the limitations for agriculture see the “Potential Cropland Limitations and Hazards” table.

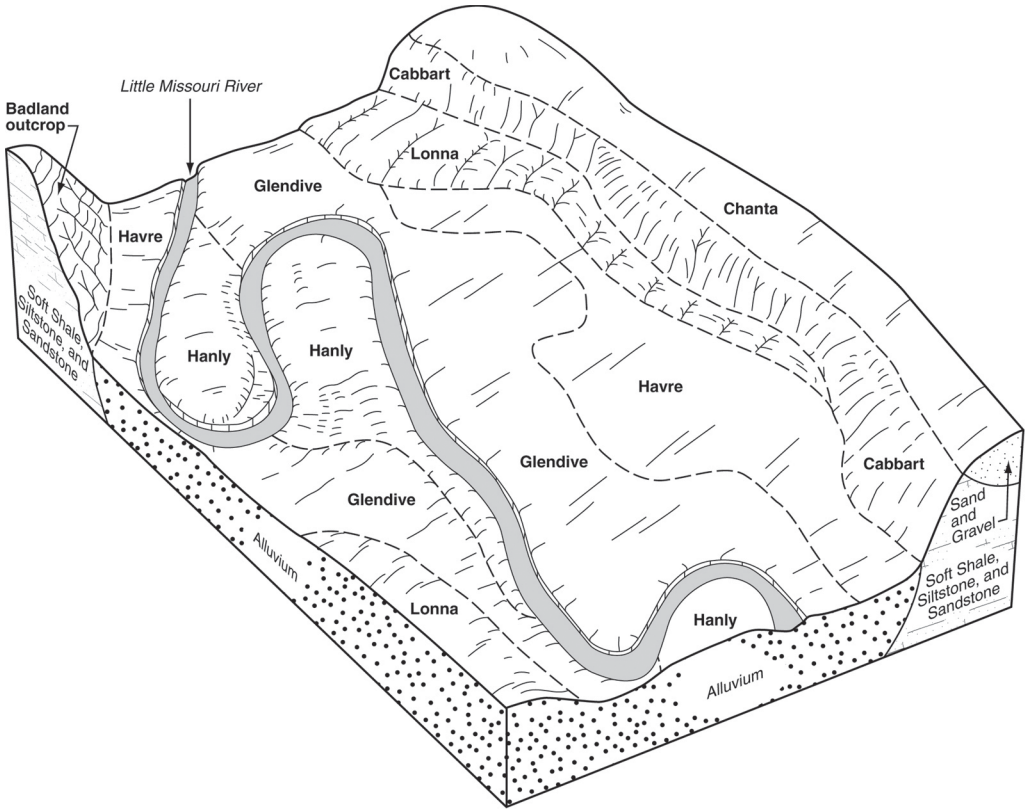

Figure 4. Typical pattern of soils and underlying material in the Glendive-Havre-Hanly Association.

160—Rhame-Fleak Association, gently rolling to very steep

	SURFACE TEXTURE*	SLOPE PERCENT	DRAINAGE**	PERCENT COMPOSITION
MAJOR COMPONENTS				
Rhame	FSL	6-50	W	40-45
Fleak	LFS	6-50	SE	25-30
MINOR COMPONENTS				
Boxwell	L	0-50	W	5-10
Arikara	SPM	9-70	W	5-10
Badland, outcrop	--	9-150	--	1-5
Havre	SIL	0-3	W	1-5
Scairt	SIL	6-15	W	1-5

* FSL, fine sandy loam; L, loam; LFS, loamy fine sand; SIL, silt loam; SPM, slightly decomposed plant material
** W, well; SE, somewhat excessive

Description

These soil areas consist of gently rolling to very steep fans and ridges with some flood plains. The dominant soils formed in coarse to moderately coarse textured residuum. Most areas of this association are used for rangeland. Lesser sloping areas are used for cultivated crops.

Rhame and Boxwell soils occur on backslopes of ridges and on pediments. Fleak soils occur on shoulders of ridges. Arikara soils occur on footslopes and backslopes of ridges. Badland, outcrop occurs on barren side slopes of ridges. Havre soils occur on flood plains. Scairt soils occur in micro-lows on footslopes and backslopes of ridges. They have a dense, sodium-affected subsoil that restricts root growth.

Major Limitations for Agricultural Use

Water erosion is a concern on steep areas. Wind erosion is a concern on coarse and moderately coarse textured soils. Droughtiness, due to restricted root growth, is a concern on sodium affected soils. For additional information concerning these soils see "Detailed Map Unit Descriptions" and "Series Descriptions." For information concerning the limitations for agriculture see the “Potential Cropland Limitations and Hazards” table.

176—Patent-Badland, outcrop-Cabbart Association, nearly level to very steep

	SURFACE TEXTURE*	SLOPE PERCENT	DRAINAGE**	PERCENT COMPOSITION
MAJOR COMPONENTS				
Patent	L	1-25	W	30-35
Badland, outcrop	--	9-150	--	20-25
Cabbart	L	6-70	W	15-20
MINOR COMPONENTS				
Arikara	SPM	15-70	W	1-5
Rhame	FSL	3-15	W	1-5
Gerda	SIL	0-9	W	1-5
Boxwell	L	1-50	W	1-5

* FSL, fine sandy loam; L, loam; SIL, silt loam; SPM, slightly decomposed plant material
** W, well

Description

These soil areas consist of nearly level to very steep fans and ridges with some flats (fig. 5). The dominant soils formed in medium textured alluvium and residuum. Most areas of this association are used for rangeland. Lesser sloping areas are used for cultivated crops.

Patent soils occur on fans. Badland, outcrop occurs on barren side slopes of ridges. Cabbart soils occur on shoulders of ridges. Arikara soils occur on backslopes and footslopes of ridges. Rhame and Boxwell soils occur on pediments or backslopes of ridges. Gerda soils occur in micro-lows on fans and flats. They have a dense, sodium affected subsoil that restricts root growth.

Major Limitations for Agricultural Use

Water erosion is a concern on steeper areas. Wind erosion is a concern on moderately coarse textured soils. Droughtiness, due to restricted root growth, is a concern on sodium affected soils. For additional information concerning these soils see "Detailed Map Unit Descriptions" and "Series Descriptions." For information concerning the limitations for agriculture see the “Potential Cropland Limitations and Hazards” table.

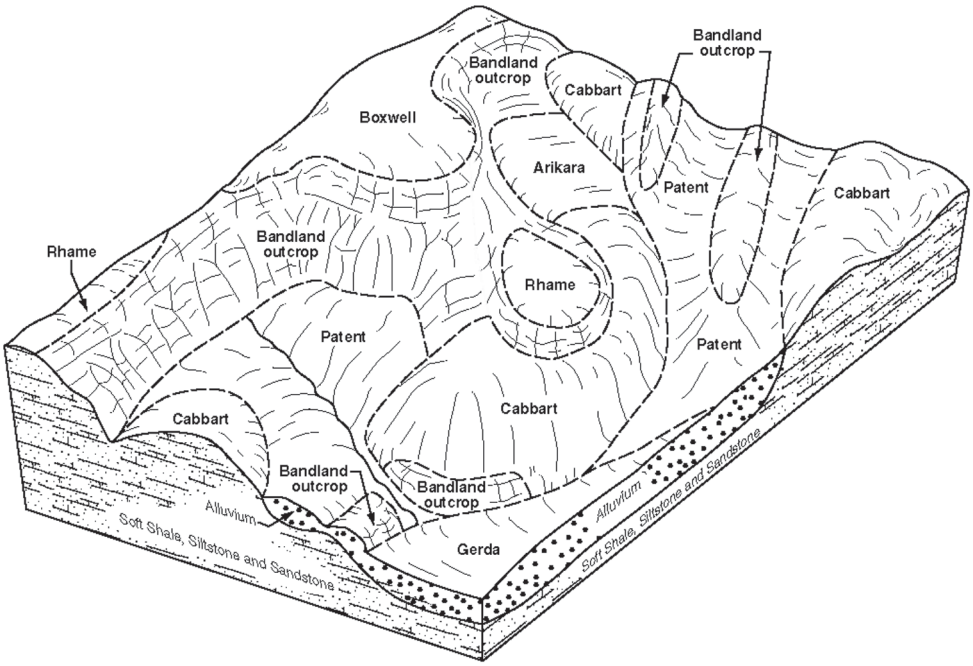

Figure 5. Typical pattern of soils and underlying material in the Patent-Badland, outcrop-Cabbart association.

177—Havre-Glendive Association, level and nearly level

	SURFACE TEXTURE*	SLOPE PERCENT	DRAINAGE**	PERCENT COMPOSITION
MAJOR COMPONENTS				
Havre	SIL	0-3	W	65-75
Glendive	FSL	0-3	W	15-20
MINOR COMPONENTS				
Badland, outcrop	--	9-150	--	1-5
Cabbart	SIL	3-50	W	1-5
Chanta	L	1-6	W	1-5
Lonna	SIL	3-15	W	1-5

* FSL, fine sandy loam; L, loam; SIL, silt loam
** W, well

Description

These soil areas consist of level and nearly level flood plains and terraces, with some fans and ridges. The dominant soils formed in moderately coarse to medium textured fluvial deposits. Most areas of this association are used for cultivated crops or rangeland.

Havre and Glendive soils occur on flood plains and terraces. Badland, outcrop occurs on barren side slopes of ridges. Cabbart soils occur on summits and shoulders of ridges. Chanta soils occur on terraces. Lonna soils occur on fans.

Major Limitations for Agricultural Use

Wind erosion is a concern on these soils. Water erosion is a concern on steeper areas. Droughtiness, due to low water holding capacity, is a concern on some soils. Flooding is a concern on the dominant soils. For additional information concerning these soils see "Detailed Map Unit Descriptions" and "Series Descriptions." For information concerning the limitations for agriculture see the “Potential Cropland Limitations and Hazards” table.

178—Boxwell-Scairt-Cabbart-Rhame Association, level to very steep

	SURFACE TEXTURE*	SLOPE PERCENT	DRAINAGE**	PERCENT COMPOSITION
MAJOR COMPONENTS				
Boxwell	L	3-60	W	30-35
Scairt	SIL	0-15	W	15-20
Cabbart	L	6-70	W	15-20
Rhame	FSL	1-50	W	10-15
MINOR COMPONENTS				
Maltese	SIL	0-25	W	10-15
Arikara	SPM	3-45	W	5-10
Badland, outcrop	--	9-150	--	1-5

* FSL, fine sandy loam; L, loam; SIL, silt loam; SPM, slightly decomposed plant material
** W, well

Description

These soil areas consist of level to very steep fans, flats, and ridges. The dominant soils formed in moderate to fine textured residuum. Most areas of this association are used for rangeland.

Boxwell, Rhame, and Scairt soils occur on pediments and backslopes of ridges. Scairt soils occur on micro-lows. Maltese soils occur on flats, fans, and footslopes of ridges. They have a dense, sodium affected subsoil that restricts root growth. Cabbart soils occur on shoulders of ridges. Arikara soils occur on backslopes and footslopes of ridges. Badland, outcrop occurs on barren side slopes of ridges.

Major Limitations for Agricultural Use

Water erosion is a concern on steeper areas. Wind erosion is a concern on moderately coarse textured soils. Droughtiness, due to restricted root growth, is a concern on sodium affected soils. For additional information concerning these soils see "Detailed Map Unit Descriptions" and "Series Descriptions." For information concerning the limitations for agriculture see the “Potential Cropland Limitations and Hazards” table.

179—Lonna-Kirby-Scairt-Badland, outcrop Association, nearly level to very steep

	SURFACE TEXTURE*	SLOPE PERCENT	DRAINAGE**	PERCENT COMPOSITION
MAJOR COMPONENTS				
Lonna	SIL	1-25	W	30-35
Kirby	CNV-L	3-70	E	20-25
Scairt	SIL	1-15	W	10-15
Badland, outcrop	--	9-150	--	10-15
MINOR COMPONENTS				
Cabbart	SIL	6-70	W	5-10
Maltese	SIL	0-25	W	1-5
Boxwell	L	6-15	W	1-5

* L, loam; SIL, silt loam; CNV-L, very channery loam
** W, well; E, excessive

Description

These soil areas consist of nearly level to very steep flats, fans, hills, and ridges. The dominant soils formed in medium to fine textured alluvium and residuum. Most areas of this association are used for rangeland.

Lonna soils occur on footslopes of hills and fans. Kirby soils occur on shoulders of hills and ridges. They have a scoria substratum that restricts root growth. Scairt soils occur on micro-lows on pediments and backslopes of ridges. Maltese soils occur on micro-highs on flats. They have a dense, sodium affected subsoil that restricts root growth. Badland, outcrop occurs on barren side slopes of ridges. Cabbart soils occur on shoulders of ridges. Boxwell soils occur on backslopes of ridges.

Major Limitations for Agricultural Use

Water erosion is a concern on steep areas. Droughtiness, due to restricted root growth, is a concern on sodium affected soils and soils with scoria substratums. For additional information concerning these soils see "Detailed Map Unit Descriptions" and "Series Descriptions." For information concerning the limitations for agriculture see the “Potential Cropland Limitations and Hazards” table.

193—Badland, outcrop-Cabbart-Arikara Association, gently rolling to very steep

	SURFACE TEXTURE*	SLOPE PERCENT	DRAINAGE**	PERCENT COMPOSITION
MAJOR COMPONENTS				
Badland, outcrop	--	9-150	--	20-25
Cabbart	L	6-70	W	20-25
Arikara	SPM	9-70	W	15-20
MINOR COMPONENTS				
Haydraw	SIL	0-9	W	10-15
Patent	L	1-30	W	10-15
Boxwell	L	6-60	W	5-10

* L, loam; SIL, silt loam; SPM, slightly decomposed plant material
** W, well

Description

These soil areas consist of gently rolling to very steep ridges with some flats and fans. The dominant soils formed in medium textured alluvium and residuum. Most areas of this association are used for rangeland or wildlife.

Badland, outcrop occurs on barren side slopes of ridges. Cabbart soils occur on shoulders of ridges. Arikara soils occur on backslopes and footslopes of ridges. Haydraw and Patent soils occur on flats and fans. Boxwell soils occur on backslopes of ridges.

Major Limitations for Agricultural Use

Water erosion is a concern on steep areas. For additional information concerning these soils see "Detailed Map Unit Descriptions" and "Series Descriptions." For information concerning the limitations for agriculture see the “Potential Cropland Limitations and Hazards” table.

194—Janesburg-Dogtooth Association, level to hilly

	SURFACE TEXTURE*	SLOPE PERCENT	DRAINAGE**	PERCENT COMPOSITION
MAJOR COMPONENTS				
Janesburg	SIL	0-25	W	40-45
Dogtooth	SIL	0-25	W	25-30
MINOR COMPONENTS				
Sen	SIL	0-15	W	10-15
Cabba	SIL	6-35	W	5-10
Vebar	FSL	1-15	W	5-10
Belfield	SIL	0-6	W	1-5
Harriet	SIL	0-3	P	1-5

* FSL, fine sandy loam; SIL, silt loam
** P, poor; W, well

Description

These soil areas consist of level to hilly flats, fans, and some drainageways, rises, and ridges (fig. 6). Most areas are used for cultivated crops with steeper areas used for rangeland.

The Dogtooth, Janesburg, Sen, and Vebar soils occur on pediments and backslopes of ridges. Janesburg soils occur on micro-highs. Dogtooth soils occur on micro-lows. Cabba soils occur on shoulder slopes of ridges. Belfield soils occur on flats and fans. Harriet soils occur in drainageways. Janesburg, Dogtooth, Belfield, and Harriet soils have a dense, sodium affected subsoil that restricts root growth.

Major Limitations for Agricultural Use

Droughtiness, due to restricted root growth, is a concern on sodium affected soils. Water erosion is a concern on steeper areas. The poorly drained soils generally have periods of wetness and ponding in the spring and after heavy rains. For additional information concerning these soils see "Detailed Map Unit Descriptions" and "Series Descriptions." For information concerning the limitations for agriculture see the “Potential Cropland Limitations and Hazards” table.

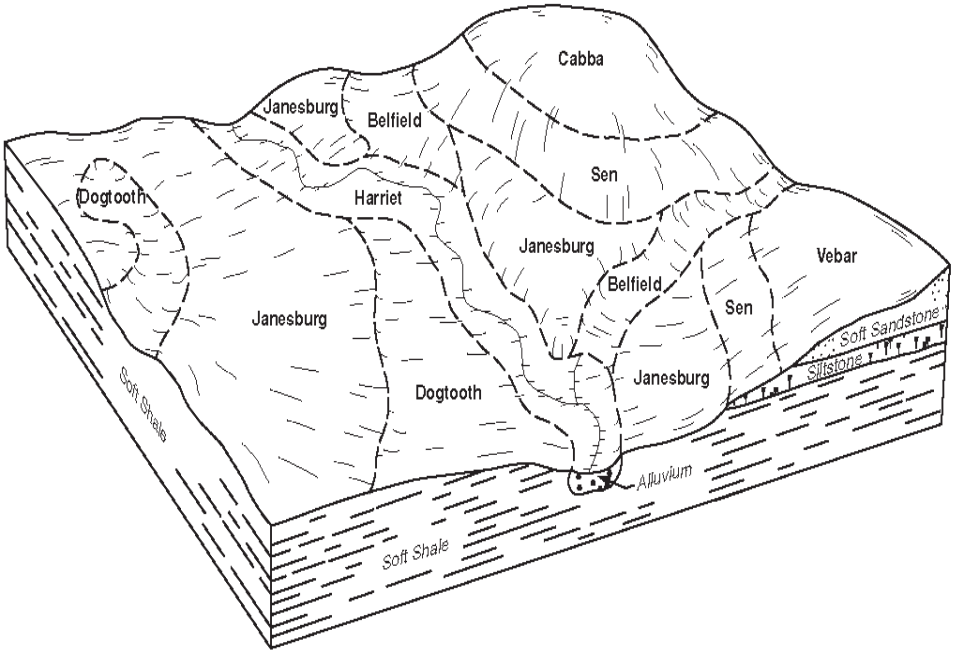

Figure 6. Typical pattern of soils and underlying material in the Janesburg-Dogtooth association.

197—Kremlin-Shibah-Patent Association, level to very steep

	SURFACE TEXTURE*	SLOPE PERCENT	DRAINAGE**	PERCENT COMPOSITION
MAJOR COMPONENTS				
Kremlin	L	0-25	W	30-35
Shibah	CN-L	3-50	W	20-25
Patent	L	6-30	W	10-15
MINOR COMPONENTS				
Cabbart	SIL	6-70	W	10-15
Badland, outcrop	--	9-150	--	10-15
Arikara	SPM	9-70	W	5-10
Gerda	SIL	0-6	W	1-5

* L, loam; SIL, silt loam; CN-L, channery loam; SPM, slightly decomposed plant material
** W, well

Description

These soil areas consist of level to very steep flats and fans, terraces, and ridges. The dominant soils formed in medium textured alluvium. Most areas of this association are used for rangeland.

Kremlin, Patent, and Gerda soils occur on flats and fans and on footslopes of ridges. Shibah soils occur on fans and terraces. They have a gravelly substratum. Badland, outcrop occurs on barren side slopes of ridges. Arikara soils occur on backslopes and footslopes of ridges. Gerda soils have a dense, sodium affected subsoil that restricts root growth.

Major Limitations for Agricultural Use

Water erosion is a concern on steeper areas. Droughtiness and limited water holding capacity, due to restricted root growth, are concerns on sodium affected soils and soils with gravelly substratums. For additional information concerning these soils see "Detailed Map Unit Descriptions" and "Series Descriptions." For information concerning the limitations for agriculture see the “Potential Cropland Limitations and Hazards” table.

198—Littlemo-Kremlin-Chanta Association, level to rolling

	SURFACE TEXTURE*	SLOPE PERCENT	DRAINAGE**	PERCENT COMPOSITION
MAJOR COMPONENTS				
Littlemo	SIL	0-3	W	40-45
Kremlin	L	0-15	W	30-35
Chanta	L	3-15	W	10-15
MINOR COMPONENTS				
Tinsley	GR-SL	6-70	E	5-10
Badland, outcrop	--	9-150	--	1-5
Gerda	SIL	0-6	W	1-5

* L, loam; SIL, silt loam; GR-SL, gravelly sandy loam
** W, well; E, excessive

Description

These soil areas consist of level to rolling paleoterraces, fans, flats, and escarpments along the Little Missouri River and its tributaries. The dominant soils formed in medium textured aluvium. Most areas of this association are used for rangeland.

Littlemo and Kremlin soils occur on flats. Chanta soils occur on flats and rises on paleoterraces. Tinsley soils occur on shoulders of paleoterraces. Badland, outcrop occurs on barren side slopes of ridges. Gerda soils occur on micro-lows on fans. They have a dense, sodium affected subsoil that restricts root growth. The Littlemo, Chanta, and Tinsley soils have gravelly substratums.

Major Limitations for Agricultural Use

Droughtines, due to low water holding capacity, is a concern on some of the dominant soils. Water erosion is a concern on steep areas. For additional information concerning these soils see "Detailed Map Unit Descriptions" and "Series Descriptions." For information concerning the limitations for agriculture see the “Potential Cropland Limitations and Hazards” table.

199—Cedarpan-Farfeld-Vebar Association, level to steep

	SURFACE TEXTURE*	SLOPE PERCENT	DRAINAGE**	PERCENT COMPOSITION
MAJOR COMPONENTS				
Cedarpan	SIL	0-35	W	30-35
Farfeld	L	0-6	W	20-25
Vebar	STX-FSL	6-35	W	15-20
MINOR COMPONENTS				
Amor	STX-L	6-25	W	10-15
Daglum	L	0-15	W	5-10
Flasher	LFS	9-35	SE	1-5
Slickspots	--	0-6	--	1-5

* LFS, loamy fine sand; L, loam; SIL, silt loam; STX-FSL, extremely stony fine sandy loam
** W, well; SE, somewhat excessive

Description

These soil areas consist of level to steep flats, fans, and ridges on a drainage divide in the northeastern part of the county. The dominant soils formed in moderately coarse to fine textured alluvium and residuum. Most areas of this association are used for rangeland.

Cedarpan soils occur on flats, fans, and side slopes of ridges. Farfeld soils occur on flats. Cedarpan and Farfeld soils have a dense, hard substratum. Vebar and Amor soils occur on side slopes of ridges. Flasher soils occur on shoulders of ridges. Daglum soils occupy micro-highs on flats and fans. Slickspots occur on fans and footslopes. Daglum, Cedarpan, and Slickspots have dense, sodium affected subsoils that restrict root growth.

Major Limitations for Agricultural Use

Droughtines, due to restricted root growth, is a concern on sodium affected soils and soils with a dense substratum. Water erosion is a concern on steeper areas. For additional information concerning these soils see "Detailed Map Unit Descriptions" and "Series Descriptions." For information concerning the limitations for agriculture see the “Potential Cropland Limitations and Hazards” table.

Detailed Soil Map Units

Map units on the detailed soil maps represent soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the soil maps and interpretive tables, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses.

A map unit delineation on the detailed soil maps represents an area on the landscape and consists of one or more soils or miscellaneous areas. The soils or miscellaneous areas are called map unit components. The map unit descriptions in this section describe the setting of the map unit or where on the landscape named map unit components can be found. The composition, or the proportion, of various soils or miscellaneous areas of a map unit determines how a map unit is named.

A map unit is identified according to the taxonomic classification of the dominant soils or miscellaneous areas. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, soils and miscellaneous areas 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 included areas that belong to other taxonomic classes.

Most included 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 similar soils. They may or may not be mentioned in the map unit description. Other included soils and miscellaneous areas, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting or dissimilar soils. 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. Included soils or miscellaneous areas are mentioned in the map unit descriptions. Soil interpretations in this manuscript are for named map unit components only.

A few included areas 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 included areas 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 segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but if intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

The map unit descriptions on the following pages give a range in composition for the named map unit components and similar soils. They also give the average composition of named, similar, and dissimilar soils.

Soils that have profiles that are almost alike make up a soil series. Except for minor differences in texture of the surface layer or underlying layers, 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 or of underlying layers. They also can differ in slope, stoniness, salinity, wetness, 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, Shambo loam, 0 to 2 percent slopes, is one of the phases of the Shambo soils.

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. Daglum-Rhoades complex, 0 to 6 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. Glendive and Havre soils, channeled, is an undifferentiated group in this survey area.

This survey includes miscellaneous areas. Such areas have little or no soil material and support little or no vegetation. Pits, gravel and sand, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by special symbols on the soil maps.

The map unit descriptions on the following pages give information on each named component. Information such as surface layer texture, depth class, and drainage class is included. There is also information concerning the management of the map unit.

An identifying symbol precedes the map unit name in each map unit description. This symbol is used to identify delineations on the soil maps.

The table, “Acreage and Proportionate Extent of the Soils,” gives the acreage and proportionate extent of each map unit in the survey area. Additional information about each named component and map unit inclusion can be found in “Soil Series and Their Morphology.” Hydric soils information can be found in the section “Hydric Soils.” The table, “Hydric Soils List” indicates the map unit components with hydric conditions. Other tables give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

3—Peta loam, 0 to 2 percent slopes

Setting

Peta soils occur on linear alluvial flats on uplands.

Map Unit Composition (percent)

Named Components
Peta and similar soils: 45 to 80 percent

Average Component Composition
Peta: 68 percent
Parshall, moderately well drained: 15 percent
Peta, fine sandy loam: 14 percent
Daglum: 2 percent
Heil: 1 percent

Named Component Description

Peta
Slope: 0 to 2 percent
Depth to Restrictive Feature: None noted
Drainage Class: Somewhat poorly drained
Flooding: None
Water Table: Seasonal
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Ap—0 to 10 inches; loam
Bt—10 to 26 inches; clay loam
BC—26 to 48 inches; fine sandy loam
C1—48 to 53 inches; loam
C2—53 to 80 inches; fine sandy loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

5—Savage silty clay loam, 0 to 2 percent slopes

Setting

Savage soils occur on linear alluvial flats on uplands.

Map Unit Composition (percent)

Named Components
Savage and similar soils: 55 to 70 percent

Average Component Composition
Savage: 61 percent
Grail: 17 percent
Belfield: 8 percent
Farnuf: 5 percent
Regent: 3 percent
Daglum: 2 percent
Lawther: 2 percent
Parshall: 2 percent

Named Component Description

Savage
Slope: 0 to 2 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
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

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

5B—Savage silty clay loam, 2 to 6 percent slopes

Setting

Savage soils occur on linear alluvial fans on uplands.

Map Unit Composition (percent)

Named Components
Savage and similar soils: 55 to 70 percent

Average Component Composition
Savage: 67 percent
Grail: 11 percent
Farland: 7 percent

Regent: 4 percent
Shambo: 4 percent
Daglum: 3 percent
Amor: 2 percent
Stady: 2 percent

Named Component Description

Savage
Slope: 2 to 6 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
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

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

6—Regan silt loam, 0 to 2 percent slopes

Setting

Regan soils occur on linear drainageways on uplands.

Map Unit Composition (percent)

Named Components
Regan and similar soils: 55 to 75 percent

Average Component Composition
Regan: 64 percent
Arveson: 16 percent
Harriet: 9 percent
Marysland, saline: 6 percent
Straw: 3 percent
Peta: 2 percent

Named Component Description

Regan
Slope: 0 to 1 percent
Depth to Restrictive Feature: None noted
Drainage Class: Poorly drained
Flooding: Occasional
Water Table: Seasonal
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 9 inches; silt loam
Bkg—9 to 28 inches; silty clay loam
2Cg—28 to 60 inches; stratified sandy loam to silty clay loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Wetland wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

7—Arnegard loam, 0 to 2 percent slopes

Setting

Arnegard soils occur on linear alluvial flats and in linear swales on uplands.

Map Unit Composition (percent)

Named Components
Arnegard and similar soils: 55 to 70 percent

Average Component Composition
Arnegard: 68 percent
Farnuf: 10 percent
Parshall: 7 percent
Belfield: 4 percent
Grail: 4 percent
Stady: 3 percent
Amor: 2 percent
Savage: 2 percent

Named Component Description

Arnegard
Slope: 0 to 2 percent

Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Ap—0 to 13 inches; loam
Bw—13 to 36 inches; loam
Bk—36 to 60 inches; loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

9F—Cabba-Sen-Chama silt loams, 15 to 70 percent slopes

Setting

Cabba soils occur on convex shoulders. Sen soils occur on linear backslopes. Chama soils occur on convex backslopes. This map unit occurs on ridges on uplands.

Map Unit Composition (percent)

Named Components
Cabba and similar soils: 35 to 55 percent
Sen and similar soils: 15 to 30 percent
Chama and similar soils: 10 to 25 percent

Average Component Composition
Cabba: 45 percent
Sen: 18 percent
Chama: 15 percent
Shambo: 6 percent
Regent: 5 percent
Vebar: 3 percent
Janesburg: 2 percent
Regan: 2 percent
Rock outcrop: 2 percent
Straw: 2 percent

Named Component Description

Cabba

Slope: 15 to 70 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 10 to 20 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 3 inches; silt loam
Bk—3 to 15 inches; silt loam
Cr—15 to 60 inches; bedrock

Sen

Slope: 15 to 25 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
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

Chama

Slope: 15 to 45 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
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

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

12B—Rhoades-Daglum complex, 0 to 6 percent slopes

Setting

Rhoades soils occur in concave micro-lows. Daglum soils occur on linear micro-highs. This map unit occurs on alluvial flats and fans on uplands.

Map Unit Composition (percent)

Named Components
Rhoades and similar soils: 45 to 65 percent
Daglum and similar soils: 25 to 40 percent

Average Component Composition
Rhoades: 55 percent
Daglum: 33 percent
Belfield: 5 percent
Savage: 3 percent
Moreau: 2 percent
Slickspots: 2 percent

Named Component Description

Rhoades
Slope: 0 to 6 percent
Depth to Restrictive Feature: Natric; top depth ranges from 1 to 5 inches
Drainage Class: Moderately well drained
Flooding: None
Water Table: Seasonal
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
E—0 to 3 inches; silt 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; stratified silt loam to silty clay loam

Daglum
Slope: 0 to 6 percent
Depth to Restrictive Feature: Natric; top depth ranges from 4 to 20 inches
Drainage Class: Moderately well drained
Flooding: None
Water Table: Seasonal

Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
Ap—0 to 7 inches; 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

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Pasture, hayland, or range

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

13B—Dogtooth-Janesburg silt loams, 0 to 6 percent slopes

Setting

Dogtooth soils occur in concave micro-lows. Janesburg soils occur on linear micro-highs. This map unit occurs on pediments on uplands.

Map Unit Composition (percent)

Named Components
Dogtooth and similar soils: 50 to 65 percent
Janesburg and similar soils: 25 to 40 percent

Average Component Composition
Dogtooth: 59 percent
Janesburg: 27 percent
Daglum: 5 percent
Regent: 2 percent
Savage: 2 percent
Slickspots: 2 percent
Wayden: 2 percent
Chama: 1 percent

Named Component Description

Dogtooth
Slope: 0 to 6 percent

Depth to Restrictive Feature: Natric; top depth ranges from 2 to 4 inches; Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
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

Janesburg
Slope: 0 to 6 percent
Depth to Restrictive Feature: Natric; top depth ranges from 2 to 13 inches; Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
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

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range, pasture, or hayland

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

13D—Dogtooth-Janesburg complex, 6 to 15 percent slopes

Setting

Dogtooth soils occur on concave micro-lows. Janesburg soils occur on linear micro-highs. This map unit occurs on backslopes of ridges on uplands.

Map Unit Composition (percent)

Named Components

Dogtooth and similar soils: 20 to 55 percent
Janesburg and similar soils: 20 to 55 percent

Average Component Composition

Dogtooth: 37 percent
Janesburg: 37 percent
Rhoades: 7 percent
Belfield: 5 percent
Cabba: 5 percent
Chama: 5 percent
Reeder: 2 percent
Stady: 2 percent

Named Component Description

Dogtooth

Slope: 6 to 15 percent
Depth to Restrictive Feature: Natric; top depth ranges from 2 to 4 inches; Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
E—0 to 2 inches; silty clay 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

Janesburg

Slope: 6 to 15 percent
Depth to Restrictive Feature: Natric; top depth ranges from 2 to 13 inches; Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
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

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

14E—Amor-Brandenburg complex, 3 to 25 percent slopes

Setting

Amor soils occur on linear pediments and convex backslopes. Brandenburg soils occur on convex rises and shoulders. This map unit occurs on hills and ridges on uplands.

Map Unit Composition (percent)

Named Components

Amor and similar soils: 15 to 45 percent
Brandenburg and similar soils: 15 to 45 percent

Average Component Composition

Amor: 20 percent
Brandenburg: 39 percent
Shambo: 16 percent
Searing: 12 percent
Cabba: 4 percent
Daglum: 3 percent
Savage: 3 percent
Arnegard: 2 percent
Scoria outcrop: 1 percent

Named Component Description

Amor

Slope: 3 to 15 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
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

Brandenburg

Slope: 3 to 25 percent

Depth to Restrictive Feature: Strongly contrasting textural stratification; top depth ranges from 10 to 20 inches
Drainage Class: Excessively drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 4 inches; channery loam
C1—4 to 10 inches; very channery loam
C2—10 to 60 inches; channers

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

15B—Daglum-Rhoades complex, 0 to 6 percent slopes

Setting

Daglum soils occur on linear micro-highs. Rhoades soils occur in concave micro-lows. This map unit occurs on alluvial flats and fans on uplands. (fig. 7)

Map Unit Composition (percent)

Named Components
Daglum and similar soils: 35 to 65 percent
Rhoades and similar soils: 10 to 40 percent

Average Component Composition
Daglum: 50 percent
Rhoades: 25 percent
Belfield: 13 percent
Savage: 7 percent
Farland: 2 percent
Grail: 2 percent
Heil: 1 percent

Named Component Description

Daglum
Slope: 0 to 6 percent
Depth to Restrictive Feature: Natric; top depth ranges from 4 to 20 inches
Drainage Class: Moderately well drained

Flooding: None
Water Table: Seasonal
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
Ap—0 to 7 inches; silt 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

Rhoades
Slope: 0 to 6 percent
Depth to Restrictive Feature: None noted
Drainage Class: Moderately well drained
Flooding: None
Water Table: Seasonal
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
E—0 to 3 inches; 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; stratified silt loam to silty clay loam

Figure 7. An area of Daglum-Rhoades complex, 0 to 6 percent slopes. The Daglum soils are on the micro-highs and the Rhoades soils are on the micro-lows.

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland, pasture, hayland, or range

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

17—Amor-Arnegard loams, 0 to 3 percent slopes

Setting

Amor soils occur on convex pediments. Arnegard soils occur in concave swales. This map unit occurs on uplands.

Map Unit Composition (percent)

Named Components

Amor and similar soils: 50 to 70 percent
Arnegard and similar soils: 10 to 20 percent

Average Component Composition

Amor: 58 percent
Reeder: 14 percent
Arnegard: 10 percent
Farnuf: 6 percent
Daglum: 3 percent
Stady: 3 percent
Vebar: 3 percent
Parshall: 2 percent
Cabba: 1 percent

Named Component Description

Amor

Slope: 0 to 3 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
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

Arnegard
Slope: 0 to 3 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Ap—0 to 13 inches; loam
Bw—13 to 36 inches; loam
Bk—36 to 60 inches; loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland, pasture, and hayland

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

17B—Amor-Shambo loams, 3 to 6 percent slopes

Setting

Amor soils occur on convex pediments. Shambo soils occur on linear alluvial fans. This map unit occurs on uplands.

Map Unit Composition (percent)

Named Components
Amor and similar soils: 65 to 80 percent
Shambo and similar soils: 10 to 20 percent

Average Component Composition
Amor: 67 percent
Shambo: 15 percent
Morton: 7 percent
Chama: 4 percent
Cabba: 3 percent
Arnegard: 2 percent
Vebar: 2 percent

Named Component Description

Amor
Slope: 3 to 6 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches

Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
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

Shambo
Slope: 3 to 6 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
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

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

17C—Amor-Cabba loams, 6 to 9 percent slopes

Setting

Amor soils occur on convex backslopes. Cabba soils occur on convex shoulders. This map unit occurs on knolls and ridges on uplands.

Map Unit Composition (percent)

Named Components
Amor and similar soils: 30 to 45 percent
Cabba and similar soils: 25 to 35 percent

Average Component Composition

Amor: 39 percent
Cabba: 29 percent
Amor, gently sloping: 10 percent
Shambo: 9 percent
Chama: 5 percent
Cohagen: 3 percent
Regent: 3 percent
Savage: 2 percent

Named Component Description

Amor

Slope: 6 to 9 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
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

Cabba

Slope: 6 to 9 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 10 to 20 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 3 inches; loam
Bk—3 to 15 inches; loam
Cr—15 to 60 inches; bedrock

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland, pasture, and hayland

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

17D—Amor-Cabba loams, 9 to 15 percent slopes

Setting

Amor soils occur on convex backslopes. Cabba soils occur on convex shoulders. This map unit occurs on hills and ridges on uplands.

Map Unit Composition (percent)

Named Components

Amor and similar soils: 35 to 45 percent
Cabba and similar soils: 20 to 30 percent

Average Component Composition

Amor: 42 percent
Cabba: 29 percent
Amor, moderately sloping: 5 percent
Shambo: 5 percent
Chama: 4 percent
Cohagen: 4 percent
Vebar: 3 percent
Arnegard: 2 percent
Dogtooth: 2 percent
Regent: 2 percent
Savage: 2 percent

Named Component Description

Amor

Slope: 9 to 15 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
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

Cabba

Slope: 9 to 15 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 10 to 20 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 3 inches; loam

Bk—3 to 15 inches; loam
Cr—15 to 60 inches; bedrock

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland, pasture, hayland, or range

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

18E—Manning-Schaller-Wabek complex, 6 to 25 percent slopes

Setting

Manning soils occur on convex backslopes. Schaller and Wabek soils occur on convex summits and shoulders. This map unit occurs on ridges on uplands.

Map Unit Composition (percent)

Named Components
Manning and similar soils: 15 to 40 percent
Schaller and similar soils: 15 to 35 percent
Wabek and similar soils: 10 to 30 percent

Average Component Composition
Manning: 24 percent
Schaller: 22 percent
Wabek: 22 percent
Stady: 20 percent
Tally: 6 percent
Cabba: 4 percent
Janesburg: 2 percent

Named Component Description

Manning
Slope: 6 to 15 percent
Depth to Restrictive Feature: Strongly contrasting textural stratification; top depth ranges from 24 to 40 inches
Drainage Class: Somewhat excessively drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Ap—0 to 5 inches; fine sandy loam

Bw—5 to 18 inches; fine sandy loam
Bk—18 to 25 inches; fine sandy loam
2C—25 to 60 inches; stratified loamy sand to extremely gravelly loamy coarse sand

Schaller
Slope: 6 to 25 percent
Depth to Restrictive Feature: None noted
Drainage Class: Excessively drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 9 inches; sandy loam
Bk—9 to 15 inches; fine sandy loam
C—15 to 60 inches; gravelly loamy coarse sand

Wabek
Slope: 9 to 25 percent
Depth to Restrictive Feature: Strongly contrasting textural stratification; top depth ranges from 7 to 14 inches
Drainage Class: Excessively drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 5 inches; loam
Bk—5 to 9 inches; gravelly coarse sandy loam
C—9 to 60 inches; very gravelly coarse sand

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

19—Sen-Golva silt loams, 0 to 3 percent slopes

Setting

Sen soils occur on convex pediments. Golva soils occur on concave alluvial flats. This map unit occurs on uplands.

Map Unit Composition (percent)

Named Components

Sen and similar soils: 40 to 65 percent
Golva and similar soils: 5 to 20 percent

Average Component Composition

Sen: 56 percent
Amor: 11 percent
Chama: 11 percent
Golva: 11 percent
Cabba: 5 percent
Shambo: 5 percent
Vebar: 1 percent

Named Component Description

Sen

Slope: 0 to 3 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
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

Golva

Slope: 0 to 3 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 5 inches; silt loam
Bw1—5 to 15 inches; silt loam
Bw2—15 to 21 inches; silt loam
Bk—21 to 40 inches; silt loam
C—40 to 60 inches; silt loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland, pasture, hayland, or range

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

19B—Chama-Sen-Cabba silt loams, 3 to 6 percent slopes

Setting

Chama and Sen soils occur on convex pediments. Cabba soils occur on convex rises on pediments. This map unit occurs on uplands.

Map Unit Composition (percent)

Named Components

Chama and similar soils: 35 to 50 percent
Sen and similar soils: 20 to 30 percent
Cabba and similar soils: 10 to 20 percent

Average Component Composition

Chama: 43 percent
Sen: 25 percent
Cabba: 14 percent
Golva: 12 percent
Chama, moderately sloping: 2 percent
Janesburg: 2 percent
Maschetah: 2 percent

Named Component Description

Chama

Slope: 3 to 6 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
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

Sen

Slope: 3 to 6 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained

Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
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

Cabba
Slope: 3 to 6 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 10 to 20 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 3 inches; silt loam
Bk—3 to 15 inches; silt loam
Cr—15 to 60 inches; bedrock

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland, pasture, hayland, or range

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

19C—Chama-Cabba-Sen silt loams, 6 to 9 percent slopes

Setting

Chama soils occur on convex backslopes. Cabba soils occur on convex shoulders and summits. Sen soils occur on linear backslopes. This map unit occurs on knolls and ridges on uplands.

Map Unit Composition (percent)

Named Components
Chama and similar soils: 35 to 45 percent
Cabba and similar soils: 20 to 30 percent
Sen and similar soils: 10 to 20 percent

Average Component Composition

Chama: 40 percent
Cabba: 28 percent
Sen: 17 percent
Cohagen: 4 percent
Chama, gently sloping: 3 percent
Golva: 3 percent
Grail: 3 percent
Janesburg: 1 percent
Vebar: 1 percent

Named Component Description

Chama

Slope: 6 to 9 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
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

Cabba

Slope: 6 to 9 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 10 to 20 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 3 inches; silt loam
Bk—3 to 15 inches; silt loam
Cr—15 to 60 inches; bedrock

Sen

Slope: 6 to 9 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected

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

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland, pasture, or hayland

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

19D—Cabba-Chama-Sen silt loams, 9 to 15 percent slopes

Setting

Cabba soils occur on convex shoulders. Chama soils occur on convex backslopes. Sen soils occur on linear backslopes. This map unit occurs on hills and ridges on uplands.

Map Unit Composition (percent)

Named Components
Cabba and similar soils: 30 to 45 percent
Chama and similar soils: 20 to 35 percent
Sen and similar soils: 10 to 20 percent

Average Component Composition
Cabba: 38 percent
Chama: 26 percent
Sen: 16 percent
Vebar: 5 percent
Arnegard: 4 percent
Cabba, gently sloping: 4 percent
Janesburg: 3 percent
Golva: 2 percent
Maschetah: 2 percent

Named Component Description

Cabba
Slope: 9 to 15 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 10 to 20 inches
Drainage Class: Well drained

Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 3 inches; silt loam
Bk—3 to 15 inches; silt loam
Cr—15 to 60 inches; bedrock

Chama
Slope: 9 to 15 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
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

Sen
Slope: 9 to 15 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
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

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland, pasture, hayland, or range

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

21B—Parshall fine sandy loam, 0 to 6 percent slopes

Setting

Parshall soils occur on concave alluvial flats and fans and stream terraces on uplands.

Map Unit Composition (percent)

Named Components
Parshall and similar soils: 65 to 80 percent

Average Component Composition
Parshall: 67 percent
Tally: 10 percent
Arnegard: 9 percent
Lihen: 6 percent
Vebar: 3 percent
Daglum: 2 percent
Manning: 2 percent
Regan: 1 percent

Named Component Description

Parshall
Slope: 0 to 6 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 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

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland, pasture, hayland, or range

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

22B—Regent-Savage silty clay loams, 3 to 6 percent slopes

Setting

Regent soils occur on convex pediments. Savage soils occur on linear alluvial fans. This map unit occurs on uplands.

Map Unit Composition (percent)

Named Components

Regent and similar soils: 60 to 75 percent
Savage and similar soils: 10 to 20 percent

Average Component Composition

Regent: 71 percent
Savage: 15 percent
Moreau: 6 percent
Cabba: 2 percent
Chama: 2 percent
Daglum: 2 percent
Wayden: 2 percent

Named Component Description

Regent

Slope: 3 to 6 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—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

Savage

Slope: 3 to 6 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
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 60 inches; silty clay loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

24B—Janesburg fine sandy loam, 0 to 6 percent slopes

Setting

Janesburg soils occur on linear pediments on uplands.

Map Unit Composition (percent)

Named Components

Janesburg and similar soils: 35 to 65 percent

Average Component Composition

Janesburg: 51 percent
Tally: 10 percent
Evridge: 9 percent
Vebar: 8 percent
Daglum: 5 percent
Desart: 4 percent
Dogtooth: 4 percent
Lihen: 3 percent
Regent: 3 percent
Shambo: 3 percent

Named Component Description

Janesburg

Slope: 0 to 6 percent
Depth to Restrictive Feature: Natric; top depth ranges from 2 to 13 inches; Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
A—0 to 8 inches; fine sandy loam
E—8 to 10 inches; fine sandy loam
Btn—10 to 21 inches; silty clay
BCk—21 to 26 inches; silt loam
Cr—26 to 60 inches; bedrock

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland, pasture, hayland, or range

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

25B—Lefor fine sandy loam, 0 to 6 percent slopes

Setting

Lefor soils occur on convex pediments on uplands.

Map Unit Composition (percent)

Named Components

Lefor and similar soils: 70 to 90 percent

Average Component Composition

Lefor: 78 percent
Parshall: 9 percent
Vebar: 4 percent
Belfield: 2 percent
Cohagen: 2 percent
Dogtooth: 2 percent
Lihen: 2 percent
Heil: 1 percent

Named Component Description

Lefor

Slope: 0 to 6 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Ap—0 to 7 inches; fine sandy loam
B/E—7 to 15 inches; fine sandy loam
Bt—15 to 30 inches; sandy clay loam
Bk—30 to 36 inches; fine sandy loam
Cr—36 to 60 inches; bedrock

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this

map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland or hayland

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

27F—Badland, outcrop-Lambert-Cabba complex, 6 to 50 percent slopes

Setting

Badland occurs on barren convex backslopes and shoulders on ridges. Lambert soils occur on linear fans. Cabba soils occur on convex shoulders and linear summits of ridges. This map unit occurs on uplands.

Map Unit Composition (percent)

Named Components

Badland, outcrop and similar soils: 30 to 55 percent
Lambert and similar soils: 20 to 45 percent
Cabba and similar soils: 5 to 25 percent

Average Component Composition

Badland, outcrop: 42 percent
Lambert: 34 percent
Cabba: 12 percent
Daglum: 4 percent
Rhoades: 3 percent
Arikara: 2 percent
Vebar: 2 percent
Havrelon: 1 percent

Named Component Description

Badland, outcrop

Slope: 9 to 150 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 0 to 5 inches
Drainage Class: —-
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
H1—0 to 60 inches; bedrock

Lambert

Slope: 6 to 15 percent
Depth to Restrictive Feature: None noted

Drainage Class: Well drained
Flooding: Occasional
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 5 inches; silt loam
C1—5 to 36 inches; silt loam
C2—36 to 60 inches; very fine sandy loam

Cabba
Slope: 9 to 50 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 10 to 20 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 3 inches; silt loam
Bk—3 to 15 inches; silt loam
Cr—15 to 60 inches; bedrock

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

28F—Flasher-Rock outcrop-Vebar complex, 9 to 70 percent slopes

Setting

Flasher soils occur on convex shoulders. Rock outcrop occurs on convex shoulders and summits. Vebar soils occur on convex backslopes. This map unit occurs on hills and ridges on uplands.

Map Unit Composition (percent)

Named Components
Flasher and similar soils: 25 to 40 percent
Rock outcrop and similar soils: 15 to 30 percent
Vebar and similar soils: 10 to 20 percent

Average Component Composition

Flasher: 35 percent
Rock outcrop: 22 percent
Vebar: 13 percent
Beisigl: 11 percent
Tally: 6 percent
Cohagen: 4 percent
Telfer: 4 percent
Amor: 3 percent
Cabba: 2 percent

Named Component Description

Flasher

Slope: 9 to 70 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 7 to 20 inches
Drainage Class: Somewhat excessively drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 6 inches; loamy fine sand
AC—6 to 10 inches; loamy fine sand
Cr—10 to 60 inches; bedrock

Rock outcrop

Slope: 9 to 99 percent
Depth to Restrictive Feature: Bedrock (lithic); top depth ranges from 0 to 1 inches
Drainage Class: —-
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected

Vebar

Slope: 15 to 50 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
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

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

29F—Arikara-Shambo-Cabba loams, 9 to 70 percent slopes

Setting

Arikara soils occur on wooded concave backslopes and footslopes. Shambo soils occur on concave footslopes. Cabba soils occur on convex shoulders and linear summits. This map unit occurs on ridges on uplands.

Map Unit Composition (percent)

Named Components

Arikara and similar soils: 20 to 40 percent
Shambo and similar soils: 15 to 35 percent
Cabba and similar soils: 10 to 25 percent

Average Component Composition

Arikara: 33 percent
Shambo: 21 percent
Cabba: 18 percent
Lambert: 12 percent
Chama: 6 percent
Tally: 4 percent
Badland, outcrop: 2 percent
Daglum: 2 percent
Regent: 2 percent

Named Component Description

Arikara

Slope: 15 to 70 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Oi—0 to 1 inches; slightly decomposed plant material
A—1 to 2 inches; loam

Bw—2 to 14 inches; loam
Bk—14 to 39 inches; loam
C—39 to 60 inches; loam

Shambo
Slope: 9 to 35 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
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

Cabba
Slope: 9 to 70 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 10 to 20 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 3 inches; loam
Bk—3 to 15 inches; loam
Cr—15 to 60 inches; bedrock

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

30F—Vebar-Amor complex, 6 to 35 percent slopes, extremely stony

Setting

Vebar and Amor soils occur on convex backslopes of ridges on uplands.

Map Unit Composition (percent)

Named Components

Vebar, extremely stony and similar soils: 15 to 45 percent
Amor, extremely stony and similar soils: 15 to 45 percent

Average Component Composition

Vebar, extremely stony: 27 percent
Amor, extremely stony: 21 percent
Parshall, very stony: 15 percent
Cabba, extremely stony: 8 percent
Flasher, extremely stony: 8 percent
Arnegard: 7 percent
Amor, extremely stony, moderately steep: 6 percent
Regent, very stony: 5 percent
Janesburg: 3 percent

Named Component Description

Vebar, extremely stony

Slope: 15 to 35 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 5 inches; extremely stony 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

Amor, stony

Slope: 6 to 15 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Ap—0 to 8 inches; extremely stony loam
Bw—8 to 19 inches; loam
Bk—19 to 31 inches; loam
Cr—31 to 60 inches; bedrock

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

31B—Sen-Janesburg silt loams, 0 to 6 percent slopes

Setting

The Sen soil occurs on linear pediments. The Janesburg soil occurs on concave pediments. This map unit occurs on uplands.

Map Unit Composition (percent)

Named Components

Sen and similar soils: 15 to 40 percent
Janesburg and similar soils: 25 to 50 percent

Average Component Composition

Sen: 23 percent
Janesburg: 34 percent
Regent: 10 percent
Farland: 9 percent
Dogtooth: 6 percent
Reeder: 6 percent
Chama: 5 percent
Belfield: 4 percent
Cabba: 3 percent

Named Component Description

Sen

Slope: 0 to 6 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
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

Janesburg

Slope: 0 to 6 percent
Depth to Restrictive Feature: Natric; top depth ranges from 2 to 13 inches; Bedrock (paralithic); top depth ranges from 20 to 40 inches

Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
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

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland, pasture, hayland, or range

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

31C—Sen-Janesburg silt loams, 6 to 9 percent slopes

Setting

Sen soils occur on linear backslopes. Janesburg soils occur on linear micro-highs on backslopes. This map unit occurs on uplands.

Map Unit Composition (percent)

Named Components
Sen and similar soils: 15 to 40 percent
Janesburg and similar soils: 15 to 40 percent

Average Component Composition
Sen: 22 percent
Janesburg: 21 percent
Shambo: 13 percent
Cabba: 11 percent
Dogtooth: 11 percent
Daglum: 7 percent
Regent: 5 percent
Savage: 5 percent
Belfield: 3 percent
Tally: 2 percent

Named Component Description

Sen
Slope: 6 to 9 percent

Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
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

Janesburg
Slope: 6 to 9 percent
Depth to Restrictive Feature: Natric; top depth ranges from 2 to 13 inches; Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
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

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland, pasture, hayland, or range

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

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

Setting

Flasher soils occur on linear summits and convex shoulders. Vebar soils occur on convex backslopes. Parshall soils occur on concave footslopes. This map unit occurs on hills or ridges on uplands.

Map Unit Composition (percent)

Named Components

Flasher and similar soils: 25 to 40 percent
Vebar and similar soils: 20 to 30 percent
Parshall and similar soils: 10 to 20 percent

Average Component Composition

Flasher: 32 percent
Vebar: 22 percent
Parshall: 15 percent
Beisigl: 11 percent
Telfer: 10 percent
Cohagen: 5 percent
Amor: 4 percent
Rock outcrop: 1 percent

Named Component Description

Flasher

Slope: 9 to 35 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 7 to 20 inches
Drainage Class: Somewhat excessively drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 6 inches; loamy fine sand
AC—6 to 10 inches; loamy fine sand
Cr—10 to 60 inches; bedrock

Vebar

Slope: 15 to 35 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
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

Parshall

Slope: 9 to 15 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None

Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 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
Mapunit Notes: Some areas have hardwood stands that may affect wildlife, range, and other interpretations. These stands may be dependent on landscape position, slope, or aspect.

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range or wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

36B—Ekalaka-Parshall-Desart fine sandy loams, 0 to 6 percent slopes

Setting

Ekalaka soils occur on concave alluvial fans and linear alluvial flats. Parshall soils occur on concave alluvial flats and alluvial fans. Desart soils occur on linear alluvial flats and alluvial fans. This map unit occurs on uplands.

Map Unit Composition (percent)

Named Components
Ekalaka and similar soils: 25 to 55 percent
Parshall and similar soils: 15 to 40 percent
Desart and similar soils: 10 to 30 percent

Average Component Composition
Ekalaka: 32 percent
Parshall: 32 percent
Desart: 15 percent
Daglum, fine sandy loam: 8 percent
Farnuf: 4 percent
Telfer: 4 percent
Daglum, silt loam: 2 percent
Janesburg, fine sandy loam: 2 percent
Rhoades: 1 percent

Named Component Description

Ekalaka

Slope: 0 to 6 percent
Depth to Restrictive Feature: Natric; top depth ranges from 5 to 20 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
A—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; stratified sand to fine sandy loam

Parshall

Slope: 0 to 6 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 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

Desart

Slope: 0 to 6 percent
Depth to Restrictive Feature: Natric; top depth ranges from 15 to 30 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Sodic within 30 inches
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

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland, pasture, hayland, or range

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

37B—Farfeld-Cedarpan loams, 0 to 6 percent slopes

Setting

Farfeld soils occur on linear drainage divides. Cedarpan soils occur on linear micro-highs on drainage divides. This map unit occurs on uplands. (fig. 8)

Map Unit Composition (percent)

Named Components

Farfeld and similar soils: 25 to 60 percent
Cedarpan and similar soils: 15 to 45 percent

Average Component Composition

Farfeld: 39 percent
Cedarpan: 27 percent
Amor: 13 percent
Janesburg: 11 percent
Dogtooth: 4 percent
Savage: 4 percent
Farnuf: 2 percent

Named Component Description

Farfeld

Slope: 0 to 6 percent
Depth to Restrictive Feature: Duripan; top depth ranges from 10 to 20 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 4 inches; loam
Bw—4 to 15 inches; loam
2Bqm—15 to 37 inches; cemented material
3Bt—37 to 53 inches; clay
3C—53 to 120 inches; clay

Cedarpan

Slope: 0 to 6 percent
Depth to Restrictive Feature: Natric; top depth ranges from 5 to 15 inches; Duripan; top depth ranges from 10 to 20 inches
Drainage Class: Well drained

Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
A—0 to 4 inches; loam
BE—4 to 9 inches; silt loam
Btn—9 to 15 inches; silty clay
2Bqm—15 to 26 inches; cemented material
3Btny—26 to 45 inches; silty clay
3BC—45 to 80 inches; silty clay

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

Figure 8. An area of Farfeld-Cedarpan loams, 0 to 6 percent slopes, used as range. Both soils have a duripan at a depth of 10 to 20 inches. The Cedarpan soils have a dense, sodium affected subsoil.

37F—Cedarpan-Slickspots, stony-Farfeld complex, 3 to 35 percent slopes

Setting

Cedarpan soils occur on linear micro-highs on backslopes. Slickspots occur on barren concave footslopes and backslopes. Farfeld soils occur on concave footslopes. This map unit occurs on drainage divides on uplands.

Map Unit Composition (percent)

Named Components

Cedarpan and similar soils: 15 to 50 percent
Slickspots, stony and similar soils: 10 to 40 percent
Farfeld and similar soils: 5 to 25 percent

Average Component Composition

Cedarpan: 25 percent
Slickspots, stony: 24 percent
Cabba: 10 percent
Farfeld: 10 percent
Janesburg: 8 percent
Dogtooth: 6 percent
Felor: 6 percent
Vebar: 6 percent
Wayden: 3 percent
Savage: 2 percent

Named Component Description

Cedarpan

Slope: 3 to 35 percent
Depth to Restrictive Feature: Natric; top depth ranges from 5 to 15 inches; Duripan; top depth ranges from 10 to 20 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
A—0 to 4 inches; loam
BE—4 to 9 inches; silt loam
Btn—9 to 15 inches; silty clay
2Bqm—15 to 26 inches; cemented material
3Btny—26 to 45 inches; silty clay
3BC—45 to 80 inches; silty clay

Slickspots, stony

Slope: 3 to 25 percent
Depth to Restrictive Feature: None noted
Drainage Class: Moderately well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches

Sodium Affected: Sodic within 30 inches
Typical profile:
H1—0 to 2 inches; silty clay
H2—2 to 60 inches; stratified loam to silty clay

Farfeld
Slope: 3 to 6 percent
Depth to Restrictive Feature: Duripan; top depth ranges from 10 to 20 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 4 inches; loam
Bw—4 to 15 inches; loam
2Bqm—15 to 37 inches; cemented material
3Bt—37 to 53 inches; clay
3C—53 to 120 inches; clay

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

41C—Wayden-Moreau silty clays, 3 to 9 percent slopes

Setting

Wayden soils occur on convex shoulders and rises. Moreau soils occur on convex backslopes on ridges. This map unit occurs on pediments on uplands.

Map Unit Composition (percent)

Named Components
Wayden and similar soils: 45 to 70 percent
Moreau and similar soils: 10 to 35 percent

Average Component Composition
Wayden: 58 percent
Moreau: 15 percent
Cabba: 13 percent
Dogtooth: 4 percent

Sen: 4 percent
Regent: 3 percent
Lawther: 2 percent
Daglum: 1 percent

Named Component Description

Wayden
Slope: 3 to 9 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 10 to 20 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Not affected
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

Moreau
Slope: 3 to 9 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Not affected
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

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland and range

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

42B—Searing-Ringling loams, 0 to 6 percent slopes

Setting

Searing soils occur on linear pediments. Ringling soils occur on convex rises on pediments. This map unit occurs on uplands.

Map Unit Composition (percent)

Named Components

Searing and similar soils: 45 to 70 percent
Ringling and similar soils: 15 to 35 percent

Average Component Composition

Searing: 60 percent
Ringling: 19 percent
Farnuf: 7 percent
Belfield: 5 percent
Amor: 3 percent
Brandenburg: 2 percent
Cabba: 2 percent
Chama: 2 percent

Named Component Description

Searing

Slope: 0 to 6 percent
Depth to Restrictive Feature: Strongly contrasting textural stratification; top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 8 inches; loam
Bw—8 to 23 inches; loam
C1—23 to 33 inches; channery loam
2C2—33 to 60 inches; channers

Ringling

Slope: 2 to 6 percent
Depth to Restrictive Feature: Strongly contrasting textural stratification; top depth ranges from 12 to 20 inches
Drainage Class: Excessively drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 5 inches; loam
Bw—5 to 17 inches; very channery loam
2Ck—17 to 42 inches; channers
2C—42 to 60 inches; channers

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland, pasture, hayland, or range

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

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

Setting

Belfield soils occur on linear alluvial flats. Grail soils occur in concave swales. This map unit occurs on uplands.

Map Unit Composition (percent)

Named Components

Belfield and similar soils: 45 to 60 percent
Grail and similar soils: 20 to 35 percent

Average Component Composition

Belfield: 49 percent
Grail: 26 percent
Savage: 7 percent
Daglum: 6 percent
Farnuf: 4 percent
Arnegard: 2 percent
Lawther: 2 percent
Regent: 2 percent
Straw: 2 percent

Named Component Description

Belfield

Slope: 0 to 2 percent
Depth to Restrictive Feature: None noted
Drainage Class: Moderately well drained
Flooding: None
Water Table: Seasonal
Ponding: None
Salt Affected: Not affected
Sodium Affected: Sodic within 30 inches
Typical profile:
A—0 to 9 inches; silty 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

Grail

Slope: 0 to 2 percent
Depth to Restrictive Feature: None noted
Drainage Class: Moderately well drained
Flooding: None
Water Table: Seasonal
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 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

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

44—Shambo loam, 0 to 2 percent slopes

Setting

Shambo soils occur on linear treads on stream terraces and alluvial flats on uplands.

Map Unit Composition (percent)

Named Components

Shambo and similar soils: 40 to 55 percent

Average Component Composition

Shambo: 48 percent
Shambo, gravelly substratum: 20 percent
Arnegard: 10 percent
Farnuf: 8 percent
Stady: 5 percent
Amor: 4 percent
Parshall: 3 percent
Tally: 2 percent

Named Component Description

Shambo

Slope: 0 to 2 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained

Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
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

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

44B—Shambo loam, 2 to 6 percent slopes

Setting

Shambo soils occur on linear treads on alluvial fans and stream terraces on uplands.

Map Unit Composition (percent)

Named Components
Shambo and similar soils: 50 to 70 percent

Average Component Composition
Shambo: 59 percent
Arnegard: 15 percent
Farnuf: 9 percent
Shambo, gravelly substratum: 7 percent
Stady: 4 percent
Amor: 2 percent
Arnegard, level: 2 percent
Parshall: 2 percent

Named Component Description

Shambo
Slope: 2 to 6 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None

Salt Affected: Not affected
Sodium Affected: Not affected
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

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

47—Stady loam, 0 to 3 percent slopes

Setting

Stady soils occur on treads on stream terraces along river valleys.

Map Unit Composition (percent)

Named Components
Stady and similar soils: 30 to 55 percent

Average Component Composition
Stady: 41 percent
Bowdle: 31 percent
Arnegard: 15 percent
Lehr: 6 percent
Belfield: 2 percent
Manning: 2 percent
Marysland: 2 percent
Amor: 1 percent

Named Component Description

Stady
Slope: 0 to 3 percent
Depth to Restrictive Feature: Strongly contrasting textural stratification; top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected

Typical profile:
Ap—0 to 6 inches; loam
Bw—6 to 15 inches; loam
Bk—15 to 29 inches; loam
2C—29 to 60 inches; very gravelly coarse sand

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

48B—Manning fine sandy loam, 0 to 6 percent slopes

Setting

Manning soils occur on linear treads on stream terraces along river valleys.

Map Unit Composition (percent)

Named Components
Manning and similar soils: 55 to 70 percent

Average Component Composition
Manning: 66 percent
Parshall: 12 percent
Stady: 12 percent
Shambo, gravelly substratum: 4 percent
Wabek: 4 percent
Vebar: 2 percent

Named Component Description

Manning
Slope: 0 to 6 percent
Depth to Restrictive Feature: Strongly contrasting textural stratification; top depth ranges from 24 to 40 inches
Drainage Class: Somewhat excessively drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Ap—0 to 5 inches; fine sandy loam
Bw—5 to 18 inches; fine sandy loam
Bk—18 to 25 inches; fine sandy loam

2C—25 to 60 inches; stratified loamy sand to extremely gravelly loamy coarse sand

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland or hayland

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

49B—Lihen-Parshall complex, 0 to 6 percent slopes

Setting

Lihen soils occur on convex alluvial flats and alluvial fans. Parshall soils occur in concave swales. This map unit occurs on uplands.

Map Unit Composition (percent)

Named Components

Lihen and similar soils: 35 to 50 percent
Parshall and similar soils: 10 to 20 percent

Average Component Composition

Lihen: 38 percent
Parshall: 15 percent
Telfer: 15 percent
Tally: 9 percent
Stady: 7 percent
Lihen, fine sandy loam: 6 percent
Seroco: 3 percent
Shambo: 3 percent
Beisigl: 2 percent
Manning: 2 percent

Named Component Description

Lihen

Slope: 0 to 6 percent
Depth to Restrictive Feature: None noted
Drainage Class: Somewhat excessively drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected

Typical profile:
A1—0 to 9 inches; loamy fine sand
A2—9 to 24 inches; loamy sand
Bk—24 to 32 inches; sand
C—32 to 60 inches; sand

Parshall
Slope: 0 to 6 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 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

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland, pasture, or hayland

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

51B—Janesburg-Dogtooth silt loams, 0 to 6 percent slopes

Setting

Janesburg soils occur on linear micro-highs. Dogtooth soils occur in concave micro-lows. This map unit occurs on pediments on uplands.

Map Unit Composition (percent)

Named Components
Janesburg and similar soils: 35 to 50 percent
Dogtooth and similar soils: 20 to 40 percent

Average Component Composition
Janesburg: 40 percent
Dogtooth: 29 percent
Belfield: 10 percent
Regent: 8 percent
Janesburg, fine sandy loam: 5 percent

Moreau: 4 percent
Farland: 3 percent
Slickspots: 1 percent

Named Component Description

Janesburg
Slope: 0 to 6 percent
Depth to Restrictive Feature: Natric; top depth ranges from 2 to 13 inches; Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
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

Dogtooth
Slope: 0 to 6 percent
Depth to Restrictive Feature: Natric; top depth ranges from 2 to 4 inches; Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
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

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Pasture, hayland, or range

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

52—Heil silt loam, 0 to 1 percent slopes

Setting

Heil soils occur in concave depressions on uplands.

Map Unit Composition (percent)

Named Components
Heil and similar soils: 80 to 95 percent

Average Component Composition
Heil: 84 percent
Heil, silty clay: 5 percent
Belfield: 3 percent
Dimmick: 3 percent
Rhoades: 3 percent
Regan: 2 percent

Named Component Description

Heil
Slope: 0 to 1 percent
Depth to Restrictive Feature: Natric; top depth ranges from 1 to 4 inches
Drainage Class: Poorly drained
Flooding: None
Water Table: Seasonal
Ponding: Frequent
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
E—0 to 3 inches; silt loam
Btn—3 to 24 inches; silty clay
Bg—24 to 38 inches; silty clay
Byg—38 to 52 inches; silty clay
Cg—52 to 60 inches; silty clay

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range, pasture, hay, and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

53B—Savage-Daglum silt loams, 0 to 6 percent slopes

Setting

Savage soils occur on convex alluvial fans and alluvial flats. Daglum soils occur on linear micro-highs on alluvial fans and alluvial flats. This map unit occurs on uplands.

Map Unit Composition (percent)

Named Components

Savage and similar soils: 15 to 40 percent
Daglum and similar soils: 15 to 40 percent

Average Component Composition

Savage: 25 percent
Daglum: 24 percent
Golva: 14 percent
Grail: 13 percent
Rhoades: 9 percent
Maschetah: 5 percent
Belfield: 4 percent
Regent: 4 percent
Regan: 2 percent

Named Component Description

Savage

Slope: 0 to 6 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 7 inches; silt loam
Bt—7 to 25 inches; silty clay
Bk—25 to 51 inches; silty clay loam
C—51 to 60 inches; silty clay loam

Daglum

Slope: 0 to 6 percent
Depth to Restrictive Feature: Natric; top depth ranges from 4 to 20 inches
Drainage Class: Moderately well drained
Flooding: None
Water Table: Seasonal
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
Ap—0 to 7 inches; silt 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

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland, pasture, hayland, or range

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

54—Straw loam, channeled, 0 to 2 percent slopes

Setting

Straw soils occur on linear flood plains along river valleys of uplands.

Map Unit Composition (percent)

Named Components
Channel and similar soils: 10 to 70 percent
Straw and similar soils: 30 to 65 percent

Average Component Composition
Channel: 40 percent
Straw: 40 percent
Korell: 13 percent
Belfield: 2 percent
Rhoades: 2 percent
Velva: 2 percent
Dimmick: 1 percent

Named Component Description

Channel
Slope: 3 to 15 percent
Depth to Restrictive Feature: None noted
Drainage Class: —
Flooding: Frequent
Water Table: Seasonal
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected

Straw
Slope: 0 to 2 percent
Depth to Restrictive Feature: None noted
Drainage Class: Moderately well drained
Flooding: Frequent
Water Table: Seasonal

Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Ap—0 to 5 inches; loam
A1—5 to 23 inches; loam
A2—23 to 30 inches; loam
C—30 to 36 inches; clay loam
Ab—36 to 40 inches; clay loam
C'—40 to 66 inches; clay loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

55—Pits, gravel and sand

Setting

Pits, gravel and sand occur on convex and concave stream terraces along river valleys of uplands.

Map Unit Composition (percent)

Named Components
Pits and similar soils: 80 to 100 percent

Average Component Composition
Pits, gravel and sand: 85 percent
Wabek: 10 percent
Lehr: 5 percent

Named Component Description

Pits
Slope: 0 to 60 percent
Depth to Restrictive Feature: None noted
Drainage Class: Excessively drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
H1—0 to 6 inches; extremely gravelly sand
H2—6 to 60 inches; extremely gravelly sand

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

57—Straw-Rhoades-Daglum silt loams, 0 to 2 percent slopes

Setting

Straw soils occur on linear floodplains. Rhoades soils occur on treads in concave micro-lows on stream terraces. Daglum soils occur on treads in linear micro-highs on stream terraces. This map unit occurs on uplands.

Map Unit Composition (percent)

Named Components

Straw and similar soils: 15 to 50 percent
Rhoades and similar soils: 10 to 45 percent
Daglum and similar soils: 5 to 30 percent

Average Component Composition

Straw: 28 percent
Rhoades: 21 percent
Daglum: 12 percent
Korell: 12 percent
Harriet: 7 percent
Magnus: 7 percent
Channel: 5 percent
Regan: 4 percent
Trembles: 4 percent

Named Component Description

Straw

Slope: 0 to 2 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: Rare
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Ap—0 to 5 inches; silt loam
A1—5 to 23 inches; loam

A2—23 to 30 inches; loam
C—30 to 36 inches; clay loam
Ab—36 to 40 inches; clay loam
C'—40 to 66 inches; clay loam

Rhoades
Slope: 0 to 2 percent
Depth to Restrictive Feature: Natric; top depth ranges from 1 to 5 inches
Drainage Class: Moderately well drained
Flooding: None
Water Table: Seasonal
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
E—0 to 3 inches; silt 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; stratified silt loam to silty clay loam

Daglum
Slope: 0 to 2 percent
Depth to Restrictive Feature: Natric; top depth ranges from 4 to 20 inches
Drainage Class: Moderately well drained
Flooding: None
Water Table: Seasonal
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
Ap—0 to 7 inches; silt 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

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

58—Straw loam, 0 to 2 percent slopes

Setting

Straw soils occur on linear flood plains along river valleys on uplands.

Map Unit Composition (percent)

Named Components
Straw and similar soils: 65 to 80 percent

Average Component Composition
Straw: 67 percent
Korell: 12 percent
Velva: 8 percent
Channel: 5 percent
Arnegard: 4 percent
Havrelon, fine sandy loam: 3 percent
Belfield: 1 percent

Named Component Description

Straw
Slope: 0 to 2 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: Rare
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Ap—0 to 5 inches; loam
A1—5 to 23 inches; loam
A2—23 to 30 inches; loam
C—30 to 36 inches; clay loam
Ab—36 to 40 inches; clay loam
C'—40 to 66 inches; clay loam
Mapunit Notes: Some areas have hardwood stands that may affect wildlife, range, and other interpretations. These stands maybe dependent on landscape position, slope, or aspect.

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

60—Korell silt loam, 0 to 2 percent slopes

Setting

Korell soils occur on linear flood plains along river valleys on uplands.

Map Unit Composition (percent)

Named Components
Korell and similar soils: 65 to 85 percent

Average Component Composition
Korell: 75 percent
Straw: 7 percent
Channel: 5 percent
Velva, very fine sandy loam: 4 percent
Velva, loam: 4 percent
Daglum: 2 percent
Havrelon: 2 percent
Magnus: 1 percent

Named Component Description

Korell
Slope: 0 to 2 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: Rare
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Ap—0 to 8 inches; loam
Bw—8 to 15 inches; loam
Bk—15 to 48 inches; loam
C—48 to 60 inches; stratified silt loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

62F—Dogtooth-Janesburg-Brandenburg complex, 9 to 35 percent slopes

Setting

Dogtooth soils occur in concave micro-lows on backslopes. Janesburg soils occur on linear micro-highs on backslopes. Brandenburg soils occur on convex shoulders and linear summits. This map unit occurs on hills and ridges on uplands.

Map Unit Composition (percent)

Named Components

Dogtooth and similar soils: 10 to 35 percent
Janesburg and similar soils: 10 to 35 percent
Brandenburg and similar soils: 10 to 30 percent

Average Component Composition

Dogtooth: 23 percent
Janesburg: 23 percent
Brandenburg: 18 percent
Cabba: 18 percent
Amor: 10 percent
Harriet: 3 percent
Searing: 2 percent
Wayden: 2 percent
Regent: 1 percent

Named Component Description

Dogtooth

Slope: 9 to 25 percent
Depth to Restrictive Feature: Natric; top depth ranges from 2 to 4 inches; Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
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

Janesburg

Slope: 9 to 25 percent
Depth to Restrictive Feature: Natric; top depth ranges from 2 to 13 inches; Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches

Sodium Affected: Sodic within 30 inches
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

Brandenburg
Slope: 9 to 35 percent
Depth to Restrictive Feature: Strongly contrasting textural stratification; top depth ranges from 10 to 20 inches
Drainage Class: Excessively drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 4 inches; channery loam
C1—4 to 10 inches; very channery loam
C2—10 to 60 inches; channers

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

63F—Dogtooth-Janesburg-Cabba complex, 6 to 30 percent slopes

Setting

Dogtooth soils occur in concave micro-lows on backslopes. Janesburg soils occur on convex micro-highs on backslopes. Cabba soils occur on convex shoulders and linear summits. This map unit occurs on hills and ridges on uplands.

Map Unit Composition (percent)

Named Components
Dogtooth and similar soils: 25 to 40 percent
Janesburg and similar soils: 15 to 25 percent
Cabba and similar soils: 10 to 25 percent

Average Component Composition
Dogtooth: 33 percent

Janesburg: 22 percent
Cabba: 20 percent
Moreau: 7 percent
Wayden: 4 percent
Amor: 3 percent
Chama: 3 percent
Ekalaka: 3 percent
Regan: 3 percent
Slickspots: 2 percent

Named Component Description

Dogtooth

Slope: 6 to 25 percent
Depth to Restrictive Feature: Natric; top depth ranges from 2 to 4 inches; Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
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

Janesburg

Slope: 6 to 25 percent
Depth to Restrictive Feature: Natric; top depth ranges from 2 to 13 inches; Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
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

Cabba

Slope: 9 to 30 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 10 to 20 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected

Typical profile:
A—0 to 3 inches; loam
Bk—3 to 15 inches; loam
Cr—15 to 60 inches; bedrock

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

65—Banks-Trembles fine sandy loams, channeled, 0 to 2 percent slopes

Setting

Banks and Trembles soils occur on flood plains along river valleys on uplands.

Map Unit Composition (percent)

Named Components
Channel and similar soils: 10 to 70 percent
Banks and similar soils: 20 to 80 percent
Trembles and similar soils: 10 to 50 percent

Average Component Composition
Channel: 40 percent
Banks: 29 percent
Trembles: 18 percent
Straw: 7 percent
Dogiecreek: 2 percent
Havrelon: 2 percent
Shambo: 2 percent

Named Component Description

Channel
Slope: 3 to 15 percent
Depth to Restrictive Feature: None noted
Drainage Class: —
Flooding: Frequent
Water Table: Seasonal
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected

Banks
Slope: 0 to 2 percent

Depth to Restrictive Feature: None noted
Drainage Class: Excessively drained
Flooding: Frequent
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 4 inches; fine sandy loam
C1—4 to 30 inches; fine sand
C2—30 to 60 inches; loamy fine sand

Trembles
Slope: 0 to 2 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: Frequent
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Ap—0 to 9 inches; fine sandy loam
C—9 to 59 inches; stratified fine sandy loam to silt loam
2C—59 to 80 inches; stratified sand

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

66B—Stady loam, 3 to 6 percent slopes

Setting

Stady soils occur on treads on linear stream terraces along river valleys on uplands.

Map Unit Composition (percent)

Named Components
Stady and similar soils: 25 to 65 percent

Average Component Composition
Stady: 50 percent
Bowdle: 17 percent
Lehr: 11 percent
Manning: 10 percent

Shambo, gravelly substratum: 5 percent
Parshall: 3 percent
Amor: 2 percent
Daglum: 2 percent

Named Component Description

Stady
Slope: 3 to 6 percent
Depth to Restrictive Feature: Strongly contrasting textural stratification; top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Ap—0 to 6 inches; loam
Bw—6 to 15 inches; loam
Bk—15 to 29 inches; loam
2C—29 to 60 inches; very gravelly coarse sand

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland, pasture, or hayland

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

67B—Evridge-Desart-Telfer fine sandy loams, 0 to 6 percent slopes

Setting

Evridge soils occur on convex pediments. Desart soils occur on concave flats and fans. Telfer soils occur on linear alluvial flats and convex alluvial fans. This map unit occurs on uplands.

Map Unit Composition (percent)

Named Components
Evridge and similar soils: 15 to 45 percent
Desart and similar soils: 10 to 35 percent
Telfer and similar soils: 5 to 25 percent

Average Component Composition

Evridge: 28 percent
Desart: 18 percent
Telfer: 13 percent
Janesburg: 11 percent
Tally: 10 percent
Ekalaka: 9 percent
Beisigl: 5 percent
Slickspots: 3 percent
Reeder: 2 percent
Heil: 1 percent

Named Component Description

Evridge

Slope: 0 to 6 percent
Depth to Restrictive Feature: Natric; top depth ranges from 13 to 33 inches; Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
A—0 to 12 inches; fine sandy loam
E—12 to 17 inches; loamy fine sand
Btn—17 to 21 inches; fine sandy loam
Bkz—21 to 31 inches; fine sandy loam
BCyz—31 to 38 inches; loamy sand
Cr—38 to 60 inches; bedrock

Desart

Slope: 0 to 6 percent
Depth to Restrictive Feature: Natric; top depth ranges from 15 to 30 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Sodic within 30 inches
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

Telfer

Slope: 0 to 6 percent
Depth to Restrictive Feature: None noted
Drainage Class: Somewhat excessively drained
Flooding: None
Water Table: None
Ponding: None

Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 6 inches; fine sandy loam
C—6 to 60 inches; fine sand

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range or cropland

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

68F—Cabbart-Badland, outcrop complex, 6 to 70 percent slopes

Setting

Cabbart soils occur on linear summits and convex shoulders. Badland occurs on barren convex shoulders and backslopes. This map unit occurs on ridges in badlands.

Map Unit Composition (percent)

Named Components
Cabbart and similar soils: 35 to 55 percent
Badland, outcrop and similar soils: 15 to 30 percent

Average Component Composition
Cabbart: 41 percent
Badland, outcrop: 27 percent
Boxwell: 6 percent
Patent: 6 percent
Blacksheep: 5 percent
Fleak: 5 percent
Kirby: 4 percent
Kremlin: 4 percent
Gerda: 2 percent

Named Component Description

Cabbart
Slope: 6 to 70 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 10 to 20 inches
Drainage Class: Well drained
Flooding: None
Water Table: None

Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 3 inches; loam
Bk—3 to 18 inches; loam
Cr—18 to 60 inches; bedrock

Badland, outcrop
Slope: 9 to 150 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 0 to 5 inches
Drainage Class: —-
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
H1—0 to 60 inches; bedrock

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

69F—Patent-Badland, outcrop-Cabbart complex, 6 to 50 percent slopes

Setting

Patent soils occur on linear alluvial fans. Badland occurs on barren convex shoulders and backslopes. Cabbart soils occur on linear summits and convex shoulders. This map unit occurs on ridges in badlands.

Map Unit Composition (percent)

Named Components
Patent and similar soils: 20 to 45 percent
Badland, outcrop and similar soils: 15 to 35 percent
Cabbart and similar soils: 10 to 30 percent

Average Component Composition
Patent: 33 percent
Badland, outcrop: 21 percent
Cabbart: 21 percent

Lonna: 10 percent
Gerda: 4 percent
Kremlin: 4 percent
Arikara: 3 percent
Kirby: 2 percent
Maltese: 2 percent

Named Component Description

Patent
Slope: 6 to 15 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: Occasional
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
AC—0 to 7 inches; loam
C—7 to 60 inches; stratified fine sandy loam to clay loam

Badland, outcrop
Slope: 9 to 150 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 0 to 5 inches
Drainage Class: —-
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
H1—0 to 60 inches; bedrock

Cabbart
Slope: 9 to 50 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 10 to 20 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 3 inches; loam
Bk—3 to 18 inches; loam
Cr—18 to 60 inches; bedrock

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

70B—Maltese-Gerda complex, 0 to 6 percent slopes

Setting

Maltese soils occur on linear micro-highs. Gerda soils occur in concave micro-lows. This map unit occurs on alluvial flats and fans in badlands.

Map Unit Composition (percent)

Named Components

Maltese and similar soils: 30 to 60 percent
Gerda and similar soils: 20 to 40 percent

Average Component Composition

Maltese: 39 percent
Gerda: 30 percent
Tanna: 12 percent
Kremlin: 8 percent
Scairt: 7 percent
Lonna: 2 percent
Rhame: 1 percent
Slickspots: 1 percent

Named Component Description

Maltese

Slope: 0 to 6 percent
Depth to Restrictive Feature: Natric; top depth ranges from 2 to 15 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Sodic within 30 inches
Typical profile:
A—0 to 7 inches; silt loam
E—7 to 10 inches; silt loam
Btn—10 to 16 inches; silty clay
Btkn—16 to 20 inches; silty clay
Btkny—20 to 33 inches; silty clay loam
BCy—33 to 60 inches; silty clay loam

Gerda

Slope: 0 to 6 percent
Depth to Restrictive Feature: Natric; top depth ranges from 0 to 3 inches
Drainage Class: Well drained

Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
E—0 to 2 inches; loam
Btn—2 to 11 inches; silty clay
Btkny—11 to 19 inches; silty clay
Bky—19 to 29 inches; silty clay loam
Bk—29 to 44 inches; silty clay
C—44 to 80 inches; silt loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range or hayland

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

71B—Chinook-Rhame fine sandy loams, 1 to 6 percent slopes

Setting

Chinook soils occur on linear alluvial fans. Rhame soils occur on convex pediments. This map unit is in badlands.

Map Unit Composition (percent)

Named Components
Chinook and similar soils: 30 to 60 percent
Rhame and similar soils: 15 to 40 percent

Average Component Composition
Chinook: 42 percent
Rhame: 28 percent
Kremlin: 12 percent
Boxwell: 5 percent
Chinook, moderately sloping: 5 percent
Blacksheep: 3 percent
Ethridge: 3 percent
Maltese: 2 percent

Named Component Description

Chinook
Slope: 1 to 6 percent
Depth to Restrictive Feature: None noted

Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 6 inches; fine sandy loam
Bw—6 to 15 inches; fine sandy loam
Bk—15 to 40 inches; fine sandy loam
BC—40 to 66 inches; fine sandy loam

Rhame
Slope: 1 to 6 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 8 inches; fine sandy loam
B—8 to 26 inches; fine sandy loam
C—26 to 34 inches; fine sandy loam
Cr—34 to 60 inches; bedrock

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range, pasture, hayland, or cropland

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

71D—Rhame-Chinook fine sandy loams, 6 to 15 percent slopes

Setting

Rhame soils occur on convex backslopes. Chinook soils occur on concave footslopes. This map unit occurs on hills and ridges in badlands. (fig. 9)

Map Unit Composition (percent)

Named Components
Rhame and similar soils: 35 to 60 percent
Chinook and similar soils: 25 to 40 percent

Average Component Composition

Rhame: 42 percent
Chinook: 32 percent
Kremlin: 10 percent
Tusler: 5 percent
Blacksheep: 4 percent
Fleak: 4 percent
Maltese: 2 percent
Burgraff: 1 percent

Named Component Description

Rhame

Slope: 6 to 15 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected

Typical profile:

A—0 to 8 inches; fine sandy loam
B—8 to 26 inches; fine sandy loam
C—26 to 34 inches; fine sandy loam
Cr—34 to 60 inches; bedrock

Figure 9. An area of Rhame-Chinook fine sandy loams, 6 to 15 percent slopes used for range. In the background is an area of map unit 69F - Patent-Badland, outcrop-Cabbart complex, 6 to 50 percent slopes also used for range.

Chinook

Slope: 6 to 15 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 6 inches; fine sandy loam
Bw—6 to 15 inches; fine sandy loam
Bk—15 to 40 inches; fine sandy loam
BC—40 to 66 inches; fine sandy loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range, pasture, hayland, or cropland

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

72F—Rhame-Fleak complex, 9 to 50 percent slopes

Setting

Rhame soils occur on convex backslopes. Fleak soils occur on linear summits and convex shoulders. This map unit occurs on ridges in badlands.

Map Unit Composition (percent)

Named Components

Rhame and similar soils: 20 to 40 percent
Fleak and similar soils: 35 percent

Average Component Composition

Rhame: 29 percent
Fleak: 27 percent
Chinook: 10 percent
Blacksheep: 7 percent
Cabbart: 6 percent
Rhame, strongly sloping: 6 percent
Tusler: 5 percent
Kremlin: 4 percent
Rock outcrop: 4 percent
Gerda: 2 percent

Named Component Description

Rhame

Slope: 15 to 50 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 8 inches; fine sandy loam
B—8 to 26 inches; fine sandy loam
C—26 to 34 inches; fine sandy loam
Cr—34 to 60 inches; bedrock

Fleak

Slope: 15 to 50 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 7 to 20 inches
Drainage Class: Excessively drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 3 inches; loamy fine sand
C—3 to 17 inches; loamy fine sand
Cr—17 to 60 inches; bedrock

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

73D—Gerda-Kirby complex, 1 to 15 percent slopes

Setting

Gerda soils occur in concave micro-lows on footslopes. Kirby soils occur on convex summits and shoulders. This map unit occurs on hills and ridges in badlands.

Map Unit Composition (percent)

Named Components

Gerda and similar soils: 15 to 40 percent
Kirby and similar soils: 15 to 30 percent

Average Component Composition

Kirby: 23 percent
Scairt: 18 percent
Gerda: 16 percent
Absher: 9 percent
Kremlin: 11 percent
Maltese: 9 percent
Searing, aridic-ustic: 5 percent
Cabbart: 4 percent
Ethridge: 4 percent
Harriet: 1 percent

Named Component Description

Gerda

Slope: 1 to 9 percent
Depth to Restrictive Feature: Natric; top depth ranges from 0 to 3 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
E—0 to 2 inches; loam
Btn—2 to 11 inches; silty clay
Btkny—11 to 19 inches; silty clay
Bky—19 to 29 inches; silty clay loam
Bk—29 to 44 inches; silty clay
C—44 to 80 inches; silt loam

Kirby

Slope: 6 to 15 percent
Depth to Restrictive Feature: Strongly contrasting textural stratification; top depth ranges from 17 to 20 inches
Drainage Class: Excessively drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 4 inches; very channery loam
Bk—4 to 12 inches; extremely channery loam
2C—12 to 60 inches; channers

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat.

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

74—Glendive and Havre soils, channeled, 0 to 3 percent slopes

Setting

Glendive soils occur on convex floodplains. Havre soils occur on linear flood plains. This map unit occurs in badlands.

Map Unit Composition (percent)

Named Components

Channel and similar soils: 10 to 70 percent
Glendive and similar soils: 0 to 80 percent
Havre and similar soils: 0 to 80 percent

Average Component Composition

Channel: 40 percent
Glendive: 35 percent
Havre: 18 percent
Hanly: 3 percent
Lonna: 3 percent
Regan: 1 percent

Named Component Description

Channel

Slope: 3 to 15 percent
Depth to Restrictive Feature: None noted
Drainage Class: —
Flooding: Frequent
Water Table: Seasonal
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected

Glendive

Slope: 0 to 3 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: Rare
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Ap—0 to 5 inches; fine sandy loam

C1—5 to 16 inches; loam
C2—16 to 60 inches; stratified loamy fine sand to silt loam

Havre
Slope: 0 to 3 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: Rare
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Ap—0 to 10 inches; silt loam
C—10 to 60 inches; stratified fine sandy loam to clay loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

75—Havre silt loam, 0 to 3 percent slopes

Setting

Havre soils occur on linear flood plains in river valleys in badlands.

Map Unit Composition (percent)

Named Components
Havre and similar soils: 60 to 85 percent

Average Component Composition
Havre: 77 percent
Havre, loam: 9 percent
Glendive: 6 percent
Channel: 5 percent
Kremlin: 2 percent
Wolf Point: 1 percent

Named Component Description

Havre
Slope: 0 to 3 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: Occasional

Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Ap—0 to 10 inches; silt loam
C—10 to 60 inches; stratified fine sandy loam to clay loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland, hayland, pasture, or range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

76B—Lonna silt loam, 1 to 6 percent slopes

Setting

Lonna soils occur on linear alluvial fans in badlands.

Map Unit Composition (percent)

Named Components
Lonna and similar soils: 70 to 95 percent

Average Component Composition
Lonna: 87 percent
Ethridge: 5 percent
Patent: 4 percent
Lonna, moderately sloping: 2 percent
Maltese: 2 percent

Named Component Description

Lonna
Slope: 1 to 6 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 2 inches; silt loam
Bw—2 to 11 inches; silt loam
Bk—11 to 34 inches; silt loam
C—34 to 60 inches; silt loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland, pasture, hayland, or range

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

76C—Lonna silt loam, 6 to 9 percent slopes

Setting

Lonna soils occur on linear alluvial fans in badlands.

Map Unit Composition (percent)

Named Components

Lonna and similar soils: 55 to 80 percent

Average Component Composition

Lonna: 64 percent
Lonna, gently sloping: 18 percent
Patent: 8 percent
Kremlin: 7 percent
Sham: 2 percent
Cabbart: 1 percent

Named Component Description

Lonna

Slope: 6 to 9 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 2 inches; silt loam
Bw—2 to 11 inches; silt loam
Bk—11 to 34 inches; silt loam
C—34 to 60 inches; silt loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range, pasture, or hayland

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

77—Glendive fine sandy loam, 0 to 3 percent slopes

Setting

Glendive soils occur on linear flood plains in river valleys. (fig. 10)

Map Unit Composition (percent)

Named Components

Glendive and similar soils: 55 to 80 percent

Average Component Composition

Glendive: 70 percent
Hanly: 11 percent
Glendive, loam: 10 percent
Channel: 5 percent
Havre: 4 percent

Figure 10. An area of Glendive fine sandy loam, 0 to 3 percent slopes, on the Little Missouri River floodplain. Map unit 103F - Badland, outcrop-Arikara-Cabbart complex, 15 to 70 percent slopes, is in the background.

Named Component Description

Glendive
Slope: 0 to 3 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: Occasional
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Ap—0 to 5 inches; fine sandy loam
C1—5 to 16 inches; loam
C2—16 to 60 inches; stratified loamy fine sand to silt loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland, pasture, hayland, or range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

78B—Hanly fine sandy loam, 0 to 6 percent slopes

Setting

Hanly soils occur on convex flood plains in river valleys.

Map Unit Composition (percent)

Named Components
Hanly and similar soils: 75 to 90 percent

Average Component Composition
Hanly: 81 percent
Glendive: 17 percent
Minnewaukan: 1 percent
Riverwash: 1 percent

Named Component Description

Hanly
Slope: 0 to 6 percent
Depth to Restrictive Feature: None noted
Drainage Class: Somewhat excessively drained
Flooding: Occasional
Water Table: None

Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 5 inches; fine sandy loam
C—5 to 60 inches; stratified loamy sand to fine sandy loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

79C—Zeona loamy fine sand, 1 to 9 percent slopes

Setting

Zeona soils occur on convex dunes on flood plains in river valleys.

Map Unit Composition (percent)

Named Components
Zeona and similar soils: 55 to 85 percent

Average Component Composition
Zeona: 76 percent
Glendive: 12 percent
Hanly: 7 percent
Havre: 5 percent

Named Component Description

Zeona
Slope: 1 to 9 percent
Depth to Restrictive Feature: None noted
Drainage Class: Excessively drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 3 inches; loamy fine sand
C—3 to 60 inches; fine sand

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this

map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

80—Ethridge silt loam, 1 to 3 percent slopes

Setting

Ethridge soils occur on linear alluvial flats in badlands.

Map Unit Composition (percent)

Named Components
Ethridge and similar soils: 35 to 85 percent

Average Component Composition
Ethridge: 64 percent
Ethridge, silty clay loam: 10 percent
Kremlin: 8 percent
Tanna: 8 percent
Maltese: 6 percent
Gerda: 2 percent
Lonna: 2 percent

Named Component Description

Ethridge
Slope: 1 to 3 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Ap—0 to 3 inches; silt loam
Bt—3 to 10 inches; silty clay loam
Btk—10 to 23 inches; silty clay loam
Bk—23 to 38 inches; silty clay loam
Bky—38 to 60 inches; silt loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and cropland

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

81B—Vebar-Parshall fine sandy loams, 0 to 6 percent slopes

Setting

Vebar soils occur on convex pediments. Parshall soils occur in linear swales. This map unit occurs on uplands.

Map Unit Composition (percent)

Named Components

Vebar and similar soils: 40 to 50 percent
Parshall and similar soils: 15 to 25 percent

Average Component Composition

Vebar: 46 percent
Parshall: 19 percent
Tally: 12 percent
Beisigl: 7 percent
Arnegard: 6 percent
Flasher: 4 percent
Amor: 3 percent
Cohagen: 3 percent

Named Component Description

Vebar

Slope: 0 to 6 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
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

Parshall

Slope: 0 to 6 percent
Depth to Restrictive Feature: None noted

Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 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

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland, hayland, or pasture

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

81C—Vebar-Tally fine sandy loams, 6 to 9 percent slopes

Setting

Vebar soils occur on convex backslopes. Tally soils occur on linear footslopes. This map unit occurs on hills and ridges on uplands.

Map Unit Composition (percent)

Named Components
Vebar and similar soils: 20 to 55 percent
Tally and similar soils: 15 to 45 percent

Average Component Composition
Vebar: 34 percent
Tally: 32 percent
Parshall: 10 percent
Cohagen: 7 percent
Vebar, nearly level: 6 percent
Amor: 5 percent
Farnuf: 4 percent
Ekalaka: 2 percent

Named Component Description

Vebar
Slope: 6 to 9 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches

Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
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

Tally
Slope: 6 to 9 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
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

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland, pasture, hayland, or range

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

81D—Vebar-Flasher-Tally complex, 9 to 15 percent slopes

Setting

Vebar soils occur on convex backslopes. Flasher soils occur on convex shoulders. Tally soils occur on concave footslopes. This map unit occurs on hills and ridges on uplands.

Map Unit Composition (percent)

Named Components
Vebar and similar soils: 25 to 35 percent
Flasher and similar soils: 15 to 25 percent
Tally and similar soils: 10 to 20 percent

Average Component Composition

Vebar: 32 percent
Flasher: 16 percent
Tally: 15 percent
Cohagen: 12 percent
Vebar, moderately sloping: 7 percent
Beisigl: 6 percent
Parshall: 5 percent
Amor: 4 percent
Telfer: 3 percent

Named Component Description

Vebar

Slope: 9 to 15 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
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

Flasher

Slope: 9 to 15 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 7 to 20 inches
Drainage Class: Somewhat excessively drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 6 inches; loamy fine sand
AC—6 to 10 inches; loamy fine sand
Cr—10 to 60 inches; bedrock

Tally

Slope: 9 to 15 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
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

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

82E—Badland, outcrop-Patent complex, 6 to 25 percent slopes

Setting

Badland occurs on barren convex shoulders and backslopes of ridges. Patent soils occur on linear alluvial fans. This map unit occurs in badlands. (fig. 11)

Figure 11. An area of Badland, outcrop-Patent complex, 6 to 25 percent slopes, used for range.

Map Unit Composition (percent)

Named Components

Badland, outcrop and similar soils: 45 to 70 percent
Patent and similar soils: 20 to 45 percent

Average Component Composition

Badland, outcrop: 54 percent
Patent: 25 percent
Patent, moderately steep: 7 percent
Cabbart: 6 percent
Lonna: 5 percent
Scoria outcrop: 2 percent
Havre: 1 percent

Named Component Description

Badland, outcrop

Slope: 9 to 150 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 0 to 5 inches
Drainage Class: —-
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
H1—0 to 60 inches; bedrock

Patent

Slope: 6 to 15 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: Occasional
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
AC—0 to 7 inches; loam
C—7 to 60 inches; stratified fine sandy loam to silty clay loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

83—Badland

Setting

Badlands occur on barren convex shoulders and backslopes.

Map Unit Composition (percent)

Named Components
Badland and similar soils: 80 to 100 percent

Average Component Composition
Badland: 88 percent
Cabbart: 5 percent
Patent: 5 percent
Scoria outcrop: 2 percent

Named Component Description

Badland
Slope: 9 to 180 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 0 to 5 inches
Drainage Class: —-
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
H1—0 to 60 inches; bedrock

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

85F—Lonna-Cabbart silt loams, 6 to 35 percent slopes

Setting

Lonna soils occur on linear alluvial fans. Cabbart soils occur on linear summits and convex shoulders of ridges. This map unit occurs in badlands.

Map Unit Composition (percent)

Named Components

Lonna and similar soils: 20 to 40 percent
Cabbart and similar soils: 25 to 45 percent

Average Component Composition

Lonna: 34 percent
Cabbart: 33 percent
Lonna, moderately steep: 14 percent
Kremlin: 7 percent
Gerda: 4 percent
Blacksheep: 3 percent
Ethridge: 3 percent
Arikara: 2 percent

Named Component Description

Lonna

Slope: 6 to 15 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 2 inches; silt loam
Bw—2 to 11 inches; silt loam
Bk—11 to 34 inches; silt loam
C—34 to 60 inches; silt loam

Cabbart

Slope: 6 to 35 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 10 to 20 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 3 inches; silt loam
Bk—3 to 18 inches; silt loam
Cr—18 to 60 inches; bedrock

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

86F—Kirby-Badland, outcrop-Patent complex, 9 to 70 percent slopes

Setting

Kirby soils occur on convex shoulders of ridges. Badland occurs on barren convex shoulders and backslopes of ridges. Patent soils occur on linear alluvial fans. This map unit occurs in badlands.

Map Unit Composition (percent)

Named Components

Kirby and similar soils: 25 to 50 percent
Badland, outcrop and similar soils: 15 to 40 percent
Patent and similar soils: 10 to 30 percent

Average Component Composition

Kirby: 39 percent
Badland, outcrop: 23 percent
Cabbart: 13 percent
Patent: 13 percent
Patent, strongly sloping: 6 percent
Maltese: 4 percent
Kremlin: 2 percent

Named Component Description

Kirby

Slope: 9 to 70 percent
Depth to Restrictive Feature: Strongly contrasting textural stratification; top depth ranges from 17 to 20 inches
Drainage Class: Excessively drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 4 inches; very channery loam
Bk—4 to 12 inches; extremely channery loam
2C—12 to 60 inches; channers

Badland, outcrop

Slope: 9 to 150 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 0 to 5 inches
Drainage Class: —-
Flooding: None
Water Table: None
Ponding: None

Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
H1—0 to 60 inches; bedrock

Patent
Slope: 15 to 25 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: Occasional
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
AC—0 to 7 inches; loam
C—7 to 60 inches; stratified fine sandy loam to silty clay loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

88—Littlemo-Chanta complex, 0 to 3 percent slopes

Setting

Littlemo soils occur on linear treads. Chanta soils occur on convex rises. This map unit occurs on paleoterraces in river valleys.

Map Unit Composition (percent)

Named Components
Littlemo and similar soils: 45 to 75 percent
Chanta and similar soils: 10 to 35 percent

Average Component Composition
Littlemo: 58 percent
Chanta: 20 percent
Kremlin: 20 percent
Boxwell: 2 percent

Named Component Description

Littlemo
Slope: 0 to 3 percent
Depth to Restrictive Feature: None noted

Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 6 inches; silt loam
Bw—6 to 17 inches; loam
Bk—17 to 28 inches; loam
2C—28 to 60 inches; very gravelly coarse sandy loam

Chanta
Slope: 0 to 3 percent
Depth to Restrictive Feature: Strongly contrasting textural stratification; top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 6 inches; loam
Bw1—6 to 22 inches; loam
Bw2—22 to 26 inches; sandy loam
2C—26 to 60 inches; gravelly sand

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland, hayland, pasture, or range

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

89B—Patent loam, 1 to 6 percent slopes

Setting

Patent soils occur on linear alluvial fans in badlands.

Map Unit Composition (percent)

Named Components
Patent and similar soils: 70 to 90 percent

Average Component Composition
Patent: 80 percent
Sham: 8 percent

Lonna: 6 percent
Benz: 5 percent
Kremlin: 1 percent

Named Component Description

Patent
Slope: 1 to 6 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: Occasional
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
AC—0 to 7 inches; loam
C—7 to 60 inches; stratified fine sandy loam to silty clay loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

91F—Lonna-Kirby-Cabbart complex, 3 to 50 percent slopes

Setting

Lonna soils occur on linear footslopes on hills and ridges on linear alluvial fans. Kirby and Cabbart soils occur on convex shoulders on hills and ridges. This map unit occurs in badlands.

Map Unit Composition (percent)

Named Components
Lonna and similar soils: 20 to 55 percent
Kirby and similar soils: 20 to 40 percent
Cabbart and similar soils: 5 to 25 percent

Average Component Composition
Lonna: 35 percent
Kirby: 34 percent
Cabbart: 16 percent
Boxwell: 8 percent
Maltese: 3 percent

Scairt: 2 percent
Scoria, outcrop: 2 percent

Named Component Description

Lonna
Slope: 3 to 25 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 2 inches; silt loam
Bw—2 to 11 inches; silt loam
Bk—11 to 34 inches; silt loam
C—34 to 60 inches; silt loam

Kirby
Slope: 6 to 50 percent
Depth to Restrictive Feature: Strongly contrasting textural stratification; top depth ranges from 17 to 20 inches
Drainage Class: Excessively drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 4 inches; very channery loam
Bk—4 to 12 inches; extremely channery loam
2C—12 to 60 inches; channers

Cabbart
Slope: 6 to 50 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 10 to 20 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 3 inches; silt loam
Bk—3 to 18 inches; silt loam
Cr—18 to 60 inches; bedrock

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

92B—Kremlin-Ethridge-Gerda complex, 1 to 6 percent slopes

Setting

Kremlin and Ethridge soils occur on linear alluvial fans. Gerda soils occur on concave micro-lows on alluvial fans. This map unit occurs in badlands.

Map Unit Composition (percent)

Named Components

Kremlin and similar soils: 15 to 40 percent
Ethridge and similar soils: 10 to 35 percent
Gerda and similar soils: 5 to 25 percent

Average Component Composition

Kremlin: 26 percent
Ethridge: 22 percent
Gerda: 19 percent
Maltese: 19 percent
Boxwell: 12 percent
Patent: 2 percent

Named Component Description

Kremlin

Slope: 1 to 6 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 11 inches; loam
Bw—11 to 19 inches; loam
Bk—19 to 60 inches; loam

Ethridge

Slope: 1 to 6 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None

Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Ap—0 to 3 inches; silt loam
Bt—3 to 10 inches; silty clay loam
Btk—10 to 23 inches; silty clay loam
Bk—23 to 38 inches; silty clay loam
Bky—38 to 60 inches; silt loam

Gerda
Slope: 1 to 6 percent
Depth to Restrictive Feature: Natric; top depth ranges from 0 to 3 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
E—0 to 2 inches; loam
Btn—2 to 11 inches; silty clay
Btkny—11 to 19 inches; silty clay
Bky—19 to 29 inches; silty clay loam
Bk—29 to 44 inches; silty clay
C—44 to 80 inches; silt loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

94F—Kirby-Arikara-Badland, outcrop complex, 15 to 70 percent slopes

Setting

Kirby soils occur on convex shoulders. Arikara soils occur on wooded linear backslopes and concave footslopes. Badland occurs on barren convex shoulders and backslopes. This map unit occurs on ridges in badlands.

Map Unit Composition (percent)

Named Components
Kirby and similar soils: 35 to 60 percent
Arikara and similar soils: 15 to 35 percent
Badland, outcrop and similar soils: 5 to 25 percent

Average Component Composition

Kirby: 42 percent
Arikara: 27 percent
Badland, outcrop: 16 percent
Patent: 7 percent
Cabbart: 4 percent
Lonna: 2 percent
Scairt: 2 percent

Named Component Description

Kirby

Slope: 15 to 70 percent
Depth to Restrictive Feature: Strongly contrasting textural stratification; top depth ranges from 17 to 20 inches
Drainage Class: Excessively drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 4 inches; very channery loam
Bk—4 to 12 inches; extremely channery loam
2C—12 to 60 inches; channers

Arikara

Slope: 15 to 70 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Oi—0 to 1 inches; slightly decomposed plant material
A—1 to 2 inches; loam
Bw—2 to 14 inches; loam
Bk—14 to 39 inches; loam
C—39 to 60 inches; loam

Badland, outcrop

Slope: 15 to 150 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 0 to 5 inches
Drainage Class: —-
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
H1—0 to 60 inches; unweathered bedrock

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

95F—Tinsley-Chanta complex, 6 to 35 percent slopes

Setting

Tinsley soils occur on convex shoulders. Chanta soils occur on convex backslopes. This map unit occurs on escarpments on paleoterraces in river valleys.

Map Unit Composition (percent)

Named Components

Tinsley and similar soils: 45 to 70 percent
Chanta and similar soils: 10 to 40 percent

Average Component Composition

Tinsley: 53 percent
Chanta: 17 percent
Chinook: 7 percent
Cozberg: 7 percent
Cabbart: 6 percent
Rhame: 6 percent
Kremlin: 4 percent

Named Component Description

Tinsley

Slope: 6 to 35 percent
Depth to Restrictive Feature: Strongly contrasting textural stratification; top depth ranges from 2 to 7 inches
Drainage Class: Excessively drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 4 inches; gravelly sandy loam
C—4 to 60 inches; very gravelly sand

Chanta

Slope: 6 to 15 percent
Depth to Restrictive Feature: Strongly contrasting textural stratification; top depth ranges from 20 to 40 inches

Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 6 inches; loam
Bw1—6 to 22 inches; loam
Bw2—22 to 26 inches; sandy loam
2C—26 to 60 inches; gravelly sand

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

97—Kremlin loam, 0 to 3 percent slopes

Setting

Kremlin soils occur on linear treads on paleoterraces in river valleys.

Map Unit Composition (percent)

Named Components
Kremlin and similar soils: 60 to 85 percent

Average Component Composition
Kremlin: 77 percent
Littlemo: 8 percent
Chanta: 5 percent
Chinook: 5 percent
Haydraw: 5 percent

Named Component Description

Kremlin
Slope: 0 to 3 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected

Typical profile:
A—0 to 11 inches; loam
Bw—11 to 19 inches; loam
Bk—19 to 60 inches; loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland, pasture, hayland, or range

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

98—Wolf Point silty clay loam, 0 to 1 percent slopes

Setting

Wolf Point soils occur on linear flood plains in river valleys.

Map Unit Composition (percent)

Named Components
Wolf Point and similar soils: 70 to 95 percent

Average Component Composition
Wolf Point: 85 percent
Havre: 7 percent
Channel: 5 percent
Ethridge: 2 percent
Glendive: 1 percent

Named Component Description

Wolf Point
Slope: 0 to 1 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: Occasional
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A1—0 to 1 inches; silty clay loam
A2—1 to 10 inches; clay
C—10 to 60 inches; silty clay

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this

map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland, pasture, hayland, or range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

99F—Badland, outcrop-Cabbart complex, 6 to 70 percent slopes

Setting

Badland occurs on barren convex shoulders and backslopes. Cabbart soils occur on linear summits and convex shoulders. This map unit occurs on ridges in badlands.

Map Unit Composition (percent)

Named Components

Badland, outcrop and similar soils: 50 to 80 percent
Cabbart and similar soils: 15 to 40 percent

Average Component Composition

Badland, outcrop: 63 percent
Cabbart: 30 percent
Arikara: 3 percent
Boxwell: 2 percent
Patent: 1 percent
Rock outcrop: 1 percent

Named Component Description

Badland, outcrop

Slope: 9 to 150 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 0 to 5 inches
Drainage Class: —-
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
H1—0 to 60 inches; bedrock

Cabbart

Slope: 6 to 70 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 10 to 20 inches
Drainage Class: Well drained
Flooding: None
Water Table: None

Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 3 inches; loam
Bk—3 to 18 inches; loam
Cr—18 to 60 inches; bedrock

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

100C—Patent-Gullied land-Glendive complex, 1 to 9 percent slopes

Setting

Patent soils occur on linear alluvial fans. Gullied land occurs on dissected convex alluvial fans. Glendive soils occur on linear flood plains. This map unit occurs in badlands.

Map Unit Composition (percent)

Named Components
Patent and similar soils: 20 to 45 percent
Gullied land and similar soils: 10 to 30 percent
Glendive and similar soils: 10 to 30 percent

Average Component Composition
Patent: 32 percent
Gullied land: 19 percent
Glendive: 13 percent
Lonna: 12 percent
Hanly: 8 percent
Kremlin: 5 percent
Havre: 4 percent
Gerda: 3 percent
Ethridge: 2 percent
Sham: 2 percent

Named Component Description

Patent

Slope: 1 to 9 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: Occasional
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
AC—0 to 7 inches; loam
C—7 to 60 inches; stratified fine sandy loam to silty clay loam

Gullied land

Slope: 9 to 99 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 0 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
H1—0 to 60 inches

Glendive

Slope: 1 to 6 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: Occasional
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Ap—0 to 5 inches; fine sandy loam
C1—5 to 16 inches; loam
C2—16 to 60 inches; stratified loamy fine sand to silt loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

101F—Boxwell-Cabbart-Arikara complex, 9 to 50 percent slopes

Setting

Boxwell soils occur on convex backslopes. Cabbart soils occur on linear summits and convex shoulders. Arikara soils occur on wooded concave backslopes and footslopes. This map unit occurs on ridges in badlands.

Map Unit Composition (percent)

Named Components

Boxwell and similar soils: 20 to 50 percent
Cabbart and similar soils: 20 to 45 percent
Arikara and similar soils: 10 to 30 percent

Average Component Composition

Boxwell: 34 percent
Cabbart: 32 percent
Arikara: 16 percent
Rhame: 5 percent
Ethridge: 4 percent
Maltese: 3 percent
Scairt: 3 percent
Fleak: 2 percent
Badland, outcrop: 1 percent

Named Component Description

Boxwell

Slope: 9 to 50 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Ap—0 to 5 inches; loam
Bw—5 to 14 inches; loam
Bk—14 to 28 inches; loam
Cr—28 to 60 inches; bedrock

Cabbart

Slope: 9 to 50 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 10 to 20 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected

Typical profile:
A—0 to 3 inches; loam
Bk—3 to 18 inches; loam
Cr—18 to 60 inches; bedrock

Arikara
Slope: 15 to 50 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Oi—0 to 1 inches; slightly decomposed plant material
A—1 to 2 inches; loam
Bw—2 to 14 inches; loam
Bk—14 to 39 inches; loam
C—39 to 60 inches; loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

102B—Boxwell-Kremlin loams, 1 to 6 percent slopes

Setting

Boxwell soils occur on convex pediments. Kremlin soils occur on linear alluvial flats and fans. This map unit occurs in badlands.

Map Unit Composition (percent)

Named Components
Boxwell and similar soils: 30 to 60 percent
Kremlin and similar soils: 30 to 55 percent

Average Component Composition
Boxwell: 46 percent
Kremlin: 43 percent
Rhame: 4 percent
Burgraff: 2 percent
Chanta: 2 percent
Gerda: 2 percent
Cabbart: 1 percent

Named Component Description

Boxwell

Slope: 1 to 6 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Ap—0 to 5 inches; loam
Bw—5 to 14 inches; loam
Bk—14 to 28 inches; loam
Cr—28 to 60 inches; bedrock

Kremlin

Slope: 1 to 6 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 11 inches; loam
Bw—11 to 19 inches; loam
Bk—19 to 60 inches; loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland, pasture, hayland, or range

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

102D—Boxwell-Kremlin loams, 6 to 15 percent slopes

Setting

Boxwell soils occur on convex backslopes. Kremlin soils occur on concave footslopes. This map unit occurs on ridges in badlands.

Map Unit Composition (percent)

Named Components

Boxwell and similar soils: 25 to 55 percent
Kremlin and similar soils: 15 to 35 percent

Average Component Composition

Boxwell: 38 percent
Kremlin: 28 percent
Cabbart: 8 percent
Kremlin, gently sloping: 8 percent
Boxwell, gently sloping: 5 percent
Burgraff: 5 percent
Haydraw: 4 percent
Blacksheep: 2 percent
Maltese: 2 percent

Named Component Description

Boxwell

Slope: 6 to 15 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Ap—0 to 5 inches; loam
Bw—5 to 14 inches; loam
Bk—14 to 28 inches; loam
Cr—28 to 60 inches; bedrock

Kremlin

Slope: 6 to 15 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 11 inches; loam
Bw—11 to 19 inches; loam
Bk—19 to 60 inches; loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Pasture, hayland or range

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

103F—Badland, outcrop-Arikara-Cabbart complex, 15 to 70 percent slopes

Setting

Badland occurs on barren convex shoulders and backslopes. Arikara soils occur on wooded concave backslopes and footslopes. Cabbart soils occur on linear summits and convex shoulders. This map unit occurs on ridges in badlands. (fig. 12)

Map Unit Composition (percent)

Named Components

Badland, outcrop and similar soils: 20 to 40 percent
Arikara and similar soils: 15 to 40 percent
Cabbart and similar soils: 10 to 30 percent

Average Component Composition

Badland, outcrop: 30 percent
Arikara: 28 percent

Figure 12. An area of Badland, outcrop-Arikara-Cabbart complex, 15 to 70 percent slopes. This map unit is used for range.

Cabbart: 16 percent
Boxwell: 12 percent
Lonna: 9 percent
Kirby: 2 percent
Rhame: 2 percent
Scairt: 1 percent

Named Component Description

Badland, outcrop
Slope: 9 to 150 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 0 to 5 inches
Drainage Class: —-
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
H1—0 to 60 inches; bedrock

Arikara
Slope: 15 to 70 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Oi—0 to 1 inches; slightly decomposed plant material
A—1 to 2 inches; loam
Bw—2 to 14 inches; loam
Bk—14 to 39 inches; loam
C—39 to 60 inches; loam

Cabbart
Slope: 15 to 70 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 10 to 20 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 3 inches; loam
Bk—3 to 18 inches; loam
Cr—18 to 60 inches; bedrock

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this

map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

105—Harriet silt loam, 0 to 2 percent slopes

Setting

Harriet soils occur in linear drainageways and on alluvial flats on uplands.

Map Unit Composition (percent)

Named Components
Harriet and similar soils: 75 to 90 percent

Average Component Composition
Harriet: 80 percent
Regan: 6 percent
Slickspots: 5 percent
Rhoades: 4 percent
Heil: 3 percent
Daglum: 2 percent

Named Component Description

Harriet
Slope: 0 to 2 percent
Depth to Restrictive Feature: Natric; top depth ranges from 0 to 5 inches
Drainage Class: Poorly drained
Flooding: Occasional
Water Table: Seasonal
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
E—0 to 2 inches; silt 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; stratified very fine sandy loam to silty clay

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

106—Riverwash

Setting

Riverwash occurs on linear flood plains in badlands.

Map Unit Composition (percent)

Named Components
Riverwash and similar soils: 50 to 95 percent

Average Component Composition
Riverwash: 85 percent
Hanly: 10 percent
Minnewaukan: 5 percent

Named Component Description

Riverwash
Slope: 0 to 1 percent
Depth to Restrictive Feature: None noted
Drainage Class: Poorly drained
Flooding: Frequent
Water Table: Seasonal
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
H1—0 to 6 inches; gravelly sand
H2—6 to 60 inches; stratified coarse sand to sandy loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

107D—Rhame-Kremlin-Maltese complex, 1 to 15 percent slopes

Setting

Rhame soils occur on convex backslopes. Kremlin soils occur on linear footslopes. Maltese soils occur on concave micro-highs on footslopes. This map unit occurs on ridges in badlands.

Map Unit Composition (percent)

Named Components

Rhame and similar soils: 15 to 40 percent
Kremlin and similar soils: 10 to 30 percent
Maltese and similar soils: 10 to 30 percent

Average Component Composition

Rhame: 23 percent
Chinook: 18 percent
Kremlin: 16 percent
Maltese: 15 percent
Blacksheep: 7 percent
Boxwell: 6 percent
Ethridge: 6 percent
Tusler: 5 percent
Scairt: 3 percent
Heil: 1 percent

Named Component Description

Rhame

Slope: 3 to 15 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 8 inches; fine sandy loam
B—8 to 26 inches; fine sandy loam
C—26 to 34 inches; fine sandy loam
Cr—34 to 60 inches; bedrock

Kremlin

Slope: 1 to 15 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected

Typical profile:
A—0 to 11 inches; loam
Bw—11 to 19 inches; loam
Bk—19 to 60 inches; loam

Maltese
Slope: 1 to 9 percent
Depth to Restrictive Feature: Natric; top depth ranges from 2 to 15 inches
Drainage Class: Moderately well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Sodic within 30 inches
Typical profile:
A—0 to 7 inches; silt loam
E—7 to 10 inches; silt loam
Btn—10 to 16 inches; silty clay
Btkn—16 to 20 inches; silty clay
Btkny—20 to 33 inches; silty clay loam
BCy—33 to 60 inches; silty clay loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

108D—Boxwell-Scairt-Maltese complex, 6 to 15 percent slopes

Setting

Boxwell soils occur on convex backslopes. Scairt soils occur in concave micro-lows on backslopes. Maltese soils occur on concave micro-highs on footslopes. This map unit occurs on ridges in badlands.

Map Unit Composition (percent)

Named Components
Boxwell and similar soils: 20 to 40 percent
Scairt and similar soils: 10 to 30 percent
Maltese and similar soils: 10 to 30 percent

Average Component Composition
Boxwell: 27 percent
Scairt: 18 percent

Maltese: 14 percent
Kremlin: 10 percent
Burgraff: 9 percent
Ethridge: 7 percent
Lonna: 6 percent
Cabbart: 5 percent
Yawdim: 4 percent

Named Component Description

Boxwell

Slope: 6 to 15 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Ap—0 to 5 inches; loam
Bw—5 to 14 inches; loam
Bk—14 to 28 inches; loam
Cr—28 to 60 inches; bedrock

Scairt

Slope: 6 to 15 percent
Depth to Restrictive Feature: Natric; top depth ranges from 1 to 4 inches; Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
E—0 to 2 inches; silt loam
Btn—2 to 6 inches; silty clay
Btnz—6 to 13 inches; silty clay loam
Bkz—13 to 22 inches; silty clay loam
BCy—22 to 28 inches; silty clay loam
Cr—28 to 60 inches; bedrock

Maltese

Slope: 6 to 15 percent
Depth to Restrictive Feature: Natric; top depth ranges from 2 to 15 inches
Drainage Class: Moderately well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Sodic within 30 inches
Typical profile:
A—0 to 7 inches; silt loam
E—7 to 10 inches; silt loam

Btn—10 to 16 inches; silty clay
Btkn—16 to 20 inches; silty clay
Btkny—20 to 33 inches; silty clay loam
BCy—33 to 60 inches; silty clay loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat.

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

109F—Rhame-Arikara-Fleak complex, 9 to 50 percent slopes

Setting

Rhame soils occur on convex backslopes. Arikara soils occur on wooded concave footslopes. Fleak soils occur on convex shoulders. This map unit occurs on ridges in badlands.

Map Unit Composition (percent)

Named Components
Rhame and similar soils: 15 to 45 percent
Arikara and similar soils: 15 to 45 percent
Fleak and similar soils: 5 to 30 percent

Average Component Composition
Rhame: 24 percent
Arikara: 23 percent
Fleak: 16 percent
Tusler: 13 percent
Chinook: 6 percent
Kremlin: 5 percent
Rhame, strongly sloping: 5 percent
Blacksheep: 4 percent
Maltese: 4 percent

Named Component Description

Rhame
Slope: 15 to 50 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None

Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 8 inches; fine sandy loam
B—8 to 26 inches; fine sandy loam
C—26 to 34 inches; fine sandy loam
Cr—34 to 60 inches; bedrock

Arikara
Slope: 15 to 50 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Oi—0 to 1 inches; slightly decomposed plant material
A—1 to 2 inches; loam
Bw—2 to 14 inches; loam
Bk—14 to 39 inches; loam
C—39 to 60 inches; loam

Fleak
Slope: 15 to 50 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 7 to 20 inches
Drainage Class: Excessively drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 3 inches; loamy fine sand
C—3 to 17 inches; loamy fine sand
Cr—17 to 60 inches; bedrock

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

110C—Patent-Gerda-Slickspots complex, 1 to 9 percent slopes

Setting

Patent soils occur on linear alluvial fans. Gerda soils occur in concave micro-lows on alluvial fans and flats. Slickspots occur on barren concave alluvial fans and flats. This map unit occurs in badlands. (fig. 13)

Map Unit Composition (percent)

Named Components

Patent and similar soils: 30 to 50 percent
Gerda and similar soils: 20 to 40 percent
Slickspots and similar soils: 5 to 15 percent

Average Component Composition

Patent: 38 percent
Gerda: 27 percent
Slickspots: 10 percent
Benz: 6 percent
Haydraw: 6 percent
Ethridge: 5 percent
Chinook: 3 percent
Sham: 3 percent
Yawdim: 2 percent

Figure 13. Bighorn sheep on an area of Patent-Gerda-Slickspots complex, 1 to 9 percent slopes in the foreground. Map unit 99F - Badland, outcrop-Cabbart complex, 6 to 70 percent slopes, is in the background.

Named Component Description

Patent

Slope: 1 to 9 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: Occasional
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
AC—0 to 7 inches; loam
C—7 to 60 inches; stratified fine sandy loam to silty clay loam

Gerda

Slope: 1 to 9 percent
Depth to Restrictive Feature: Natric; top depth ranges from 0 to 3 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
E—0 to 2 inches; loam
Btn—2 to 11 inches; silty clay
Btkny—11 to 19 inches; silty clay
Bky—19 to 29 inches; silty clay loam
Bk—29 to 44 inches; silty clay
C—44 to 80 inches; silt loam

Slickspots

Slope: 1 to 6 percent
Depth to Restrictive Feature: None noted
Drainage Class: Moderately well drained
Flooding: Occasional
Water Table: Seasonal
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
H1—0 to 2 inches; silty clay
H2—2 to 60 inches; stratified loam to silty clay

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

111F—Lonna-Arikara-Cabbart complex, 9 to 70 percent slopes

Setting

Lonna soils occur on linear footslopes. Arikara soils occur on wooded concave backslopes and footslopes. Cabbart soils occur on linear summits and convex shoulders. This map unit occurs on ridges in badlands.

Map Unit Composition (percent)

Named Components

Lonna and similar soils: 20 to 45 percent
Arikara and similar soils: 15 to 40 percent
Cabbart and similar soils: 10 to 35 percent

Average Component Composition

Lonna: 37 percent
Arikara: 30 percent
Cabbart: 18 percent
Badland, outcrop: 6 percent
Burgraff: 3 percent
Fleak: 3 percent
Rhame: 2 percent
Havre: 1 percent

Named Component Description

Lonna

Slope: 9 to 25 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 2 inches; silt loam
Bw—2 to 11 inches; silt loam
Bk—11 to 34 inches; silt loam
C—34 to 60 inches; silt loam

Arikara

Slope: 15 to 70 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None

Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Oi—0 to 1 inches; slightly decomposed plant material
A—1 to 2 inches; loam
Bw—2 to 14 inches; loam
Bk—14 to 39 inches; loam
C—39 to 60 inches; loam

Cabbart
Slope: 9 to 70 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 10 to 20 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 3 inches; silt loam
Bk—3 to 18 inches; silt loam
Cr—18 to 60 inches; bedrock
Mapunit Notes: Some areas have intermixed stands of conifers and hardwoods that may affect wildlife, range, and other interpretations. These stands may be dependent on landscape position, slope, or aspect.

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

112—Wolf Point silty clay loam, wooded, 0 to 1 percent slopes

Setting

Wolf Point soils occur on wooded linear flood plains in river valleys.

Map Unit Composition (percent)

Named Components
Wolf Point, wooded and similar soils: 55 to 95 percent

Average Component Composition
Wolf Point, wooded: 78 percent
Havre: 11 percent
Channel: 5 percent
Glendive: 4 percent
Ethridge: 2 percent

Named Component Description

Wolf Point, wooded
Slope: 0 to 1 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: Occasional
Water Table: Seasonal
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A1—0 to 1 inches; silty clay loam
A2—1 to 10 inches; clay
C—10 to 60 inches; silty clay
Mapunit Notes: Some areas have intermixed stands of conifers and hardwoods that may affect wildlife, range, and other interpretations. These stands may be dependent on landscape position, slope, or aspect.

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

113—Havre silt loam, wooded, 0 to 1 percent slopes

Setting

Havre soils occur on wooded linear flood plains in river valleys.

Map Unit Composition (percent)

Named Components
Havre, wooded and similar soils: 75 to 95 percent

Average Component Composition
Havre, wooded: 80 percent
Glendive, wooded: 8 percent
Channel: 5 percent

Wolf Point: 4 percent
Kremlin: 2 percent
Harriet: 1 percent

Named Component Description

Havre, wooded
Slope: 0 to 1 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: Occasional
Water Table: Seasonal
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 10 inches; silt loam
C—10 to 60 inches; stratified fine sandy loam to clay loam
Mapunit Notes: Some areas have intermixed stands of conifers and hardwoods that may affect wildlife, range, and other interpretations. These stands may be dependent on landscape position, slope, or aspect.

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

114B—Haplustolls-Ustorthents complex, 0 to 6 percent slopes

Setting

Haplustolls occur on linear treads. Ustorthents occur on linear risers. This map unit occurs on stream terraces on uplands.

Map Unit Composition (percent)

Named Components
Haplustolls and similar soils: 30 to 75 percent
Ustorthents and similar soils: 20 to 60 percent

Average Component Composition
Haplustolls: 51 percent
Ustorthents: 45 percent
Spoil pile: 4 percent

Named Component Description

Haplustolls
Slope: 0 to 6 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 12 inches; gravelly loam
C—12 to 19 inches; very gravelly sandy loam
2C—19 to 60 inches; fine sandy loam

Ustorthents
Slope: 0 to 6 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 3 inches; fine sandy loam
C—3 to 60 inches; fine sandy loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Cropland, pasture, or hayland

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

115B—Cozberg-Chanta loams, 1 to 6 percent slopes

Setting

Cozberg soils occur on convex rises. Chanta soils occur on linear treads. This map unit occurs on paleoterraces in river valleys.

Map Unit Composition (percent)

Named Components
Cozberg and similar soils: 25 to 60 percent
Chanta and similar soils: 20 to 55 percent

Average Component Composition

Cozberg: 39 percent
Chanta: 35 percent
Chinook: 13 percent
Kremlin: 8 percent
Tinsley: 5 percent

Named Component Description

Cozberg

Slope: 1 to 6 percent
Depth to Restrictive Feature: Strongly contrasting textural stratification; top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Ap—0 to 7 inches; loam
Bw—7 to 20 inches; fine sandy loam
Bk1—20 to 26 inches; fine sandy loam
2Bk2—26 to 30 inches; gravelly loamy sand
2C—30 to 60 inches; loamy sand

Chanta

Slope: 1 to 6 percent
Depth to Restrictive Feature: Strongly contrasting textural stratification; top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 6 inches; loam
Bw1—6 to 22 inches; loam
Bw2—22 to 26 inches; sandy loam
2C—26 to 60 inches; gravelly sand

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

116F—Kremlin-Shibah loams, 9 to 50 percent slopes, very bouldery

Setting

Kremlin soils occur on linear backslopes. Shibah soils occur on convex shoulders. This map unit occurs on ridges in badlands.

Map Unit Composition (percent)

Named Components

Kremlin, moderately steep and similar soils: 10 to 45 percent
Shibah and similar soils: 10 to 40 percent

Average Component Composition

Kremlin: 22 percent
Kremlin, strongly sloping: 21 percent
Shibah: 20 percent
Boxwell: 8 percent
Tanna: 7 percent
Blacksheep: 6 percent
Arikara: 5 percent
Maltese: 5 percent
Lonna: 3 percent
Scairt: 3 percent

Named Component Description

Kremlin, moderately steep

Slope: 15 to 25 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 11 inches; loam
Bw—11 to 19 inches; loam
Bk—19 to 60 inches; loam

Shibah

Slope: 9 to 50 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 4 inches; loam
Bw—4 to 8 inches; gravelly loam
Bk—8 to 18 inches; very cobbly loam
C—18 to 80 inches; very cobbly loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

117B—Kremlin-Chanta loams, 1 to 6 percent slopes

Setting

Kremlin and Chanta soils occur on linear treads. This map unit occurs on paleoterraces in river valleys.

Map Unit Composition (percent)

Named Components

Kremlin and similar soils: 25 to 65 percent
Chanta and similar soils: 20 to 60 percent

Average Component Composition

Kremlin: 43 percent
Chanta: 42 percent
Littlemo: 9 percent
Chinook: 4 percent
Tinsley: 2 percent

Named Component Description

Kremlin

Slope: 1 to 6 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 11 inches; loam
Bw—11 to 19 inches; loam
Bk—19 to 60 inches; loam

Chanta

Slope: 1 to 6 percent
Depth to Restrictive Feature: Strongly contrasting textural stratification; top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None

Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 6 inches; loam
Bw1—6 to 22 inches; loam
Bw2—22 to 26 inches; sandy loam
2C—26 to 60 inches; gravelly sand

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Pasture or range

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

118F—Shibah-Rubbleland-Arikara complex, 15 to 70 percent slopes

Setting

Shibah soils occur on convex shoulders. Rubbleland occurs as areas of boulders or stones on convex shoulders. Arikara soils occur on wooded concave backslopes and footslopes. This map unit occurs on ridges in badlands. (fig. 14)

Map Unit Composition (percent)

Named Components
Shibah and similar soils: 25 to 65 percent
Rubbleland and similar soils: 15 to 45 percent
Arikara and similar soils: 10 to 40 percent

Average Component Composition
Shibah: 39 percent
Rubbleland: 29 percent
Arikara: 25 percent
Kremlin: 6 percent
Rock outcrop: 1 percent

Named Component Description

Shibah
Slope: 15 to 45 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None

Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 4 inches; loam
Bw—4 to 8 inches; gravelly loam
Bk—8 to 18 inches; very cobbly loam
C—18 to 80 inches; very cobbly loam

Rubbleland
Slope: 15 to 70 percent
Depth to Restrictive Feature: None noted
Drainage Class: —-
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected

Arikara
Slope: 15 to 70 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected

Figure 14. An area of Shibah-Rubbleland-Arikara complex, 15 to 70 percent slopes. The Rubbleland is scattered predominantly on knobs or ridges and backslopes of adjacent hills.

Typical profile:
Oi—0 to 1 inches; slightly decomposed plant material
A—1 to 2 inches; loam
Bw—2 to 14 inches; loam
Bk—14 to 39 inches; loam
C—39 to 60 inches; loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

119—Glendive fine sandy loam, wooded, 0 to 3 percent slopes

Setting

Glendive soils occur on wooded linear flood plains in river valleys. (fig. 15)

Map Unit Composition (percent)

Named Components
Glendive, wooded and similar soils: 70 to 95 percent

Average Component Composition
Glendive, wooded: 74 percent
Glendive: 9 percent
Hanly: 8 percent
Channel: 5 percent
Havre: 4 percent

Named Component Description

Glendive, wooded
Slope: 0 to 3 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: Occasional
Water Table: Seasonal
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Ap—0 to 5 inches; fine sandy loam
C1—5 to 16 inches; loam
C2—16 to 60 inches; stratified loamy fine sand to silt loam

Figure 15. An area of Glendive fine sandy loam, wooded, 0 to 3 percent slopes. In the background is an area of map unit 68F - Cabbart-Badland, outrcrop complex, 6 to 70 percent slopes. The foreground is an area of map unit 86F - Kirby-Badland, outcrop-Patent complex, 9 to 70 percent slopes.

Mapunit Notes: Some areas have intermixed stands of conifers and hardwoods that may affect wildlife, range, and other interpretations. These stands may be dependent on landscape position, slope, or aspect.

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

120B—Hanly fine sandy loam, wooded, 0 to 6 percent slopes

Setting

Hanly soils occur on wooded linear flood plains in river valleys.

Map Unit Composition (percent)

Named Components
Hanly, wooded and similar soils: 55 to 90 percent

Average Component Composition
Hanly, wooded: 61 percent
Hanly: 20 percent
Glendive: 17 percent
Minnewaukan: 1 percent
Riverwash: 1 percent

Named Component Description

Hanly, wooded
Slope: 0 to 6 percent
Depth to Restrictive Feature: None noted
Drainage Class: Somewhat excessively drained
Flooding: Occasional
Water Table: Seasonal
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 5 inches; fine sandy loam
C—5 to 60 inches; stratified sand to fine sandy loam
Mapunit Notes: Some areas have intermixed stands of conifers and hardwoods that may affect wildlife, range, and other interpretations. These stands may be dependent on landscape position, slope, or aspect.

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

121F—Maltese-Lonna-Arikara complex, 3 to 50 percent slopes

Setting

Maltese soils occur on concave micro-highs on footslopes. Lonna soils occur on linear backslopes. Arikara soils occur on wooded concave backslopes and footslopes of ridges. This map unit occurs on ridges in badlands.

Map Unit Composition (percent)

Named Components

Maltese and similar soils: 15 to 40 percent
Lonna and similar soils: 15 to 40 percent
Arikara and similar soils: 15 to 40 percent

Average Component Composition

Maltese: 25 percent
Lonna: 24 percent
Arikara: 22 percent
Scairt: 12 percent
Tanna: 7 percent
Cabbart: 6 percent
Lallie: 2 percent
Yawdim: 2 percent

Named Component Description

Maltese

Slope: 3 to 15 percent
Depth to Restrictive Feature: Natric; top depth ranges from 2 to 15 inches
Drainage Class: Moderately well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Sodic within 30 inches
Typical profile:
A—0 to 7 inches; silt loam
E—7 to 10 inches; silt loam
Btn—10 to 16 inches; silty clay
Btkn—16 to 20 inches; silty clay
Btkny—20 to 33 inches; silty clay loam
BCy—33 to 60 inches; silty clay loam

Lonna

Slope: 3 to 25 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 2 inches; silt loam
Bw—2 to 11 inches; silt loam
Bk—11 to 34 inches; silt loam
C—34 to 60 inches; silt loam

Arikara

Slope: 15 to 50 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None

Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Oi—0 to 1 inches; slightly decomposed plant material
A—1 to 2 inches; loam
Bw—2 to 14 inches; loam
Bk—14 to 39 inches; loam
C—39 to 60 inches; loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

122C—Bulltop-Shibah loams, 1 to 9 percent slopes

Setting

Bulltop soils occur on concave alluvial fans. Shibah soils occur on convex alluvial fans. This map unit occurs in badlands.

Map Unit Composition (percent)

Named Components
Bulltop and similar soils: 45 to 80 percent
Shibah and similar soils: 15 to 50 percent

Average Component Composition
Bulltop: 59 percent
Shibah: 25 percent
Kremlin: 9 percent
Cabbart: 5 percent
Burgraff: 2 percent

Named Component Description

Bulltop
Slope: 1 to 6 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected

Typical profile:
A—0 to 4 inches; loam
Bw—4 to 15 inches; loam
2BCk—15 to 19 inches; gravelly loam
2C—19 to 80 inches; very gravelly loam

Shibah
Slope: 3 to 9 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 4 inches; loam
Bw—4 to 8 inches; gravelly loam
Bk—8 to 18 inches; very cobbly loam
C—18 to 80 inches; very cobbly loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

123E—Scairt-Maltese-Boxwell complex, 3 to 25 percent slopes

Setting

Scairt soils occur in concave micro-lows on backslopes. Maltese soils occur on convex micro-highs on footslopes. Boxwell soils occur on convex backslopes. This map unit occurs on ridges in badlands.

Map Unit Composition (percent)

Named Components
Scairt and similar soils: 20 to 45 percent
Maltese and similar soils: 10 to 35 percent
Boxwell and similar soils: 5 to 20 percent

Average Component Composition
Scairt: 31 percent
Maltese: 22 percent

Gerda: 12 percent
Boxwell: 10 percent
Cabbart: 10 percent
Kremlin: 7 percent
Burgraff: 4 percent
Rhame: 2 percent
Yawdim: 2 percent

Named Component Description

Scairt

Slope: 6 to 15 percent
Depth to Restrictive Feature: Natric; top depth ranges from 1 to 4 inches; Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
E—0 to 2 inches; silt loam
Btn—2 to 6 inches; silty clay
Btnz—6 to 13 inches; silty clay loam
Bkz—13 to 22 inches; silty clay loam
BCy—22 to 28 inches; silty clay loam
Cr—28 to 60 inches; bedrock

Maltese

Slope: 3 to 25 percent
Depth to Restrictive Feature: Natric; top depth ranges from 2 to 15 inches
Drainage Class: Moderately well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Sodic within 30 inches
Typical profile:
A—0 to 7 inches; silt loam
E—7 to 10 inches; silt loam
Btn—10 to 16 inches; silty clay
Btkn—16 to 20 inches; silty clay
Btkny—20 to 33 inches; silty clay loam
BCy—33 to 60 inches; silty clay loam

Boxwell

Slope: 6 to 15 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 20 to 40 inches
Drainage Class: Well drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected

Typical profile:
Ap—0 to 5 inches; loam
Bw—5 to 14 inches; loam
Bk—14 to 28 inches; loam
Cr—28 to 60 inches; bedrock

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

152—Heil silt loam, low precipitation, 0 to 1 percent slopes

Setting

Heil soils occur in concave depressions in badlands.

Map Unit Composition (percent)

Named Components
Heil and similar soils: 90 to 100 percent

Average Component Composition
Heil: 94 percent
Ethridge: 2 percent
Gerda: 2 percent
Harriet: 2 percent

Named Component Description

Heil
Slope: 0 to 1 percent
Depth to Restrictive Feature: Natric; top depth ranges from 1 to 4 inches
Drainage Class: Poorly drained
Flooding: None
Water Table: Seasonal
Ponding: Frequent
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
E—0 to 3 inches; silt loam
Btn—3 to 24 inches; silty clay
Bg—24 to 38 inches; silty clay
Byg—38 to 52 inches; silty clay
Cg—52 to 60 inches; silty clay

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

155—Dumps and Pits, mine

Setting

Dumps and Pits, mine occurs as abandoned coal mines and municipal landfill areas.

Map Unit Composition (percent)

Named Components
Dumps and Pits, mine and similar soils: 85 to 100 percent

Average Component Composition
Dumps and Pits, mine: 90 percent
Cabba: 5 percent
Flasher: 5 percent

Named Component Description

Dumps and Pits
Slope: 0 to 60 percent
Depth to Restrictive Feature: None noted
Drainage Class: Excessively drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
H1—0 to 4 inches; clay loam
H2—4 to 60 inches; clay loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following

sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

159—Straw-Daglum complex, channeled, 0 to 2 percent slopes

Setting

Straw soils occur on linear flood plains. Daglum soils are on linear micro-highs on treads on stream terraces. These soils are on uplands.

Map Unit Composition (percent)

Named Components

Channel and similar soils: 10 to 70 percent
Straw and similar soils: 20 to 35 percent
Daglum and similar soils: 15 to 25 percent

Average Component Composition

Channel: 40 percent
Straw: 28 percent
Daglum: 18 percent
Rhoades: 6 percent
Belfield: 2 percent
Grail: 2 percent
Harriet: 2 percent
Savage: 2 percent

Named Component Description

Channel

Slope: 3 to 15 percent
Depth to Restrictive Feature: None noted
Drainage Class: —
Flooding: Frequent
Water Table: Seasonal
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected

Straw

Slope: 0 to 2 percent
Depth to Restrictive Feature: None noted
Drainage Class: Moderately well drained
Flooding: Frequent
Water Table: Seasonal
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Ap—0 to 5 inches; loam
A1—5 to 23 inches; loam
A2—23 to 30 inches; loam
C—30 to 36 inches; clay loam

Ab—36 to 40 inches; clay loam
C'—40 to 66 inches; clay loam

Daglum
Slope: 0 to 2 percent
Depth to Restrictive Feature: Natric; top depth ranges from 4 to 20 inches
Drainage Class: Moderately well drained
Flooding: None
Water Table: Seasonal
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
Ap—0 to 7 inches; silt 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

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range or wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

175—Havre silt loam, 0 to 3 percent slopes, rarely flooded

Setting

Havre soils occur on linear flood plains in badlands.

Map Unit Composition (percent)

Named Components
Havre, rarely flooded and similar soils: 75 to 100 percent

Average Component Composition
Havre, rarely flooded: 89 percent
Channel: 5 percent
Glendive: 4 percent
Patent: 2 percent

Named Component Description

Havre
Slope: 0 to 3 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: Rare
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Ap—0 to 10 inches; silt loam
C—10 to 60 inches; stratified fine sandy loam to clay loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

177—Glendive fine sandy loam, 0 to 3 percent slopes, rarely flooded

Setting

Glendive soils occur on linear flood plains in badlands.

Map Unit Composition (percent)

Named Components
Glendive, rarely flooded and similar soils: 60 to 95 percent

Average Component Composition
Glendive, rarely flooded: 84 percent
Channel: 5 percent
Hanly: 5 percent
Havre: 4 percent
Patent: 2 percent

Named Component Description

Glendive
Slope: 0 to 3 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: Rare

Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
Ap—0 to 5 inches; fine sandy loam
C1—5 to 16 inches; loam
C2—16 to 60 inches; stratified loamy fine sand to silt loam

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

183—Badland, high precipitation

Setting

Badland occurs on barren convex shoulder and backslopes of ridges on uplands.

Map Unit Composition (percent)

Named Components
Badland, high precipitation and similar soils: 85 to 100 percent

Average Component Composition
Badland, high precipitation: 90 percent
Cabba: 5 percent
Lambert: 4 percent
Moreau: 1 percent

Named Component Description

Badland
Slope: 9 to 180 percent
Depth to Restrictive Feature: Bedrock (paralithic); top depth ranges from 0 to 5 inches
Drainage Class: —-
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
H1—0 to 60 inches; bedrock

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

205—Harriet silt loam, low precipitation, 0 to 3 percent slopes

Setting

Harriet soils occur on linear alluvial flats and drainageways in badlands.

Map Unit Composition (percent)

Named Components
Harriet, low precipitation and similar soils: 80 to 100 percent

Average Component Composition
Harriet, low precipitation: 85 percent
Slickspots: 10 percent
Gerda: 5 percent

Named Component Description

Harriet, low precipitation
Slope: 0 to 3 percent
Depth to Restrictive Feature: Natric; top depth ranges from 0 to 5 inches
Drainage Class: Poorly drained
Flooding: Occasional
Water Table: Seasonal
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
E—0 to 2 inches; silt 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; stratified very fine sandy loam to silty clay

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

210C—Lambert-Slickspots-Rhoades complex, 1 to 9 percent slopes

Setting

Lambert soils occur on linear alluvial fans. Slickspots occur on barren concave areas and alluvial flats and fans. Rhoades soils occur in concave micro-lows on alluvial fans and alluvial flats. This map unit occurs on uplands.

Map Unit Composition (percent)

Named Components

Lambert and similar soils: 25 to 60 percent
Slickspots and similar soils: 10 to 40 percent
Rhoades and similar soils: 10 to 40 percent

Average Component Composition

Lambert: 41 percent
Slickspots: 21 percent
Rhoades: 15 percent
Daglum: 10 percent
Korell: 7 percent
Rhoades: 6 percent

Named Component Description

Lambert

Slope: 0 to 9 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: Occasional
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
A—0 to 5 inches; silt loam
C1—5 to 36 inches; silt loam
C2—36 to 60 inches; very fine sandy loam

Slickspots

Slope: 0 to 6 percent
Depth to Restrictive Feature: None noted
Drainage Class: Well drained
Flooding: None
Water Table: None

Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
H1—0 to 2 inches; silty clay
H2—2 to 60 inches; stratified loam to silty clay

Rhoades
Slope: 0 to 6 percent
Depth to Restrictive Feature: Natric; top depth ranges from 4 to 20 inches
Drainage Class: Well drained
Flooding: None
Water Table: Seasonal
Ponding: None
Salt Affected: Saline within 30 inches
Sodium Affected: Sodic within 30 inches
Typical profile:
E—0 to 3 inches; silt 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

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Range and wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

255—Pits, gravel and sand, low precipitation

Setting

Pits, gravel and sand, low precipitation occurs on paleoterraces in badlands.

Map Unit Composition (percent)

Named Components
Pits, gravel and sand, low precipitation and similar soils: 85 to 100 percent

Average Component Composition
Pits, gravel and sand, low precipitation: 90 percent
Chanta: 5 percent
Tinsley: 5 percent

Named Component Description

Pits
Slope: 0 to 60 percent
Depth to Restrictive Feature: None noted
Drainage Class: Excessively drained
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected
Typical profile:
H1—0 to 6 inches; extremely gravelly sand
H2—6 to 60 inches; extremely gravelly sand

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Wildlife habitat

For cropland limitations and hazards see the "Potential Cropland Limitations and Hazards" table. For information about managing this map unit, see the following sections: Agronomy, Rangeland, Recreation, Wildlife Habitat, Engineering, and Soil Properties.

M-W—Miscellaneous water

Setting

These are generally small areas of waste water such as sewage lagoons.

Map Unit Composition (percent)

Named Components
Miscellaneous water and similar soils: 100 percent

Average Component Composition
Miscellaneous water: 100 percent

Named Component Description

Miscellaneous water
Slope: —-
Depth to Restrictive Feature: None noted
Drainage Class: —-
Flooding: None
Water Table: None
Ponding: None
Salt Affected: Not affected
Sodium Affected: Not affected

Detailed soil descriptions for all map unit components are in alphabetical order in the section "Soil Series and Their Morphology." Additional information specific to this map unit, such as USDA textures, permeability, and soil reaction, is available in the "Soil Properties" section.

Management

Major uses: Waste water storage

W—Water

Setting

These are natural and man made fresh water bodies, generally along streams and in depressions.

Map Unit Composition (percent)

Named Components
Water and similar soils:100 percent

Average Component Composition
Water: 100 percent

Named Component Description

Definition: Areas, including ponds, lakes, streams, and reservoirs, that are covered with water in most years during the period that is warm enough for plants to grow or longer.

Management

Major uses: Wetland wildlife habitat

Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
3	Peta loam, 0 to 2 percent slopes	221	*
5	Savage silty clay loam, 0 to 2 percent slopes	703	*
5B	Savage silty clay loam, 2 to 6 percent slopes	887	0.1
6	Regan silt loam, 0 to 2 percent slopes	255	*
7	Arnegard loam, 0 to 2 percent slopes	620	*
9F	Cabba-Sen-Chama silt loams, 15 to 70 percent slopes	2,763	0.4
12B	Rhoades-Daglum complex, 0 to 6 percent slopes	13,472	1.8
13B	Dogtooth-Janesburg silt loams, 0 to 6 percent slopes	18,036	2.4
13D	Dogtooth-Janesburg complex, 6 to 15 percent slopes	1,723	0.2
14E	Amor-Brandenburg complex, 3 to 25 percent slopes	2,885	0.4
15B	Daglum-Rhoades complex, 0 to 6 percent slopes	31,276	4.2
17	Amor-Arnegard loams, 0 to 3 percent slopes	525	*
17B	Amor-Shambo loams, 3 to 6 percent slopes	5,808	0.8
17C	Amor-Cabba loams, 6 to 9 percent slopes	1,625	0.2
17D	Amor-Cabba loams, 9 to 15 percent slopes	3,761	0.5
18E	Manning-Schaller-Wabek complex, 6 to 25 percent slopes	2,245	0.3
19	Sen-Golva silt loams, 0 to 3 percent slopes	2,120	0.3
19B	Chama-Sen-Cabba silt loams, 3 to 6 percent slopes	4,501	0.6
19C	Chama-Cabba-Sen silt loams, 6 to 9 percent slopes	3,415	0.5
19D	Cabba-Chama-Sen silt loams, 9 to 15 percent slopes	4,963	0.7
21B	Parshall fine sandy loam, 0 to 6 percent slopes	801	0.1
22B	Regent-Savage silty clay loams, 3 to 6 percent slopes	622	*
24B	Janesburg fine sandy loam, 0 to 6 percent slopes	2,426	0.3
25B	Lefor fine sandy loam, 0 to 6 percent slopes	323	*
27F	Badland, outcrop-Lambert-Cabba complex, 6 to 50 percent slopes	2,463	0.3
28F	Flasher-Rock outcrop-Vebar complex, 9 to 70 percent slopes	315	*
29F	Arikara-Shambo-Cabba loams, 9 to 70 percent slopes	1,169	0.2
30F	Vebar-Amor complex, 6 to 35 percent slopes, extremely stony	2,364	0.3
31B	Sen-Janesburg silt loams, 0 to 6 percent slopes	17,897	2.4
31C	Sen-Janesburg silt loams, 6 to 9 percent slopes	7,409	1.0
35F	Flasher-Vebar-Parshall complex, 9 to 35 percent slopes	5,668	0.8
36B	Ekalaka-Parshall-Desart fine sandy loams, 0 to 6 percent slopes	1,596	0.2
37B	Farfeld-Cedarpan loams, 0 to 6 percent slopes	856	0.1
37F	Cedarpan-Slickspots, stony-Farfeld complex, 3 to 35 percent slopes	881	0.1
41C	Wayden-Moreau silty clays, 3 to 9 percent slopes	596	*
42B	Searing-Ringling loams, 0 to 6 percent slopes	38	*
43	Belfield-Grail silty clay loams, 0 to 2 percent slopes	3,630	0.5
44	Shambo loam, 0 to 2 percent slopes	1,002	0.1
44B	Shambo loam, 2 to 6 percent slopes	690	*
47	Stady loam, 0 to 3 percent slopes	1,802	0.2
48B	Manning fine sandy loam, 0 to 6 percent slopes	2,058	0.3
49B	Lihen-Parshall complex, 0 to 6 percent slopes	477	*
51B	Janesburg-Dogtooth silt loams, 0 to 6 percent slopes	46,428	6.3
52	Heil silt loam, 0 to 1 percent slopes	458	*
53B	Savage-Daglum silt loams, 0 to 6 percent slopes	1,302	0.2
54	Straw loam, channeled, 0 to 2 percent slopes	4,213	0.6
55	Pits, gravel and sand	105	*
57	Straw-Rhoades-Daglum silt loams, 0 to 2 percent slopes	1,046	0.1
58	Straw loam, 0 to 2 percent slopes	400	*
60	Korell silt loam, 0 to 2 percent slopes	319	*
62F	Dogtooth-Janesburg-Brandenburg complex, 9 to 35 percent slopes	6,062	0.8
63F	Dogtooth-Janesburg-Cabba complex, 6 to 30 percent slopes	12,526	1.7
65	Banks-Trembles fine sandy loams, channeled, 0 to 2 percent slopes	280	*
66B	Stady loam, 3 to 6 percent slopes	1,721	0.2
67B	Evridge-Desart-Telfer fine sandy loams, 0 to 6 percent slopes	595	*
68F	Cabbart-Badland, outcrop complex, 6 to 70 percent slopes	8,515	1.2
69F	Patent-Badland, outcrop-Cabbart complex, 6 to 50 percent slopes	109,434	14.8
70B	Maltese-Gerda complex, 0 to 6 percent slopes	5,417	0.7
71B	Chinook-Rhame fine sandy loams, 1 to 6 percent slopes	1,677	0.2
71D	Rhame-Chinook fine sandy loams, 6 to 15 percent slopes	8,950	1.2
72F	Rhame-Fleak complex, 9 to 50 percent slopes	17,301	2.3
73D	Gerda-Kirby complex, 1 to 15 percent slopes	7,309	1.0

* See footnote at end of table.

Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Acres	Percent
74	Glendive and Havre soils, channeled, 0 to 3 percent slopes	11,189	1.5
75	Havre silt loam, 0 to 3 percent slopes	3,398	0.5
76B	Lonna silt loam, 1 to 6 percent slopes	4,541	0.6
76C	Lonna silt loam, 6 to 9 percent slopes	1,426	0.2
77	Glendive fine sandy loam, 0 to 3 percent slopes	5,450	0.7
78B	Hanly fine sandy loam, 0 to 6 percent slopes	3,504	0.5
79C	Zeona loamy fine sand, 1 to 9 percent slopes	657	*
80	Ethridge silt loam, 1 to 3 percent slopes	172	*
81B	Vebar-Parshall fine sandy loams, 0 to 6 percent slopes	13,065	1.8
81C	Vebar-Tally fine sandy loams, 6 to 9 percent slopes	4,370	0.6
81D	Vebar-Flasher-Tally complex, 9 to 15 percent slopes	14,126	1.9
82E	Badland, outcrop-Patent complex, 6 to 25 percent slopes	18,582	2.5
83	Badland	5,134	0.7
85F	Lonna-Cabbart silt loams, 6 to 35 percent slopes	25,689	3.5
86F	Kirby-Badland, outcrop-Patent complex, 9 to 70 percent slopes	12,167	1.7
88	Littlemo-Chanta complex, 0 to 3 percent slopes	5,487	0.7
89B	Patent loam, 1 to 6 percent slopes	3,271	0.4
91F	Lonna-Kirby-Cabbart complex, 3 to 50 percent slopes	35,463	4.8
92B	Kremlin-Ethridge-Gerda complex, 1 to 6 percent slopes	8,146	1.1
94F	Kirby-Arikara-Badland, outcrop complex, 15 to 70 percent slopes	4,357	0.6
95F	Tinsley-Chanta complex, 6 to 35 percent slopes	2,975	0.4
97	Kremlin loam, 0 to 3 percent slopes	3,371	0.5
98	Wolf Point silty clay loam, 0 to 1 percent slopes	454	*
99F	Badland, outcrop-Cabbart complex, 6 to 70 percent slopes	16,450	2.2
100C	Patent-Gullied land-Glendive complex, 1 to 9 percent slopes	7,694	1.0
101F	Boxwell-Cabbart-Arikara complex, 9 to 50 percent slopes	17,013	2.3
102B	Boxwell-Kremlin loams, 1 to 6 percent slopes	1,598	0.2
102D	Boxwell-Kremlin loams, 6 to 15 percent slopes	1,861	0.3
103F	Badland, outcrop-Arikara-Cabbart complex, 15 to 70 percent slopes	41,923	5.7
105	Harriet silt loam, 0 to 2 percent slopes	3,940	0.5
106	Riverwash	925	0.1
107D	Rhame-Kremlin-Maltese complex, 1 to 15 percent slopes	7,156	1.0
108D	Boxwell-Scairt-Maltese complex, 6 to 15 percent slopes	9,712	1.3
109F	Rhame-Arikara-Fleak complex, 9 to 50 percent slopes	4,166	0.6
110C	Patent-Gerda-Slickspots complex, 1 to 9 percent slopes	13,591	1.8
111F	Lonna-Arikara-Cabbart complex, 9 to 70 percent slopes	10,228	1.4
112	Wolf Point silty clay loam, wooded, 0 to 1 percent slopes	375	*
113	Havre silt loam, wooded, 0 to 1 percent slopes	975	0.1
114B	Haplustolls-Ustorthents complex, 0 to 6 percent slopes	220	*
115B	Cozberg-Chanta loams, 1 to 6 percent slopes	1,090	0.1
116F	Kremlin-Shibah loams, 9 to 50 percent slopes, very bouldery	1,652	0.2
117B	Kremlin-Chanta loams, 1 to 6 percent slopes	1,484	0.2
118F	Shibah-Rubbleland-Arikara complex, 15 to 70 percent slopes	426	*
119	Glendive fine sandy loam, wooded, 0 to 3 percent slopes	330	*
120B	Hanly fine sandy loam, wooded, 0 to 6 percent slopes	1,438	0.2
121F	Maltese-Lonna-Arikara complex, 3 to 50 percent slopes	5,103	0.7
122C	Bulltop-Shibah loams, 1 to 9 percent slopes	244	*
123E	Scairt-Maltese-Boxwell complex, 3 to 25 percent slopes	3,176	0.4
152	Heil silt loam, low precipitation, 0 to 1 percent slopes	12	*
155	Dumps and pits, mine	62	*
159	Straw-Daglum complex, channeled, 0 to 2 percent slopes	2,093	0.3
175	Havre silt loam, 0 to 3 percent slopes, rarely flooded	935	0.1
177	Glendive fine sandy loam, 0 to 3 percent slopes, rarely flooded	507	*
183	Badland, high precipitation	41	*
205	Harriet silt loam, low precipitation, 0 to 3 percent slopes	141	*
210C	Lambert-Slickspots-Rhoades complex, 1 to 9 percent slopes	288	*
255	Pits, gravel and sand, low precipitation	74	*
M-W	Miscellaneous water	8	*
W	Water	2,130	0.3
	Total	737,000	100.0

* Less than 0.1 percent.

Formation and Classification of the Soils

This section relates the soils in the survey area to the major factors of soil formation and describes the system of soil classification.

Formation of the Soils

Soils form through processes acting on deposited or accumulated geological material. Characteristics of the soil at a given point are determined by: (1) the physical and mineralogical composition of the parent material, (2) the climate under which the soil material has accumulated and existed since accumulation, (3) the plants and animal life on and in the soils, (4) the relief, or lay of the land, and (5) the length of time that forces of soil formation have acted on the soil material (Buol, et al., 1980).

Climate and plant and animal life are active factors of soil formation. They act on the parent material that has accumulated through the weathering of geological deposits and slowly change it to a natural body that has genetically related horizons. Relief conditions the effects of climate and plant and animal life. Finally, time is needed for changing the parent material into soil. Some time is always required for the differentiation of soil horizons. Usually, a long time is required for the development of distinct horizons.

The factors of soil formation are so closely interrelated in their effects on the soil that few generalizations can be made regarding the effects of any one factor unless conditions are specified for the other four. Many of the processes of soil development are unknown.

Parent Material

Parent material is the unconsolidated material from which a soil forms. It determines the chemical and mineral composition of the soil.

The majority of the soils of Billings County developed from sedimentary rocks. This is called residuum. To a lesser extent, some soils formed in alluvium and colluvium. Alluvium is soil material deposited by water along streams and on fans. Colluvium is soil material transported and deposited on lower side slopes by mass movement or direct gravitational action.

The residual material of the exposed soils in Billings County has several different origins. The most extensive parent material is weathered from soft bedrock of the Tertiary Period. The formations of this period are the Sentinel Butte, Bullion Creek (Tongue River), Golden Valley, and White River Formations. The Sentinel Butte and Bullion Creek Formations are from Paleocene time. The Golden Valley Formation is from Eocene time. The White River Formation is from Oligocene time. Alluvium is also present from the Quaternary Period (Bluemle, 1991).

The Sentinel Butte Formation is present at the surface in most of the eastern two-thirds of Billings County. It has dull gray layers of interbedded sandstone, mudstone, siltstone, shale, lignite, porcelanite, and limestone. This material originated from materials deposited in lakes, on deltas, and along rivers. These deposits can be as

thick as 650 feet (Clayton, et al., 1980). The topography consists of broad, rolling uplands and eroded Badlands. Shallow soils, such as Flasher, Cabba, and Wayden developed in this formation. Each developed from different parent materials, but occur on the same landscape position (knobs and ridges). The Flasher soil developed from sandstone. Cabba developed from mudstone or siltstone, and Wayden developed from shale. Moderately deep soils, such as Vebar, Amor, Sen, and Moreau also developed from this formation. Each formed from different parent materials, but occur on the same landscape position (backslopes). The Vebar soil formed in sandstone. Amor developed from mudstone. Sen developed from siltstone, and Moreau developed from shale.

The Bullion Creek Formation is present at the surface in the western one-third of Billings County adjacent to the Little Missouri River. It has yellowish layers of interbedded sandstone, mudstone, siltstone, shale, lignite, porcelanite, and limestone. This material originated from materials deposited in lakes, on deltas, and along rivers. These deposits can be as thick as 650 feet (Clayton, et. al, 1980). The topography is broad uplands and eroded Badlands adjacent to the Little Missouri River. Soils such as Boxwell and Rhame developed from this formation. Each formed from different parent materials, but occurs on the same landscape position (backslopes). The Boxwell soil developed from mudstone and the Rhame soil developed from sandstone.

The Golden Valley Formation makes up only a small percentage of Billings County. It is found on hills, uplands, and drainage divides north of Fairfield. In places, it can be up to 250 feet thick (Clayton, et al., 1980). This formation is distinctive because of the exposed silicrete (cemented rock layer) and whitish underlying soil material (kaolinitic type clays). Three soils that developed from this formation are recognized in Billings County. They are Lefor, Cedarpan, and Farfeld. Lefor is moderately deep to soft sandstone bedrock. Cedarpan and Farfeld have an inhibiting cemented layer at 10 to 20 inches. These soils are not productive because of the restrictive layer and/or the underlying kaolinitic-type clays.

The White River Formation can be found in the extreme southwestern corner of the county on and around Bullion Butte. This area is also unique because of the amount of limestone rock fragments in the soils. The White River Formation can be up to 250 feet thick (Clayton, et al., 1980). The Bulltop and Shibah soils developed in this formation. Bulltop is moderately deep to the limestone channers and has dark colors from 7 to 16 inches. Shibah is shallow to the limestone channers and has dark colors to a depth of 7 to 10 inches. Both soils are found on the fans and terraces on the landscape. In addition, Shibah is found on side slopes and ridges of dissected terraces.

Alluvium and colluvium deposits are present on floodplains and fans along the Little Missouri River and its tributaries, the Green River, and the Knife River. They consist of sand, silt, clay, and gravel, with an irregular decrease of organic matter with depth. These materials are of variable thickness. Soils found in alluvial material include the Hanly, Havre, Glendive, and Wolf Point soils. The placement of the redeposited material is directly correlated to the stream load (amount and size of material being redeposited), stream energy (velocity of water), and stream topography (shape of landform). Generally, the Hanly soil (sand) is found closest to the river. The Glendive soil (fine sandy loam) is found adjacent to the Hanly soil, and the Havre soil (loam) is found adjacent to the Glendive soil. The Wolf Point soil (clay) is found furthest from the present water source, and is adjacent to the Havre soil.

Several processes have been involved in the formation of soils in Billings County. These processes are the accumulation of organic matter, the solution, transfer, and removal of calcium carbonates and bases, and the weathering and translocation of clay minerals. In most soils, combinations of these processes have been active in developing different soil horizons.

The parent materials in which most of the soils developed initially contained generous amounts of calcium and magnesium carbonate minerals. These minerals have been dissolved by water and removed from the upper horizons of the soil profiles. Pure water is not an effective agent for dissolving calcium and magnesium carbonates. These minerals are only slightly soluble in pure water, but become moderately soluble and dissolve much more rapidly in a weak acid. The respiratory activity of plants is a significant factor in dissolving calcium and magnesium carbonates. As plants respire, they give off carbon dioxide. Carbon dioxide dissolves in soil water to form a weak carbonic acid. This action facilitates dissolving calcium and magnesium carbonates in the soil.

In a dissolved state, calcium and magnesium are in the form of ions that have a positive net electrical charge. Calcium and magnesium ions are essential elements for plant nutrition, and can either be taken up by the plant roots or carried away (leached) with moving soil water. Some of the calcium and magnesium ions are leached from the soil profile. “Seep” sites along steep slopes that have deposits of recently precipitated calcium and magnesium carbonates provide evidence of leaching.

A large amount of the calcium and magnesium ions are translocated to upper soil horizons by a cyclical process of root uptake and ultimate release when plant materials decompose. As vegetation decays, positively charged calcium and magnesium ions move downward with water to the upper horizons of the soil profile. There they are held by the electrostatic forces of negatively charged clay particles, and are once again available for plant uptake.

Climate

Climate has direct and indirect effects on the formation of soils. Precipitation, temperature, and wind directly affect the weathering and reworking of soil material. Climate indirectly affects soil formation through its effects on the amount and kind of vegetation and animal life on and in the soil.

In addition to weathering soil material, precipitation and temperature affect the leaching and redistribution of carbonate minerals and clay particles, and the accumulation of organic matter in the soil. Freezing and thawing help to break down soil particles in the parent material, thereby providing more surface area for chemical processes. Cool temperatures affect the content of organic matter by slowing the decay of plant material and animal remains.

Billings County has a continental climate, characterized by long, cold winters and short, warm summers. The soil is generally frozen to a depth of 3 to 6 feet from November to April. The soil forming processes are mostly dormant during this time except for some effects of frost action. Most of the precipitation falls during the growing season and is distributed in an erratic pattern. It is during this part of the year that the soil forming processes influenced by climate are most active. The climate in the eastern portion of the county is generally cooler and moister than in the western portion of the county.

Evidence of the effects of localized climate (microclimate) can be related to slope and aspect in the steep dissected areas. Areas on the north and northeast slopes have less evapotranspiration and are cooler and moister. This results in some of these sites being wooded. The soils (Arikara, Kremlin, and Boxwell) on these slopes have a deep, dark surface layer. On the south and southwest facing slopes, the evapotranspiration is much greater. These areas are dryer and hotter. The soils on these sites (Patent and Lonna) are not wooded and lack a dark surface.

Living Organisms

Soils in Billings County formed mainly under grassland vegetation. Grasses provide a plentiful supply of organic matter, which improves the chemical and physical properties of the soil. Fibrous roots of these grasses penetrate the soil to a depth of several feet, making it more porous and more granular. As a result of these changes in the soil, less water runs off of the surface so that more moisture is available for increased plant growth and microbiological activity. Decay of plants improves the available water capacity, tilth, and fertility of the soil. Decayed organic matter accumulating over long periods gives the surface its dark color.

The darkness of the surface is related to the amount of organic matter available for decomposition from plant production. Evidence of this can be observed in steep dissected areas on well-drained soils. The amount of organic matter is less on south aspects. The grass species common on these slopes are blue grama and western wheatgrass. The soils on these areas are Patent and Lonna. On north aspects, the amount of organic matter is higher. Common soils in these areas would be Kremlin, Boxwell, and Arikara. The grass species on these areas is mostly little bluestem.

Soils such as Shambo, Amor, and Sen are found on nearly level well-drained sites, and are dominated by medium and short grasses. Among these grasses are western wheatgrass and green needlegrass. Medium and short grasses dominate on soils such as Hanly and Zeona, found on level to moderately sloping, somewhat excessively and excessively drained sites. Among these grasses are needleandthread and prairie sandreed. Heil soil occurs on level, poorly drained sites that are dominated by medium and short grasses. Among these grasses are western wheatgrass and Nuttall alkaligrass.

Microorganisms have important effects on soil formation because they feed on undecomposed organic matter and convert it into humus from which plants can obtain nutrients for growth. Bacteria and different kinds of fungi attack leaves and other forms of organic matter. Insects, earthworms, and small burrowing animals help mix the humus with the soil.

Human activities greatly affect soil formation. Management measures can alter soil drainage. They can help control erosion and maintain fertility. Poor management can increase the susceptibility to erosion and result in an unproductive soil.

Topography

The eastern half of Billings County is generally nearly level to undulating. The western half of the county in the Badland areas and along the Little Missouri River is nearly level to very steep. The steepest areas are the escarpments along the Little Missouri River. Local differences in relief within a square mile range from about 10 feet to over 200 feet.

Relief influences the formation of soil through its effects on drainage, runoff, and erosion. Many differences in the soils of this county result from their topographic position. Among these differences are drainage, thickness of the A horizon, content of organic matter, color of the subsoil, thickness of the solum, and degree of horizon differentiation.

Runoff is rapid on steep slopes, and only a small percentage of the rainfall penetrates the soil. Under these conditions, there is little moisture for plant growth and soil development. The steep soils are thin and low in organic matter content, and they have weak horizonation. Examples of these are the well and somewhat excessively drained Cabba, Flasher, and Wayden soils.

Soils on the level to rolling slopes are well drained. Moisture is sufficient to support fair stands of mixed native grasses, and the soils have well-developed profiles characterized by a very dark grayish brown moist B horizon. Examples of

these are Amor, Vebar, and Moreau soils. Other well-drained soils occur on level or in slightly concave areas. They generally have a thicker A horizon, a darker B horizon, and a greater depth to lime than those on convex, undulating or rolling landscapes. They receive runoff from higher elevations. Examples of these are Parshall, Arnegard, and Grail soils. Other soils on level to nearly level terraces are well or somewhat excessively drained. Moisture is adequate to support fair stands of mixed native grasses, and the soils have well developed profiles characterized by dark brown B horizons and are underlain by sand and gravel at depths of 20 to 40 inches. Examples of these are the Manning and Stady soils.

Depressional areas and closed alluvial flats that receive a large amount of runoff from higher elevations have somewhat poor to poor natural drainage. Peta and Heil soils exhibit an advanced degree of horizonation because of alternate wet and dry cycles that occur in these depressions and enclosed alluvial flats. These soils have properties much like soils from areas with much higher precipitation. They are examples of soils in which translocated clays have accumulated in the Bt horizon. Gleying, or the reduction and transfer of iron, has occurred in all of the poorly and somewhat poorly drained soils in the county. In these naturally wet soils, this process has been significant in horizon differentiation. The gray color and redoximorphic features of the subsoil indicate the redistribution of reduced iron oxide.

Time

The formation of soil is a very slow process. Much time is required for the process of soil formation to act on the parent material and to form distinct horizons within the soil profile. The parent materials in the county are old, in geological terms, compared to most of the state.

More time has been available for the formation of the Sen soils on residual flats than for the formation of Straw soils on flood plains. The processes of soil formation have been continually acting on the parent material of Sen soils; however, Straw soils are continually gaining new material at the surface as a result of flooding. Sen soils have well defined soil horizons, whereas Straw soils have less distinct horizons. Patent soils, found on alluvial fans, continually receive additional material at the surface as a result of very brief, occasional flooding from runoff from Badland areas. These soils are considered younger than Straw soils.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (Soil Survey Staff, 1999). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. The table, “Classification of the Soils” shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

Order. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in sol. An example is Mollisol.

Suborder. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Ustoll (Ust, meaning burnt, plus oll, from Mollisol).

Great Group. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons;

soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haplustoll (Hapl, meaning minimal horizonation, plus ustoll, the suborder of the Mollisols that has an Ustic moisture regime).

Subgroup. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective Pachic identified the subgroup that has a thick epipedon. An example is Pachic Haplustolls.

Family. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of a root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, superactive, frigid Pachic Haplustolls.

Series. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series. An example is the Arnegard series.

Classification of the Soils

(An asterisk in the first column indicates a taxadjunct to the series. See text for a description of those characteristics that are outside the range of the series.)

Soil name	Family or higher taxonomic class
Amor	Fine-loamy, mixed, superactive, frigid Typic Haplustolls
Arikara	Fine-loamy, mixed, superactive, frigid Typic Haplustepts
Arnegard	Fine-loamy, mixed, superactive, frigid Pachic Haplustolls
Banks	Sandy, mixed, frigid Typic Ustifluvents
Belfield	Fine, smectitic, frigid Glossic Natrustolls
Boxwell	Fine-loamy, mixed, superactive, frigid Aridic Haplustolls
Brandenburg	Fragmental, mixed, frigid Typic Ustorthents
Bulltop	Loamy-skeletal, mixed, superactive, frigid Aridic Haplustolls
Cabba	Loamy, mixed, superactive, calcareous, frigid, shallow Typic Ustorthents
Cabbart	Loamy, mixed, superactive, calcareous, frigid, shallow Aridic Ustorthents
Cedarpan	Clayey, smectitic, frigid, shallow Natric Durustolls
Chama	Fine-silty, mixed, superactive, frigid Typic Calciustolls
Chanta	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Aridic Haplustolls
Chinook	Coarse-loamy, mixed, superactive, frigid Aridic Haplustolls
Cozberg	Coarse-loamy, mixed, superactive, frigid Aridic Haplustolls
Daglum	Fine, smectitic, frigid Vertic Natrustolls
Desart	Coarse-loamy, mixed, superactive, frigid Typic Natrustolls
Dogtooth	Fine, smectitic, frigid Leptic Natrustolls
Ekalaka	Coarse-loamy, mixed, superactive, frigid Typic Natrustolls
Ethridge	Fine, smectitic, frigid Torrertic Argiustolls
Evridge	Coarse-loamy, mixed, superactive, frigid Typic Natrustolls
Farfeld	Loamy, mixed, superactive, frigid, shallow Entic Durustolls
Flasher	Mixed, frigid, shallow Typic Ustipsamments
Fleak	Mixed, frigid, shallow Aridic Ustipsamments
Gerda	Fine, smectitic, frigid Leptic Torrertic Natrustolls
Glendive	Coarse-loamy, mixed, superactive, calcareous, frigid Aridic Ustifluvents
Golva	Fine-silty, mixed, superactive, frigid Typic Haplustolls
Grail	Fine, smectitic, frigid Vertic Argiustolls
Hanly	Sandy, mixed, frigid Aridic Ustifluvents
Haplustolls	Haplustolls
Harriet	Fine, smectitic, frigid Typic Natraquolls
Havre	Fine-loamy, mixed, superactive, calcareous, frigid Aridic Ustifluvents
Heil	Fine, smectitic, frigid Typic Natraquerts
Janesburg	Fine, smectitic, frigid Typic Natrustolls
Kirby	Loamy-skeletal over fragmental, mixed, superactive, calcareous, frigid Aridic Ustorthents
Korell	Fine-loamy, mixed, superactive, frigid Fluventic Haplustolls
Kremlin	Fine-loamy, mixed, superactive, frigid Aridic Haplustolls
Lambert	Fine-silty, mixed, superactive, calcareous, frigid Typic Ustorthents
Lefor	Fine-loamy, mixed, semiactive, frigid Typic Argiustolls
Lihen	Sandy, mixed, frigid Entic Haplustolls
Littlemo	Fine-loamy, mixed, superactive, frigid Aridic Haplustolls
Lonna	Fine-silty, mixed, superactive, frigid Aridic Haplustepts
Maltese	Fine, smectitic, frigid Torrertic Natrustolls
Manning	Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Haplustolls
Moreau	Fine, smectitic, frigid Vertic Haplustolls
Parshall	Coarse-loamy, mixed, superactive, frigid Pachic Haplustolls
Patent	Fine-loamy, mixed, superactive, calcareous, frigid Aridic Ustorthents
Peta	Fine-loamy, mixed, superactive, frigid Pachic Argiustolls
Regan	Fine-silty, mixed, superactive, frigid Typic Calciaquolls
Regent	Fine, smectitic, frigid Vertic Argiustolls
Rhame	Coarse-loamy, mixed, superactive, frigid Aridic Haplustolls
Rhoades	Fine, smectitic, frigid Leptic Vertic Natrustolls
Ringling	Loamy-skeletal over fragmental, mixed, superactive, frigid Typic Haplustolls
Savage	Fine, smectitic, frigid Vertic Argiustolls
Scairt	Fine, smectitic, frigid Aridic Leptic Natrustolls
Schaller	Sandy, mixed, frigid Entic Haplustolls
Searing	Fine-loamy over fragmental, mixed, superactive, frigid Typic Haplustolls
Sen	Fine-silty, mixed, superactive, frigid Typic Haplustolls

Classification of the Soils--Continued

Soil name	Family or higher taxonomic class
Shambo	Fine-loamy, mixed, superactive, frigid Typic Haplustolls
Shibah	Loamy-skeletal, mixed, superactive, frigid Torriorthentic Haplustolls
Stady	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Haplustolls
Straw	Fine-loamy, mixed, superactive, frigid Cumulic Haplustolls
Tally	Coarse-loamy, mixed, superactive, frigid Typic Haplustolls
Telfer	Sandy, mixed, frigid Entic Haplustolls
Tinsley	Sandy-skeletal, mixed, frigid Aridic Ustorthents
Trembles	Coarse-loamy, mixed, superactive, calcareous, frigid Typic Ustifluvents
Ustorthents	Ustorthents
Vebar	Coarse-loamy, mixed, superactive, frigid Typic Haplustolls
Wabek	Sandy-skeletal, mixed, frigid Entic Haplustolls
Wayden	Clayey, smectitic, calcareous, frigid, shallow Typic Ustorthents
Wolf Point	Fine, smectitic, calcareous, frigid Torrertic Ustifluvents
Zeona	Mixed, frigid Aridic Ustipsamments

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetical order.

Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (Soil Survey Staff, 1993). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (USDA-NRCS, 1999) and Keys to Soil Taxonomy (Soil Survey Staff, 1998). Effervescence refers to disseminated lime throughout the horizon. Following the pedon description is the range of important characteristics of the soil series.

Absher Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Very slow
Landform: Hills, ridges, and alluvial fans
Parent material: Alluvium
Slope: 1 to 9 percent
Notes: These soils are saline-sodic.

Taxonomic class: Fine, smectitic, frigid Leptic Torrertic Natrustalfs

Typical pedon:
Absher loam, about 2,520 feet east and 2,580 feet north of the southwest corner of sec. 17, T. 19 N., R. 1 E. (Colors are for dry soil unless otherwise stated.)

E—0 to 1 inch; light brownish gray (2.5Y 6/2) loam, very dark grayish brown (2.5Y 3/2) moist; moderate very thin platy structure parting to moderate very fine and fine granular; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine pores; many unstained sand grains; neutral; abrupt wavy boundary.

Btn1—1 to 5 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; strong medium columnar structure; extremely hard, firm, sticky and plastic; many very fine and fine roots; many very fine and fine and few medium pores; few faint uncoated sand grains on vertical faces of peds; continuous distinct clay films on faces of peds; slightly alkaline; clear wavy boundary.

Btn2—5 to 11 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; strong medium prismatic structure parting to strong fine and medium angular blocky; extremely hard, firm, sticky and plastic; many very fine and fine roots; many very fine and fine pores; continuous distinct clay films on faces of peds; slight effervescence; moderately alkaline; clear wavy boundary.

Btknyz—11 to 16 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; strong fine and medium subangular blocky structure; extremely hard, friable, sticky and plastic; many very fine and fine roots; many very fine and fine pores; moderately thick continuous clay films on faces of peds; few very fine masses of lime; common fine and medium crystals of gypsum and other salts; strong effervescence; strongly alkaline; clear wavy boundary.

Bknyz—16 to 32 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; massive; extremely hard, firm, sticky and plastic; many very fine and fine roots; and many very fine and fine pores; many medium and coarse crystals of gypsum and other salts; common fine threads of lime; strong effervescence; strongly alkaline; clear wavy boundary.

Bkyz1—32 to 42 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; massive; extremely hard, firm, sticky and plastic; common very fine and fine roots; many very fine and fine and few medium pores; common fine crystals of gypsum; common fine crystals of salt; few fine threads of lime; slight effervescence; strongly alkaline; diffuse wavy boundary.

Bkyz2—42 to 60 inches; very pale brown (10YR 7/3) clay, grayish brown (2.5Y 5/2) and brown (10YR 5/3) moist; silt loam varves that are massive and average 1 centimeter in thickness; extremely hard, firm, sticky and plastic; few very fine and fine roots; few very fine and fine crystals of gypsum and other salts; few fine threads of lime; slight effervescence; strongly alkaline.

Range in Characteristics

Depth to gypsum or other salts: less than 16 inches
Depth to the Btknyz horizon: 6 to 16 inches

E horizon:
Hue: 2.5Y, 10YR, or 7.5YR
Value: 6 or 7, 3 to 5 moist
Chroma: 1 to 3

Btn horizons:
Hue: 2.5Y, 7.5YR, or 10YR
Value: 4 to 6, 4 or 5 moist
Chroma: 1 to 3
Texture: silty clay, clay, or clay loam

Btknyz horizon:
Hue: 2.5Y, 10YR, or 7.5YR
Value: 4 to 6, 4 or 5 moist
Chroma: 2 or 3
Texture: clay loam, clay, or silty clay

Bk horizons:
Hue: 5Y, 2.5Y, 10YR, or 7.5YR
Value: 4 to 6 moist
Chroma: 2 to 4
Texture: clay loam, sandy clay loam, silty clay, clay, or silty clay loam

Amor Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Landform: Pediments, hills, knolls, and ridges
Parent material: Residuum
Slope: 0 to 25 percent

Taxonomic class: Fine-loamy, mixed, superactive, frigid Typic Haplustolls

Typical pedon:
Amor loam, 2,300 feet east and 180 feet north of the southwest corner of sec. 2, T. 131 N., R. 103 W. (Colors are for dry soil unless otherwise stated.)

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to weak medium and fine granular; slightly hard, friable, slightly sticky and nonplastic; many roots and pores; neutral; abrupt smooth boundary.

Bw1—8 to 13 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; few stains of dark grayish brown (10YR 4/2) dry on faces of peds; weak coarse prismatic structure parting to weak coarse and medium subangular blocky; hard, friable, slightly sticky and slightly plastic; common roots; many fine pores; neutral; gradual wavy boundary.

Bw2—13 to 19 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; weak coarse prismatic structure parting to weak medium subangular blocky; hard, friable, slightly sticky and slightly plastic; common fine roots; common fine pores; slight effervescence; slightly alkaline; gradual wavy boundary.

Bk—19 to 31 inches; light gray (2.5Y 7/2) loam, grayish brown (2.5Y 5/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and nonplastic; few fine roots; common fine pores; few masses of lime; violent effervescence; moderately alkaline; gradual wavy boundary.

Cr—31 to 60 inches; pale yellow and light gray (2.5Y 7/3 and 5Y 7/2) soft sandstone and siltstone, light olive gray and light olive brown (5Y 6/2 and 2.5Y 5/3) moist; slight effervescence; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 8 to 16 inches
Depth to lime: 14 to 40 inches
Depth to soft bedrock: 20 to 40 inches
Notes: Some pedons have a BCk horizon. Some pedons have an extremely stony A horizon.

Ap horizon:
Value: 3 or 4, 2 or 3 moist

Bw horizon:
Value: 4 to 6, 3 to 5 moist

Bk horizon:
Value: 5 to 7, 4 to 6 moist

Cr horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 3 to 7, 3 to 5 moist
Notes: It is soft mudstone, siltstone, or sandstone.

Arikara Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Ridges
Parent material: Colluvium
Slope: 9 to 70 percent

Taxonomic class: Fine-loamy, mixed, superactive, frigid Typic Haplustepts

Typical pedon:
Arikara loam, 2,000 feet north and 1,000 feet east of the southwest corner of sec. 11, T. 148 N., R. 96 W. (Colors are for dry soil unless otherwise stated.)

0i—0 to 1 inches; forest litter and partially decomposed forest litter; abrupt smooth boundary.

A—1 to 2 inches; dark gray (10YR 4/1) loam, black (10YR 2/1) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; few coarse and many fine and medium roots; slightly acid; abrupt wavy boundary.

Bw1—2 to 7 inches; grayish brown (2.5Y 5/2) loam, dark grayish brown (2.5Y 4/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, friable, sticky and plastic; common fine and medium roots; neutral; abrupt smooth boundary.

Bw2—7 to 14 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; weak medium prismatic structure parting to weak medium and fine subangular blocky; hard, friable, sticky and plastic; common fine and medium roots; neutral; abrupt smooth boundary.

Bk—14 to 39 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 5/2) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; few fine and medium roots; common masses of lime; strong effervescence; slightly alkaline; gradual wavy boundary.

C1—39 to 54 inches; olive brown (2.5Y 4/4) loam, light yellowish brown (2.5Y 6/4) moist; massive; soft, very friable, slightly sticky and slightly plastic; slight effervescence; slightly alkaline; gradual wavy boundary.

C2—54 to 60 inches; light yellowish brown (2.5Y 6/4) fine sandy loam, olive brown (2.5Y 4/4) moist; massive; loose, nonsticky and nonplastic; slight effervescence; slightly alkaline.

Range in Characteristics

Depth to lime: 11 to 28 inches

A horizon:
Value: 2 to 5, 2 or 3 moist
Chroma: 1 or 2
Texture: loam, clay loam, silt loam, or silty clay loam

Bw horizon:
Hue: 2.5Y or 10YR
Value: 5 or 6, 4 or 5 moist
Chroma: 2 to 4
Texture: loam, clay loam, silt loam, or silty clay loam

C horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 5 to 7, 4 or 5 moist
Chroma: 1 to 4
Texture: loam, fine sandy loam, clay loam, or silt loam

Arnegard Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Swales, alluvial flats, stream terraces, and alluvial fans
Parent material: Alluvium
Slope: 0 to 15 percent

Taxonomic class: Fine-loamy, mixed, superactive, frigid Pachic Haplustolls

Typical pedon:
Arnegard loam, 1,575 feet north and 1,700 feet west of the southeast corner of sec. 35, T. 132 N., R. 93 W. (Colors are for dry soil unless otherwise stated.)

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; weak fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine and many very fine roots; neutral; clear smooth boundary.

A—6 to 13 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; weak medium prismatic structure parting to weak fine subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; neutral; gradual wavy boundary.

Bw1—13 to 27 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium prismatic structure parting to weak medium subangular blocky; hard, friable, slightly sticky and slightly plastic; many very fine roots; neutral; clear wavy boundary.

Bw2—27 to 36 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 4/2) moist; weak medium prismatic structure parting to weak medium subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; slightly alkaline; clear wavy boundary.

Bk—36 to 60 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; weak medium prismatic structure parting to weak medium

subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; few fine irregular masses of lime; strong effervescence; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 16 to more than 30 inches
Notes: Some pedons have a BCk or C horizon.

A horizon:
Value: 3 or 4, 2 or 3 moist

Bw horizon:
Hue: 10YR or 2.5Y
Value: 3 to 5, 2 to 4 moist

Bk horizon:
Hue: 10YR or 2.5Y
Value: 5 to 7
Chroma: 2 to 4

Arveson Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate or moderately rapid
Landform: Drainageways
Parent material: Alluvium
Slope: 0 to 1 percent
Notes: These soils are highly calcareous.

Taxonomic class: Coarse-loamy, mixed, superactive, frigid Typic Calciaquolls

Typical pedon:
Arveson clay loam, 660 feet west and 165 feet north of the southeast corner of sec. 25, T. 142 N., R. 46 W. (Colors are for moist soil unless otherwise stated.)

A—0 to 8 inches; black (10YR 2/1), broken face, clay loam, dark gray (10YR 4/1), broken face, dry; weak fine granular structure; very friable, slightly sticky; strong effervescence; slightly alkaline; gradual smooth boundary.

Bk—8 to 14 inches; very dark gray (10YR 3/1), broken face, clay loam, gray (10YR 5/1), broken face, dry; weak very fine granular structure; very friable, slightly sticky; violent effervescence; moderately alkaline; gradual wavy boundary.

Bkg1—14 to 25 inches; light gray (5Y 7/1), broken face, loam; weak very fine granular structure; very friable, slightly sticky; violent effervescence; common tongues of very dark gray (10YR 3/1) Bk material; moderately alkaline; clear wavy boundary.

Bkg2—25 to 34 inches; gray (5Y 6/1), broken face, sandy loam; weak very fine granular structure; very friable, slightly sticky; many fine gray (5Y 5/1) and many medium gray (5Y 5/1) masses of lime; violent effervescence; moderately alkaline; clear smooth boundary.

2Cg1—34 to 46 inches; gray (5Y 6/1) loamy sand; weak very fine granular structure; very friable, slightly sticky; few fine distinct pale olive (5Y 6/3) masses of iron

accumulation pedogenic; strong effervescence; moderately alkaline; clear smooth boundary.

2Cg2—46 to 60 inches; light olive gray (5Y 6/2) fine sand; single grain; loose; few fine prominent olive yellow (2.5Y 6/8) and few fine distinct (5Y 6/4) masses of iron accumulation pedogenic; slight effervescence; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 24 inches
Depth to loamy fine sand or coarser material: Greater than 20 inches

Bk horizon:
Texture: sandy loam, fine sandy loam, loam, or clay loam

2Cg horizon:
Texture: loamy sand, fine sand, fine sandy loam, or sandy loam

Banks Series

Depth class: Very deep
Drainage class: Somewhat excessively drained
Permeability: Rapid
Landform: Flood plains
Parent material: Alluvium
Slope: 0 to 2 percent

Taxonomic class: Sandy, mixed, frigid Typic Ustifluvents

Typical pedon:
Banks fine sandy loam, 2,165 feet east and 1,585 feet south of the northwest corner of sec. 5, T. 140 N., R. 81 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 4 inches; light brownish gray (2.5Y 6/2) fine sandy loam, dark grayish brown (2.5Y 4/2) moist; weak medium granular structure; very friable; many roots; slight effervescence; slightly alkaline; abrupt wavy boundary.

C1—4 to 30 inches; light brownish gray (2.5Y 6/2) fine sand, grayish brown (2.5Y 5/2) moist; single grain; loose; few roots; slight effervescence; slightly alkaline; abrupt wavy boundary.

C2—30 to 60 inches; light brownish gray (2.5Y 6/2) loamy fine sand, dark grayish brown (2.5Y 4/2) moist; single grain; loose; some very thin (1/8 to 1/2 inch) bands of silt and very fine sand; slight effervescence; slightly alkaline.

Range in Characteristics

A horizon:
Hue: 10YR or 2.5Y
Value: 5 or 6, 3 or 4 moist
Chroma: 2 or 3
Texture: very fine sandy loam or fine sandy loam

C horizon:
Value: 5 to 7, 4 to 6 moist
Chroma: 2 to 4
Notes: It contains strata of very fine sand or finer materials in most pedons.

Beisigl Series

Depth class: Moderately deep
Drainage class: Somewhat excessively drained
Permeability: Rapid
Landform: Pediments, hills, and ridges
Parent material: Residuum
Slope: 0 to 35 percent

Taxonomic class: Mixed, frigid Typic Ustipsamments

Typical pedon:
Beisigl loamy fine sand, 1,460 feet south and 100 feet west of the northeast corner of sec. 15, T. 129 N., R. 92 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 5 inches; grayish brown (10YR 5/2) loamy fine sand, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine pores; 1 percent sandstone channers; slight effervescence; slightly alkaline; clear smooth boundary.

Bk1—5 to 12 inches; light yellowish brown (2.5Y 6/4) loamy fine sand, light olive brown (2.5Y 5/4) moist; weak medium prismatic structure parting to weak fine granular; soft, very friable, nonsticky and nonplastic; common very fine roots; common very fine pores; 1 percent sandstone channers; strong effervescence; moderately alkaline; clear smooth boundary.

Bk2—12 to 27 inches; pale yellow (2.5Y 7/4) loamy fine sand, light yellowish brown (2.5Y 6/4) moist; weak coarse and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine roots; common very fine pores; 1 percent coarse sandstone channers; strong effervescence; moderately alkaline; gradual smooth boundary.

Cr—27 to 60 inches; pale yellow (2.5Y 7/4) soft calcareous sandstone, light yellowish brown (2.5Y 6/4) moist; hard and brittle when dry; fractures greater than 4 inches apart.

Range in Characteristics

Depth to soft bedrock: 20 to 40 inches

A horizon:
Hue: 10YR or 2.5Y
Value: 4 to 6, 3 or 4 moist
Chroma: 2 or 3

Bk horizon:
Hue: 10YR or 2.5Y
Value: 5 to 7, 4 to 6 moist
Chroma: 2 to 4
Texture: loamy fine sand, fine sand, or loamy sand

Cr horizon:
Value: 6 or 7, 5 or 6 moist
Chroma: 2 to 6
Notes: The sandstone is slightly hard or hard, brittle when dry, and easily crushed when moist.

Belfield Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Slow
Landform: Alluvial flats, stream terraces, ridges, and alluvial fans
Parent material: Alluvium
Slope: 0 to 9 percent
Notes: These soils are sodic.

Taxonomic class: Fine, smectitic, frigid Glossic Natrustolls

Typical pedon:
Belfield silty clay loam, 2,320 feet east and 235 feet north of the southwest corner of sec. 36, T. 137 N., R. 98 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 9 inches; grayish brown (10YR 5/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic structure parting to moderate very fine subangular blocky; very hard, friable; many roots; many very fine pores; common uncoated sand grains on faces of peds; slightly acid; clear wavy boundary.

E/B—9 to 12 inches; light brownish gray (2.5Y 6/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic structure parting to weak medium platy which parts to strong very fine subangular blocky; very hard, friable; many roots; many very fine pores; thin light gray (10YR 7/1) dry uncoated sand grains on top of plates and discontinuous on bottom of plates; slightly acid; clear smooth boundary.

Btn1—12 to 17 inches; grayish brown (2.5Y 5/2) silty clay, very dark grayish brown (2.5Y 3/2) moist; strong medium prismatic structure parting to strong medium and fine angular blocky; extremely hard, friable; common roots; many very fine pores; faint continuous clay films on faces of peds; common uncoated sand grains in the upper part and few in the lower part; neutral; clear wavy boundary.

Btn2—17 to 24 inches; light olive brown (2.5Y 5/4) silty clay loam, dark grayish brown (2.5Y 4/2) moist; moderate medium prismatic structure parting to moderate medium and fine subangular blocky; very hard, friable; few roots; many fine pores; faint clay films of olive brown (2.5Y 4/3); slightly alkaline; clear wavy boundary.

Bk1—24 to 31 inches; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; moderate medium prismatic structure parting to weak medium subangular blocky; very hard, friable; few roots; many fine and very fine pores; common threads and masses of lime; strong effervescence; moderately alkaline; clear wavy boundary.

Bk2—31 to 43 inches; light brownish gray (2.5Y 6/2) and white (2.5Y 8/2) silty clay loam, dark grayish brown (2.5Y 4/2) and light brownish gray (2.5Y 6/2) moist; weak medium prismatic structure parting to moderate medium subangular blocky; very hard, friable; many fine pores; many threads and masses of lime; violent effervescence; moderately alkaline; gradual wavy boundary.

C—43 to 60 inches; light olive brown (2.5Y 5/4) clay loam, olive brown (2.5Y 4/4) moist; massive; very hard, friable; many fine pores; violent effervescence; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 25 inches
Depth to lime: 22 to 55 inches
Notes: Some pedons have a BC, a Bky, BC, or a BCky horizon.

A horizon:
Value: 3 to 5, 2 or 3 moist
Chroma: 2 or 3

E/B horizon:
Notes: Some cultivated pedons do not have an E/B horizon.

Btn horizon:
Hue: 10YR or 2.5Y
Value: 4 to 6, 2 to 5 moist
Texture: clay loam, silty clay, or silty clay loam

C horizon:
Value: 5 to 7, 4 or 5 moist
Texture: loam, clay loam, or silty clay loam

Benz Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Landform: Alluvial fans
Parent material: A lluvium
Slope: 1 to 9 percent
Notes: These soils are calcareous.

Taxonomic class: Fine-loamy, mixed, superactive, calcareous, frigid Aridic Ustorthents

Typical pedon:
Benz clay loam, about 2,520 feet south and 1,400 feet west of northeast corner of sec. 8, T. 21 N., R. 4 E. (Colors are for dry soil unless otherwise stated.)

A1—0 to 1/8 inch; light gray (2.5Y 7/2) clay loam, grayish brown (2.5Y 5/2) moist; vesicular surface crust.

A2—1/8 to 2 inches; grayish brown (2.5Y 5/2) clay loam, very dark grayish brown (2.5Y 3/2) moist; weak fine granular structure; very hard, friable, sticky and plastic; slight effervescence; strongly alkaline; clear boundary.

C1—2 to 12 inches; light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist; massive; extremely hard, friable, sticky and plastic; common fine and very fine pores; slight effervescence; strongly alkaline; diffuse wavy boundary.

C2—12 to 24 inches; light brownish gray (2.5Y 6/2) clay loam stratified with lenses of loam, dark grayish brown (2.5Y 4/2) moist; massive; extremely hard, friable, sticky and plastic; few fine and very fine roots; few fine and very fine pores; few fine threads and masses of lime; strong effervescence; very strongly alkaline; diffuse boundary.

C3—24 to 66 inches; light brownish gray (2.5Y 6/2) loam stratified with thin lenses of fine sandy loam, dark grayish brown (2.5Y 4/2) moist; massive; extremely hard, friable, sticky and slightly plastic; few roots and pores; few fine threads of lime; few fine threads of gypsum; strong effervescence; very strongly alkaline.

Range in Characteristics

Notes: Some pedons have a Ck horizon.

A horizon:
Hue: 2.5Y or 10YR
Chroma: 2 or 3

C horizon:
Hue: 5Y, 2.5Y, or 10YR
Value: 5 to 8, 4 to 6 moist
Chroma: 2 or 3
Texture: loam, clay loam, silt loam, or fine sandy loam

Blacksheep Series

Depth class: Shallow
Drainage class: Well drained
Permeability: Moderately rapid
Landform: Ridges, rises on pediments, and hills
Parent material: Residuum
Slope: 3 to 50 percent.
Notes: These soils are calcareous.

Taxonomic class: Loamy, mixed, superactive, calcareous, frigid, shallow Aridic Ustorthents

Typical pedon:
Blacksheep fine sandy loam, 1,500 feet north and 1,200 feet east of the southwest corner of sec. 32, T. 2 N., R. 46 E. (Colors are for dry soil unless otherwise stated.)

A—0 to 6 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 4/3) moist; weak medium granular structure; soft, very friable, nonsticky and nonplastic; common fine and very fine roots; common very fine tubular pores; slightly alkaline; clear smooth boundary.

Bk—6 to 16 inches; light gray (2.5Y 7/2) very fine sandy loam, grayish brown (2.5Y 5/2) moist; weak medium prismatic structure parting to weak fine subangular blocky; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; common very fine and few fine tubular pores; few medium masses of lime; violent effervescence; moderately alkaline; clear smooth boundary.

Cr—16 to 60 inches; light gray (10YR 7/2) semiconsolidated sandstone; strong effervescence; moderately alkaline.

Range in Characteristics

A horizon:
Hue: 2.5Y, 7.5YR, or 10YR
Value: 5 to 7, 4 or 5 moist
Chroma: 2 or 3

Bk horizon:
Hue: 2.5Y, 7.5YR, or 10YR
Value: 5 to 7, 5 or 6 moist
Chroma: 2 to 4
Texture: very fine sandy loam, fine sandy loam, or sandy loam

Bowdle Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate over rapid
Landform: Stream terraces
Parent material: Alluvium
Slope: 0 to 6 percent

Taxonomic class: Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Pachic Haplustolls

Typical pedon:
Bowdle loam, 265 feet east and 230 feet south of northwest corner of sec. 7, T. 122 N., R. 73 W. (Colors are for dry soil unless otherwise stated.)

Ap—0 to 8 inches; very dark brown (10YR 2/2) loam, dark grayish brown (10YR 4/2) dry; moderate fine and medium granular structure; soft, friable, slightly plastic; neutral; abrupt smooth boundary.

Bw1—8 to 16 inches; very dark brown (10YR 2/2) loam, dark grayish brown (10YR 4/2) dry; moderate medium prismatic structure parting to moderate medium angular and subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; neutral; clear smooth boundary.

Bw2—16 to 22 inches; very dark brown (10YR 2/2) crushing to very dark grayish brown (10YR 3/2) loam, dark grayish brown (10YR 4/2) dry; moderate coarse prismatic structure parting to moderate medium subangular blocky; hard, friable, slightly sticky and slightly plastic; few pebbles coated with lime; neutral; abrupt wavy boundary.

Bk—22 to 25 inches; very dark grayish brown (2.5Y 3/2) crushing to dark grayish brown (2.5Y 4/2) gravelly loam, grayish brown (2.5Y 5/2) dry; weak coarse prismatic structure parting to weak medium subangular blocky; hard, very friable, slightly sticky and slightly plastic; common fine accumulations of lime; strong effervescence; slightly alkaline; abrupt wavy boundary.

2C1—25 to 30 inches; varicolored, very gravelly loamy sand; common fine fragments of shale; strong effervescence; slightly alkaline; clear smooth boundary.

2C2—30 to 60 inches; varicolored, very gravelly loamy sand; common fine fragments of shale; slight effervescence; slightly alkaline.

Range in Characteristics

Mollic epipedon thickness: 16 to more than 28 inches
Depth to sand and gravel: 20 to 40 inches
Notes: Some pedons do not have a Bk horizon.

Ap horizon:
Value: 2 or 3, 3 or 4 dry

2C horizon:
Hue: 10YR or 2.5Y
Notes: Rock fragments range from 5 to 40 percent, but average more than 15 percent above a depth of 40 inches.

Boxwell Series

Depth class: Moderately deep
Drainage class: Well
Permeability: Moderate
Landform: Ridges, pediments, and hills
Parent material: Residuum
Slope: 1 to 50 percent

Taxonomic class: Fine-loamy, mixed, superactive, frigid Aridic Haplustolls

Typical pedon:
Boxwell loam, 200 feet north and 1,600 feet east of the center of sec. 24, T. 26 N., R. 8 W. (Colors are for dry soil unless otherwise stated.)

Ap—0 to 5 inches; grayish brown (2.5Y 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate very fine granular structure; soft, very friable, slightly sticky and slightly plastic; many fine interstitial pores; neutral; abrupt smooth boundary.

Bw1—5 to 9 inches; brown (10YR 5/3) loam, dark brown (10YR 4/3) moist; moderate medium prismatic structure; slightly hard, friable, moderately sticky and moderately plastic; coatings of dark grayish brown (10YR 4/2); common fine roots; common fine tubular pores; neutral; clear smooth boundary.

Bw2—9 to 14 inches; grayish brown (2.5Y 5/2) loam, dark grayish brown (2.5Y 4/2) moist; moderate medium prismatic structure; slightly hard, very friable, moderately sticky and moderately plastic; common fine roots; common fine tubular pores; slight effervescence; slightly alkaline; clear wavy boundary.

Bk—14 to 28 inches; white (5Y 8/2) loam, light gray (5Y 7/2) moist; weak coarse prismatic structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine roots; common fine pores; many fine masses of lime; violent effervescence; moderately alkaline; gradual smooth boundary.

Cr—28 to 60 inches; light gray (5Y 7/2) semiconsolidated sandstone that crushes to a sandy loam, light olive gray (5Y 6/2) moist; upper part strong effervescence.

Range in Characteristics

Depth to the Bk horizon: 8 to 16 inches
Depth to soft bedrock: 20 to 40 inches

Ap horizon:
Hue: 10YR or 2.5Y
Chroma: 2 or 3
Texture: loam or silt loam

Bw horizon:
Value: 4 to 7, 3 to 5 moist
Chroma: 2 to 4
Texture: clay loam, loam, or silty clay loam

Bk horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 6 to 8, 4 to 7 moist
Chroma: 2 or 3
Texture: silt loam, loam, or very fine sandy loam

Cr horizon:
Notes: It is semiconsolidated sandstone, siltstone, mudstone, or a combination of these materials interbedded. They crush to a very fine sandy loam, sandy loam, silt loam, or silty clay loam.

Brandenburg Series

Depth class: Very deep
Drainage class: Excessively drained
Permeability: Moderate over very rapid
Landform: Ridges, rises on pediments, and hills
Parent material: Residuum
Slope: 3 to 35 percent

Taxonomic class: Fragmental, mixed, frigid Typic Ustorthents

Typical pedon:
Brandenburg channery loam, 1,485 feet north of the southwest corner of sec. 33, T. 132 N., R. 101 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 4 inches; pinkish gray (7.5YR 6/2) channery loam, brown (7.5YR 4/2) moist; moderate fine granular structure; slightly hard, very friable; many fine roots; 15 to 30 percent by volume small porcelanite chips; slight effervescence; slightly alkaline; clear wavy boundary.

C1—4 to 10 inches; reddish yellow (5YR 6/6) very channery loam, yellowish red (5YR 4/6) moist; weak medium and fine subangular blocky structure; soft, very friable; over 50 percent by volume porcelanite with thin carbonate crusts on undersides; strong effervescence; moderately alkaline; clear irregular boundary.

C2—10 to 60 inches; shattered porcelanite which is slightly weathered in upper 2 to 10 inches; strong effervescence; moderately alkaline.

Range in Characteristics

Depth to lime: 0 to 3 inches
Depth to fragmental material: 10 to 20 inches

A horizon:
Hue: 7.5YR or 5YR
Value: 4 to 6
Chroma: 2 to 4
Notes: Rock fragments range from 15 to 35 percent.

C horizon:
Hue: 7.5YR or 5YR
Value: 5 to 7, 3 to 5 moist
Chroma: 2 to 4

Bulltop Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate over rapid
Landform: Alluvial fans
Parent material: Alluvium
Slope: 1 to 6 percent

Taxonomic class: Loamy-skeletal, mixed, superactive, frigid Aridic Haplustolls

Typical pedon:
Bulltop loam, 2,110 feet east and 1,475 feet north of the southwest corner of sec. 8, T. 139 N., R. 103 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 4 inches; brown (10YR 4/3) loam, dark brown (10YR 3/3) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots throughout; many very fine tubular pores; 18 percent clay; 3 percent limestone-sandstone gravel; neutral; clear smooth boundary.

Bw1—4 to 8 inches; brown (10YR 4/3) loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots throughout; common very fine tubular pores; 18 percent clay; 3 percent limestone-sandstone gravel; slightly alkaline; clear smooth boundary.

Bw2—8 to 15 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots throughout; common very fine tubular pores; 18 percent clay; 3 percent limestone-sandstone gravel; slightly alkaline; clear wavy boundary.

2BCk—15 to 19 inches; light olive brown (2.5Y 5/3) gravelly loam, olive brown (2.5Y 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots throughout; common very fine tubular pores; 18 percent clay; few carbonate coats on lower surfaces of peds or rocks; strong effervescence; 25 percent limestone-sandstone gravel; moderately alkaline; gradual wavy boundary.

2C—19 to 80 inches; light gray (2.5Y 7/2) very gravelly loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots throughout; 18 percent clay; strong effervescence; 45 percent limestone-sandstone gravel and 5 percent limestone-sandstone cobbles; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 16 inches
10 to 40 inch particle-size control section: Averages 18 to 27 percent clay
Depth to loamy-skeletal material: 10 to 18 inches
Notes: Some pedons have a 2Bw, Bk, or 2Bk horizon.

A horizon:
Value: 4 or 5
Chroma: 2 or 3
Texture: loam or silt loam
Notes: Rock fragments range from 0 to 5 percent.

Bw horizon:
Hue: 10YR or 2.5Y
Value: 3 or 4 moist
Chroma: 2 or 3
Texture: loam or silt loam
Notes: Rock fragments range from 0 to 30 percent.

2BCk horizon:
Value: 5 to 7, 4 or 5 moist
Chroma: 3 or 4
Texture: loam or coarse sandy loam
Notes: Rock fragments range from 20 to 70 percent.

2C horizon:
Value: 5 to 7, 4 or 6 moist
Chroma: 2 or 4
Texture: loam or sandy loam
Notes: Rock fragments range from 45 to 75 percent.

Burgraff Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Landform: Pediments, hills, and ridges
Parent material: Residuum
Slope: 3 to 35 percent
Notes: These soils are highly calcareous.

Taxonomic class: Fine-silty, mixed, superactive, frigid Aridic Calciustolls

Typical pedon:
Burgraff silt loam, 2,500 feet south and 2,400 feet east of the northwest corner of sec. 34, T. 20 N., R. 6 W. (Colors are for dry soil unless otherwise stated.)

A1—0 to 3 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate very fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots; strong effervescence; slightly alkaline; clear smooth boundary.

A2—3 to 6 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak medium and fine subangular blocky structure; slightly hard, friable, moderately sticky and slightly plastic; many very fine roots; many very fine tubular and interstitial pores; strong effervescence; slightly alkaline; clear smooth boundary.

Bk1—6 to 17 inches; pinkish gray (7.5YR 7/2) silt loam, pinkish gray (7.5YR 6/2) moist; moderate medium and fine subangular blocky structure; slightly hard, friable, moderately sticky and slightly plastic; common very fine roots; many very fine tubular and interstitial pores; 5 percent soft angular pebbles of siltstone; many fine and medium seams of lime; continuous faint coatings of lime on faces of peds; violent effervescence; moderately alkaline; gradual smooth boundary.

Bk2—17 to 27 inches; light gray (10YR 7/2) silt loam, grayish brown (10YR 5/2) moist; weak medium and fine subangular blocky structure; slightly hard, friable, moderately sticky and slightly plastic; common very fine roots; many very fine

tubular and interstitial pores; 20 percent small, soft, angular pebbles of siltstone; common fine and medium seams of lime; continuous faint coatings of lime on faces of peds; violent effervescence; moderately alkaline; gradual smooth boundary.

Cr—7 to 60 inches; gray (5Y 6/1) fractured semiconsolidated siltstone; few fine roots in fractures in upper part; strong effervescence.

Range in Characteristics

Depth to soft bedrock: 20 to 40 inches
Particle-size control section: 20 to 30 percent clay

A horizon:
Hue: 7.5YR or 10YR
Chroma: 2 or 3

Bk horizon:
Hue: 10YR, 7.5YR, or 2.5Y
Value: 7 or 8
Chroma: 2 or 3
Texture: silt loam or silty clay loam

Cabba Series

Depth class: Shallow
Drainage class: Well drained
Permeability: Moderate
Landform: Rises on pediments, hills, knolls, divides, escarpments, and ridges
Parent material: Residuum
Slope: 3 to 70 percent
Notes: These soils are calcareous.

Taxonomic class: Loamy, mixed, superactive, calcareous, frigid, shallow Typic Ustorthents

Typical pedon:
Cabba loam, 2,100 feet north and 1,000 feet east of the southwest corner of sec. 15, T. 21 N., R. 9 E. (Colors are for dry soil unless otherwise stated.)

A—0 to 3 inches; grayish brown (2.5Y 5/2) loam, dark grayish brown (2.5Y 4/2) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; slight effervescence; slightly alkaline; clear smooth boundary.

Bk1—3 to 8 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine pores; common fine masses of lime; strong effervescence; slightly alkaline; clear wavy boundary.

Bk2—8 to 15 inches; pale brown (10YR 6/3) clay loam, brown (10YR 5/3) moist; strong thin platy structure; hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine pores; common fine masses of lime; strong effervescence; moderately alkaline; clear wavy boundary.

Cr—15 to 60 inches; pale brown (10YR 6/3) semiconsolidated sedimentary beds consisting of interbedded sandstone and shale, brown (10YR 5/3) moist; few

very fine and fine roots in vertical cracks in upper part; strong effervescence; moderately alkaline.

Range in Characteristics

Depth to soft bedrock: 10 to 20 inches

A horizon:
Hue: 10YR or 2.5Y
Value: 3 to 6, 3 or 4 moist
Chroma: 1 to 4
Texture: loam or silt loam

Bk horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 5 to 8, 4 to 7 moist
Chroma: 1 to 6
Texture: loam, silt loam, clay loam, or silty clay loam

Cr horizon:
Notes: It is interbedded layers of siltstone, sandstone, or shale that crush to loam, silt loam, very fine sandy loam, clay loam, or silty clay loam.

Cabbart Series

Depth class: Shallow
Drainage class: Well drained
Permeability: Moderate
Landform: Ridges, rises on pediments, escarpments, and hills
Parent material: Residuum
Slope: 3 to 70
Notes: These soils are calcareous.

Taxonomic class: Loamy, mixed, superactive, calcareous, frigid, shallow Aridic Ustorthents

Typical pedon:
Cabbart loam, about 2,450 feet east and 1,200 feet north of southwest corner of sec. 7, T. 20 N., R. 3 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 3 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; weak fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine roots; many fine pores; strong effervescence; moderately alkaline; clear wavy boundary.

Bk1—3 to 7 inches; light brownish gray (2.5Y 6/2) loam, grayish brown (2.5Y 5/2) moist; weak medium prismatic structure; hard, very friable, slightly sticky and slightly plastic; many fine roots; many fine pores; few fine masses of lime; strong effervescence; moderately alkaline; clear wavy boundary.

Bk2—7 to 16 inches; pale yellow (2.5Y 7/4) loam, light yellowish brown (2.5Y 6/4) moist; weak coarse prismatic structure; hard, very friable, slightly sticky and slightly plastic; many fine roots; many fine pores; common fine masses of lime; strong effervescence; moderately alkaline; clear wavy boundary.

BC—16 to 18 inches; pale yellow (2.5Y 7/4) loam, light yellowish brown (2.5Y 6/4) moist; weak coarse prismatic structure; very hard, friable, slightly sticky and

slightly plastic; many fine roots; many fine pores; disseminated lime; strong effervescence; moderately alkaline; clear wavy boundary.

Cr—18 to 60 inches; pale yellow (5Y 7/4) semiconsolidated loamy sedimentary beds that crush to loam; few widely spaced vertical cracks in upper 4 to 6 inches with roots; root mat at contact of beds.

Range in Characteristics

Depth to soft bedrock: 10 to 20 inches
Notes: Some pedons have a C horizon.

A horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 5 to 7, 3 to 5 moist
Chroma: 2 to 4
Texture: loam or silt loam

Bk horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 5 to 8, 3 to 6 moist
Texture: loam, clay loam, silt loam, or silty clay loam

BC horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 5 to 8, 4 to 6 moist
Chroma: 3 or 4
Texture: loam, clay loam, silt loam, or silty clay loam

Cedarpan Series

Depth class: Shallow
Drainage class: Well drained
Permeability: Very slow
Landform: Divides
Parent material: Alluvium
Slope: 0 to 35 percent
Notes: These soils are sodic.

Taxonomic class: Clayey, smectitic, frigid, shallow Natric Durustolls

Typical pedon:
Cedarpan loam, 1,500 feet east and 550 feet south of the northwest corner of sec. 27, T. 143 N., R. 99 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 4 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky and weak medium granular structure; soft, friable, slightly sticky and slightly plastic; many very fine roots throughout; 18 percent clay; neutral; clear smooth boundary.

BE—4 to 9 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure parting to weak fine platy; soft, friable, slightly sticky and slightly plastic; common very fine roots throughout; 18 percent clay; neutral; clear smooth boundary.

Btn—9 to 15 inches; brown (10YR 4/3) silty clay, dark brown (10YR 3/3) moist; strong medium columnar structure parting to strong fine angular blocky; hard,

firm, sticky and plastic; common very fine roots throughout; common very fine low continuity tubular pores; 44 percent clay; many prominent continuous clay films throughout; slightly alkaline; abrupt wavy boundary.

2Bqm—15 to 26 inches; indurated silicrete; slightly alkaline; abrupt wavy boundary; fine-earth fraction is grayish brown (2.5Y 5/2) silty clay, very dark grayish brown (2.5Y 3/2) moist; this fraction makes up about 5 percent of the horizon; roots are in fissures.

3Btn—26 to 35 inches; gray (2.5Y 5/1) silty clay, dark gray (2.5Y 4/1) moist; strong fine angular blocky structure; hard, firm, sticky and plastic; many prominent continuous clay films throughout; common irregular medium masses of silica; moderately alkaline; gradual wavy boundary.

3Btny—35 to 45 inches; gray (2.5Y 6/1) silty clay, gray (2.5Y 5/1) moist; strong fine angular blocky structure; hard, firm, sticky and plastic; common continuous prominent clay films throughout; common medium irregular masses of silica pedogenic throughout; common coarse rounded nests of gypsum pedogenic throughout; moderately alkaline; gradual wavy boundary.

3BC—45 to 54 inches; gray (2.5Y 6/1) silty clay, gray (2.5Y 5/1) moist; massive; hard, friable, sticky and plastic; common medium irregular masses of silica pedogenic throughout; moderately alkaline; gradual wavy boundary.

3Cy—54 to 80 inches; gray (2.5Y 6/1) silty clay, gray (2.5Y 5/1) moist; massive; hard, friable, sticky and plastic; common fine rounded nests of gypsum pedogenic throughout; common medium irregular masses of silica pedogenic throughout; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 16 inches
Depth to the Bqm horizon: 10 to 20 inches
Notes: Some pedons have an E, a Btkn, a 3Btkn, or a 3BCy horizon.

A horizon:
Hue: 10YR or 7.5YR
Value: 4 or 5
Chroma: 2 or 3
Texture: silt loam or loam

BE horizon:
Value: 5 or 6, 3 to 5 moist
Chroma: 2 or 3
Texture: silt loam or loam

Btn horizon:
Hue: 10YR, 7.5YR, or 2.5Y
Value: 4 to 7, 3 to 6 moist
Chroma: 2 to 4
Texture: silty clay, clay, clay loam, or silty clay loam

2Bqm horizon:
Hue: 10YR or 2.5Y
Value: 4 or 5, 3 or 4 moist
Chroma: 2 to 4
Texture: silty clay or silty clay loam
Notes: It has 0 to 10 percent material less than 2mm.

3Btn horizon:
Hue: 2.5Y, 10YR, 5Y, or neutral
Value: 5 to 8, 4 to 7 moist
Chroma: 0 to 3
Texture: silty clay, silty clay loam, or clay

3BC horizon:
Hue: 2.5Y, 5Y, or neutral
Value: 6 to 8, 5 to 7 moist
Chroma: 0 to 2

3Cy horizon:
Hue: 2.5Y, 5Y, or neutral
Value: 6 to 8, 5 to 7 moist
Chroma: 0 to 3
Texture: silty clay or silty clay loam
Notes: It does not have gypsum in some pedons.

Chama Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Landform: Hills, knolls, pediments, and ridges
Parent material: Residuum
Slope: 0 to 45 percent
Notes: These soils are highly calcareous.

Taxonomic class: Fine-silty, mixed, superactive, frigid Typic Calciustolls

Typical pedon:
Chama silt loam, 1,120 feet east and 1,180 feet north of the southwest corner of sec. 15, T. 136 N., R. 99 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 4 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak medium and fine subangular blocky structure; slightly hard, friable, slightly sticky and nonplastic; neutral; abrupt smooth boundary.

Bw—4 to 8 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky and nonplastic; slight effervescence; slightly alkaline; clear smooth boundary.

Bk1—8 to 13 inches; light gray (2.5Y 7/2) silt loam, light olive brown (2.5Y 5/4) moist; weak medium prismatic structure parting to moderate medium and fine subangular blocky; slightly hard, friable, slightly sticky and nonplastic; many fine masses of lime; violent effervescence; slightly alkaline; clear smooth boundary.

Bk2—13 to 22 inches; light yellowish brown (2.5Y 6/4) silt loam, olive brown (2.5Y 4/4) moist; weak medium subangular blocky and weak thick platy structure; slightly hard, friable, slightly sticky and nonplastic; many medium masses of lime; violent effervescence; slightly alkaline; clear smooth boundary.

BCk—22 to 34 inches; light yellowish brown (2.5Y 6/4) silt loam, light olive brown (2.5Y 5/4) moist; massive; slightly hard, friable, slightly sticky and nonplastic; many large lime concretions; slight effervescence; slightly alkaline; gradual wavy boundary.

Cr—34 to 60 inches; pale yellow (2.5Y 7/4) soft siltstone, light olive brown (2.5Y 5/4) moist; slight effervescence; slightly alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 10 inches
Depth to soft bedrock: 20 to 40 inches
Notes: Some pedons have a C horizon above the Cr horizon.

A horizon:
Hue: 10YR or 2.5Y
Value: 3 to 5, 2 or 3 moist
Texture: silt loam or loam

Bw horizon:
Hue: 2.5Y or 10YR
Value: 4 to 7, 3 to 6 moist
Chroma: 2 or 3
Texture: silt loam or silty clay loam

Bk horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 4 to 7, 3 to 6 moist
Texture: silt loam or silty clay loam

Chanta Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate over rapid
Landform: Paleoterraces and escarpments
Parent material: Alluvium
Slope: 0 to 15 percent

Taxonomic class: Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Aridic Haplustolls

Typical pedon:
Chanta loam, 2,375 feet east and 50 feet south of northwest corner of sec. 13, T. 132 N., R. 107 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 6 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium and fine subangular blocky and granular structure; slightly hard, friable, slightly sticky and slightly plastic; many fine roots; many fine pores; neutral; clear smooth boundary.

Bw1—6 to 14 inches; brown (10YR 4/3) loam, dark brown (10YR 3/3) moist; moderate medium and fine prismatic structure parting to moderate medium and fine angular blocky; hard, friable, slightly sticky and slightly plastic; common fine roots; many pores; few faint very dark grayish brown (10YR 3/2) moist clay films on faces of prisms; few pebbles; neutral; clear smooth boundary.

Bw2—14 to 22 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; moderate medium and fine prismatic structure parting to

moderate medium and fine subangular blocky; hard, friable, slightly sticky and slightly plastic; few fine roots; common fine pores; neutral; clear wavy boundary.

Bw3—22 to 26 inches; grayish brown (2.5Y 5/2) sandy loam, dark grayish brown (2.5Y 4/2) moist; weak medium prismatic structure parting to moderate medium subangular blocky; hard, friable, slightly sticky and slightly plastic; few pebbles; slightly alkaline; clear wavy boundary.

2Bk—26 to 29 inches; grayish brown (2.5Y 5/2) very gravelly sand, dark grayish brown (2.5Y 4/2) moist; single grain; loose; about 40 percent rock fragments; carbonates coat pebbles and occur as masses on undersides of pebbles; strong effervescence; moderately alkaline; clear wavy boundary.

2C—29 to 60 inches; light brownish gray (2.5Y 6/2) gravelly sand, grayish brown (2.5Y 5/2) moist; single grain; loose; about 30 percent rock fragments; carbonates coat undersides of pebbles; slight effervescence; moderately alkaline.

Range in Characteristics

Depth to lime: 16 to 30 inches
Depth to sand and gravel: 20 to 40 inches
Notes: Some pedons have a Bk horizon.

A horizon:
Value: 4 or 5
Chroma: 2 or 3
Texture: loam or silt loam
Notes: Rock fragments range from 0 to 15 percent.

Bw horizon:
Chroma: 2 to 4
Texture: loam or clay loam
Notes: Layers of sandy loam less than 5 inches thick occur in the lower part in some pedons. Rock fragments range from 5 to 20 percent.

2Bk horizon:
Value: 5 to 7, 4 or 5 moist
Texture: sand or coarse sand
Notes: Rock fragments range from 15 to 70 percent.

2C horizon:
Value: 5 or 6, 4 or 5 moist
Texture: sand or coarse sand
Notes: Rock fragments range from 15 to 60 percent.

Chinook Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately rapid
Landform: Alluvial fans, paleoterraces, hills, escarpments, alluvial fans, and ridges
Parent material: Alluvium
Slope: 0 to 15 percent

Taxonomic class: Coarse-loamy, mixed, superactive, frigid Aridic Haplustolls

Typical pedon:
Chinook fine sandy loam, 660 feet north and 500 feet east of the southwest corner of sec. 27, T. 32 N., R. 15 E. (Colors are for dry soil unless otherwise stated.)

Ap—0 to 6 inches; grayish brown (10YR 5/2) fine sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many fine roots; many fine pores; neutral; abrupt wavy boundary.

Bw1—6 to 9 inches; dark yellowish brown (10YR 4/4) fine sandy loam, dark yellowish brown (10YR 3/4) moist; weak coarse prismatic structure parting to moderate fine and medium subangular blocky; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine pores; neutral; clear smooth boundary.

Bw2—9 to 15 inches; brown (10YR 5/3) fine sandy loam, brown (10YR 4/3) moist; weak coarse prismatic structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots; common very fine and fine pores; neutral; clear boundary.

Bk—15 to 32 inches; grayish brown (2.5Y 5/2) fine sandy loam, olive brown (2.5Y 4/3) moist; weak coarse prismatic structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots; few very fine and fine pores; few threads and seams of lime; strong effervescence; moderately alkaline; gradual smooth boundary.

BCk—32 to 40 inches; pale olive (5Y 6/3) fine sandy loam, olive (5Y 5/3) moist; stratified; hard, friable, nonsticky and nonplastic; common very fine and fine roots; few very fine and fine pores; few threads and seams of lime; strong effervescence; moderately alkaline; gradual smooth boundary.

C1—40 to 52 inches; olive gray (5Y 5/2) fine sandy loam, olive (5Y 5/3) moist; massive; soft, very friable, slightly sticky and nonplastic; few very fine and fine roots; strong effervescence; moderately alkaline; diffuse boundary.

C2—52 to 66 inches; olive gray (5Y 5/2) fine sandy loam, olive (5Y 4/3) moist; single grain; loose; lenses of loamy fine sand; slight effervescence; moderately alkaline.

Range in Characteristics

10 to 40 inch particle-size control section: sandy loam or fine sandy loam and has less than 18 percent clay.
Percent rock fragments: 0 to 15 percent

Ap horizon:
Hue: 10YR or 2.5Y
Value: 4 or 5, 2 or 3 moist
Texture: fine sandy loam or sandy loam

Bw horizon:
Hue: 10YR or 2.5Y
Chroma: 2 to 4
Texture: fine sandy loam or sandy loam

Bk horizon:
Hue: 2.5Y or 5Y

Value: 5 or 6, 4 or 5 moist
Texture: fine sandy loam or sandy loam

C horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 5 or 6
Chroma: 2 to 4
Texture: fine sandy loam, loamy fine sand, or sandy loam

Cohagen Series

Depth class: Shallow
Drainage class: Well drained
Permeability: Moderately rapid
Landform: Hills, knolls, rises on pediments, and ridges
Parent material: Residuum
Slope: 3 to 50 percent
Notes: These soils are calcareous.

Taxonomic class: Loamy, mixed, superactive, calcareous, frigid, shallow Typic Ustorthents

Typical pedon:
Cohagen fine sandy loam, 2,360 feet east and 250 feet north of the southwest corner of sec. 29, T. 143 N., R. 85 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 3 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure parting to weak medium granular; slightly hard, very friable; many roots; slight effervescence; slightly alkaline; clear wavy boundary.

C1—3 to 8 inches; light brownish gray (2.5Y 6/2) fine sandy loam, dark grayish brown (2.5Y 4/2) moist; weak medium and fine subangular blocky structure; slightly hard, very friable; common roots; slight effervescence; slightly alkaline; gradual boundary.

C2—8 to 17 inches; light yellowish brown (2.5Y 6/4) and light olive brown (2.5Y 5/5) fine sandy loam, olive brown (2.5Y 4/4) moist; weak medium subangular blocky structure; hard, friable; common grading to few roots; 25 percent soft sandstone fragments; slight effervescence; moderately alkaline; clear wavy boundary.

Cr—17 to 40 inches; pale yellow (2.5Y 7/4) and light yellowish brown (2.5Y 6/4) soft calcareous sandstone, light olive brown (2.5Y 5/4) moist; massive; slightly hard and brittle; soft and easily crushed; few roots in cracks in upper part; few seams of lime.

Range in Characteristics

Notes: Depth to soft bedrock is 10 to 20 inches.

Ap horizon:
Hue: 10YR or 2.5Y
Value: 4 to 6, 3 or 4 moist
Chroma: 2 or 3

C horizon:
Hue: 2.5Y or 10YR
Value: 5 to 7, 4 or 5 moist

Cozberg Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately rapid
Landform: Paleoterraces and escarpments
Parent material: Alluvium
Slope: 1 to 15 percent

Taxonomic class: Coarse-loamy, mixed, superactive, frigid Aridic Haplustolls

Typical pedon:
Cozberg loam, 1,000 feet south and 400 feet east of the northwest corner of sec. 26, T. 35 N., R. 25 E. (Colors are for dry soil unless otherwise stated.)

Ap—0 to 7 inches; brown (10YR 5/3) loam, dark grayish brown (10YR 3/2) moist; weak fine granular structure; slightly hard, very friable, nonsticky and nonplastic; many fine roots; many fine pores; neutral; clear wavy boundary.

Bw1—7 to 12 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, friable, slightly sticky and slightly plastic; common fine roots; common fine pores; neutral; clear wavy boundary.

Bw2—12 to 20 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 4/3) moist; moderate medium and coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; common fine and medium pores; slightly alkaline; clear wavy boundary.

Bk1—20 to 26 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 4/3) moist; weak coarse prismatic structure; slightly hard, very friable, slightly sticky and nonplastic; few fine and very fine roots; common fine pores; 5 percent pebbles; few faint lime coatings on surface of pebbles; slight effervescence; abrupt wavy boundary.

2Bk2—26 to 30 inches; light brownish gray (2.5Y 6/2) gravelly loamy sand, grayish brown (2.5Y 5/2) moist; single grain; loose; 20 percent pebbles; common large masses of lime; continuous distinct crusts on surface of pebbles; strong effervescence; moderately alkaline; gradual wavy boundary.

2C—30 to 60 inches; pale brown (10YR 6/3) loamy sand, brown (10YR 5/3) moist; single grain; loose; 10 percent pebbles; strong effervescence; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 16 inches
Depth to the calcic horizon: 16 to 25 inches
Depth to the lithological discontinuity: 20 to 40 inches
Notes: The material above the discontinuity has less than 50 percent fine sand and coarser sand.

A horizon:
Value: 2 or 3 moist
Chroma: 2 or 3
Notes: Rock fragments range from 0 to 15 percent.

Bw horizon:
Value: 5 or 6, 3 to 5 moist
Texture: fine sandy loam or sandy loam
Notes: Rock fragments range from 0 to 15 percent.

Bk horizon:
Value: 5 to 7, 4 to 6 moist
Chroma: 2 to 4
Texture: fine sandy loam or sandy loam
Notes: Rock fragments range from 0 to 15 percent.

2Bk horizon:
Hue: 10YR or 2.5Y
Value: 5 to 7, 4 to 6 moist
Chroma: 2 to 4
Texture: loamy sand, sandy loam, loamy coarse sand, or coarse sand
Notes: Rock fragments range from 0 to 30 percent.

2C horizon:
Hue: 10YR or 2.5Y
Value: 5 to 7, 4 to 6 moist
Chroma: 2 to 6
Texture: loamy sand, sand, loamy coarse sand, or coarse sand
Notes: Rock fragments range from 0 to 35 percent.

Daglum Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Slow
Landform: Alluvial flats, alluvial fans, ridges, and stream terraces
Parent material: Alluvium
Slope: 0 to 9 percent
Notes: These soils are sodic.

Taxonomic class: Fine, smectitic, frigid Vertic Natrustolls

Typical pedon:
Daglum silt loam, 1,950 feet east and 1,355 feet north of the southwest corner of sec. 26, T. 132 N., R. 98 W. (Colors are for dry soil unless otherwise stated.)

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; slightly acid; abrupt smooth boundary.

E—7 to 8 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate medium and coarse subangular blocky structure parting to moderate fine subangular blocky and weak medium platy; slightly hard, friable, slightly sticky and slightly plastic; many very fine pores; light gray (10YR 7/2) dry coatings; slightly acid; clear smooth boundary.

Btn1—8 to 14 inches; dark grayish brown (10YR 4/2) clay, very dark grayish brown (10YR 3/2) moist; strong fine and medium columnar structure parting to strong

fine and medium angular blocky; extremely hard, very firm, very sticky and plastic; common very fine roots along faces of peds; many very fine pores; light gray (10YR 7/2) dry silt coatings on tops of columns; many faint clay films on faces of peds; very dark brown (10YR 2/2) coatings on faces of peds; slightly alkaline; gradual smooth boundary.

Btn2—14 to 18 inches; dark grayish brown (10YR 4/2) clay, very dark grayish brown (10YR 3/2) moist; strong medium and coarse prismatic structure parting to strong fine and medium angular blocky; extremely hard, very firm, very sticky and very plastic; common very fine roots along faces of peds; many very fine pores; many faint clay films on faces of peds; very dark brown (10YR 2/2) coatings on faces of peds; moderately alkaline; clear smooth boundary.

Bky1—18 to 26 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; strong fine and medium angular and subangular blocky structure; very hard, very firm, very sticky and very plastic; common very fine roots; many very fine pores; few faint clay films on faces of peds; very dark grayish brown (10YR 3/2) coatings on faces of peds; few fine gypsum crystals; common fine and medium irregularly shaped masses of lime; strong effervescence; strongly alkaline; clear smooth boundary.

Bky2—26 to 32 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; weak coarse prismatic structure parting to moderate medium subangular blocky; hard, firm, sticky and plastic; common very fine roots; common very fine pores; common fine and medium gypsum crystals; common fine and medium irregularly shaped masses of lime; violent effervescence; strongly alkaline; clear smooth boundary.

BCk—32 to 47 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; weak medium subangular blocky structure; hard, firm, sticky and plastic; few very fine roots; many very fine pores; common fine threads of lime; violent effervescence; moderately alkaline; clear wavy boundary.

C—47 to 60 inches; light yellowish brown (2.5Y 6/4) clay, light olive brown (2.5Y 5/4) moist; common fine distinct brownish yellow (10YR 6/8) dry redoximorphic concentrations; weak medium and coarse subangular blocky structure; extremely hard, very firm, very sticky and very plastic; few very fine roots; common very fine pores; few fine gypsum crystals; common fine irregularly shaped masses of lime; strong effervescence; moderately alkaline.

Range in Characteristics

Depth to gypsum or other salts: 16 to 36 inches

A horizon:
Value: 4 or 5, 2 or 3 moist
Texture: silt loam or loam

E horizon:
Hue: 10YR or 2.5Y
Value: 4 to 7, 3 to 5 moist
Chroma: 1 or 2
Texture: silt loam or loam
Notes: Some cultivated pedons do not have an E horizon.

Btn horizon:
Hue: 10YR or 2.5Y

Value: 4 to 6, 3 to 5 moist
Chroma: 2 or 3
Texture: clay loam, silty clay loam, clay, or silty clay

Bk horizon:
Hue: 10YR or 2.5Y
Value: 4 to 6, 3 to 5 moist
Chroma: 2 or 3
Texture: clay, clay loam, or silty clay
Notes: Some pedons have Byz, By, or Bz horizons up to 10 inches thick.

BC and C horizons:
Hue: 2.5Y or 5Y
Value: 5 to 7, 3 to 6 moist
Chroma: 1 to 4
Texture: Clay loam, clay, silty clay, or silty clay loam

Desart Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Landform: Alluvial flats and alluvial fans
Parent material: Alluvium
Slope: 0 to 6 percent
Notes: These soils are sodic.

Taxonomic class: Coarse-loamy, mixed, superactive, frigid Typic Natrustolls

Typical pedon:
Desart fine sandy loam, 1,300 feet west and 300 feet south of the northeast corner of sec. 28, T. 131 N., R. 81 W. (Colors are for dry soil unless otherwise stated.)

A1—0 to 11 inches; dark grayish brown (10YR 4/2) fine sandy loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine roots; slightly acid; clear smooth boundary.

A2—11 to 20 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine roots; neutral; clear smooth boundary.

E—20 to 24 inches; light brownish gray (2.5Y 6/2) loamy fine sand, dark grayish brown (2.5Y 4/2) moist; weak medium subangular blocky structure parting to weak coarse platy; soft, very friable, nonsticky and nonplastic; common very fine roots; slightly alkaline; abrupt wavy boundary.

Btn—24 to 31 inches; light yellowish brown (2.5Y 6/3) fine sandy loam, olive brown (2.5Y 4/3) moist; strong coarse columnar structure parting to weak coarse platy; very hard, firm, slightly sticky and slightly plastic; few very fine roots; common faint dark grayish brown (2.5Y 4/2) moist clay films on faces of peds; strongly alkaline; clear wavy boundary.

C—31 to 60 inches; light brownish gray (2.5Y 6/2) loamy fine sand, dark grayish brown (2.5Y 4/2) moist; weak medium subangular blocky structure; hard, very friable, nonsticky and nonplastic; strongly alkaline.

Range in Characteristics

Depth to the Btn horizon: 20 to 30 inches
Notes: Some pedons have E/B, B/E, Bk, Bky, or BCk horizons.

A horizon:
Value: 2 or 3 moist
Chroma: 2 or 3
Texture: fine sandy loam, very fine sandy loam, or sandy loam

E horizon:
Hue: 10YR or 2.5Y
Value: 5 to 7, 3 to 5 moist
Chroma: 1 or 2
Texture: very fine sandy loam, loamy fine sand, fine sandy loam, sandy loam, loamy sand, or fine sand

Btn horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 5 or 6, 3 to 5 moist
Chroma: 2 or 3
Texture: fine sandy loam, very fine sandy loam, sandy loam, or loam
Notes: Carbonates and salts are in the lower part in some pedons.

C horizon:
Hue: 2.5Y or 5Y
Value: 5 to 7, 4 to 6 moist
Chroma: 2 or 3
Texture: loam, sandy loam, or loamy fine sand

Dimmick Series

Depth class: Very deep
Drainage class: Very poorly drained
Permeability: Very slow
Landform: Depressions
Parent material: Alluvium
Slope: 0 to 1 percent

Taxonomic class: Fine, smectitic, frigid Vertic Epiaquolls

Typical pedon:
Dimmick silty clay loam, 1,056 feet south and 180 feet east of the northwest corner of sec. 11, T. 144 N., R. 95 W. (Colors are for moist soil unless otherwise stated.)

Oe—0 to 3 inches; roots and partly decomposed stems and leaves of plants; loose; abrupt smooth boundary.

A—3 to 6 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; many very fine distinct dark yellowish brown (10YR 4/4) redoximorphic accumulations; strong fine and very fine angular blocky structure; hard, firm, very sticky and very plastic; many fine and medium roots; neutral; gradual wavy boundary.

Ag—6 to 23 inches; very dark gray (5Y 3/1) silty clay loam, gray (5Y 5/1) dry; many medium prominent dark yellowish brown (10YR 4/4) redoximorphic

accumulations; weak fine angular blocky structure; hard, very firm, very sticky and very plastic; common fine and few medium roots; neutral; gradual smooth boundary.

BCg—23 to 43 inches; dark gray (5Y 4/1) clay, gray (5Y 6/1) dry; many medium prominent olive brown (2.5Y 4/4) redoximorphic accumulations; weak fine subangular blocky structure; hard, very firm, very sticky and very plastic; few roots; neutral; diffuse wavy boundary.

Cg—43 to 63 inches; dark gray (N 4/0) clay, gray (N 6/0) dry; many coarse prominent olive brown (2.5Y 4/4) redoximorphic accumulations; massive; hard, very firm, very sticky and very plastic; slightly alkaline.

Range in Characteristics

Mollic epipedon thickness: 20 to more than 40 inches
Depth to lime: 20 to more than 40 inches
Notes: Some pedons have Bk horizons. Some pedons have strata of silty clay loam or sandy clay loam below the A horizon.

A horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 2 or 3, 4 or 5 dry
Chroma: 2 or less

C horizon:
Hue: 2.5Y, 5Y, or neutral
Value: 4 to 8
Chroma: 0 to 3
Texture: clay or silty clay
Notes: Some pedons are loam, silt loam, or silty clay loam below 40 inches.

Dogiecreek Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate
Landform: Flood plains
Parent material: Alluvium
Slope: 0 to 1 percent
Notes: These soils are calcareous.

Taxonomic class: Coarse-loamy, mixed, superactive, calcareous, frigid Typic Fluvaquents

Typical pedon:
Dogiecreek fine sandy loam, 1,050 feet west and 185 feet south of the northeast corner of sec. 26, T. 19 N., R. 5 E. (Colors are for moist soil unless otherwise stated.)

A—0 to 3 inches; dark grayish brown (2.5Y 4/2) fine sandy loam, light brownish gray (2.5Y 6/2) dry; weak thin platy structure parting to weak fine granular; soft, very friable; common fine roots; moderately alkaline; abrupt smooth boundary.

Cz—3 to 6 inches; dark grayish brown (2.5Y 4/2) very fine sandy loam, grayish brown (2.5Y 5/2) dry; moderate medium and fine subangular blocky structure; hard, friable; few fine compressed roots; few fine accumulations of salts; slight effervescence; strongly alkaline; clear wavy boundary.

Czg1—6 to 12 inches; olive gray (5Y 4/2) loam, light olive gray (5Y 6/2) dry; common fine distinct light olive brown (2.5Y 5/6) redoximorphic concentrations; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few fine compressed roots; finely stratified with material of light gray (2.5Y 6/1) dry; common fine nests of salts; strong effervescence; very strongly alkaline; clear wavy boundary.

Czg2—12 to 20 inches; olive gray (5Y 4/2) fine sandy loam, light olive gray (5Y 6/2) dry; common fine distinct light yellowish brown (2.5Y 5/6) redoximorphic concentrations; massive; soft, very friable; very few fine roots; finely stratified with material of light gray (2.5Y 6/1) dry; common fine nests of salts; slight effervescence; very strongly alkaline; clear wavy boundary.

Czg3—20 to 41 inches; olive gray (5Y 5/2) fine sandy loam, light gray (5Y 7/2) dry; common fine distinct light yellowish brown (2.5Y 5/6) redoximorphic concentrations; massive; soft, very friable; few fine accumulations of carbonates; few fine nests of salts; strong effervescence; very strongly alkaline; clear wavy boundary.

Cg—41 to 60 inches; olive gray (5Y 5/2) loamy fine sand, light olive gray (5Y 6/2) dry; common medium distinct light yellowish brown (2.5Y 5/6) redoximorphic concentrations; loose; slight effervescence; moderately alkaline.

Range in Characteristics

Depth to lime: 0 to 9 inches
Particle-size control section: 10 to 18 percent clay
Electrical conductivity: 8 to 30 mmhos

A horizon:
Hue: 10YR or 2.5Y
Value: 4 or 5, 5 to 7 dry
Chroma: 1 or 2

C horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 4 to 6
Chroma: 1 or 2

Dogtooth Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Very slow
Landform: Pediments, divides, hills, and ridges
Parent material: Residuum
Slope: 0 to 25 percent
Notes: These soils are saline-sodic.

Taxonomic class: Fine, smectitic, frigid Leptic Natrustolls

Typical pedon:
Dogtooth silt loam, 2,100 feet east and 1,350 feet south of the northwest corner of sec. 4, T. 140 N., R. 89 W. (Colors are for dry soil unless otherwise stated.)

E—0 to 2 inches; light brownish gray (2.5Y 6/2) silt loam, dark grayish brown (2.5Y 4/2) moist; weak thin platy structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; common fine pores; neutral; abrupt smooth boundary.

Btn—2 to 8 inches; grayish brown (2.5Y 5/2) silty clay, very dark grayish brown (2.5Y 3/2) moist; strong medium columnar structure parting to moderate fine angular blocky; very hard, very firm, very sticky and very plastic; common fine roots between peds; few medium and common fine pores; column tops coated with light brownish gray (2.5Y 6/2) dry E material; many distinct dark grayish brown (2.5Y 4/2) dry clay films on faces of peds; slight effervescence in lower part; moderately alkaline; clear smooth boundary.

Btkn—8 to 13 inches; light yellowish brown (2.5Y 6/4) silty clay, light olive brown (2.5Y 5/4) moist; moderate medium prismatic structure parting to strong fine angular blocky; very hard, very firm, very sticky and very plastic; few fine roots; common fine pores; many faint clay films on faces of peds; few fine irregular masses of lime; strong effervescence; moderately alkaline; clear smooth boundary.

Bky—13 to 21 inches; light yellowish brown (2.5Y 6/4) silty clay, light olive brown (2.5Y 5/4) moist; moderate medium prismatic structure parting to moderate fine angular blocky; very hard, very firm, very sticky and very plastic; few fine roots; few fine pores; common fine irregular masses of lime; few fine gypsum crystals; strong effervescence; strongly alkaline; abrupt wavy boundary.

Cr—21 to 60 inches; light gray (5Y 6/1) soft shale bedrock, dark gray (5Y 4/1) moist; slight effervescence.

Range in Characteristics

Depth to gypsum or other salts: 5 to 14 inches
Depth to soft bedrock: 20 to 40 inches

E horizon:
Hue: 10YR or 2.5Y
Value: 4 to 7, 3 or 4 moist
Chroma: 2 or 3
Texture: loam, silt loam, or silty clay loam

Btn horizon:
Hue: 10YR or 2.5Y
Value: 4 to 6, 3 or 4 moist
Chroma: 1 to 3
Texture: silty clay, clay, silty clay loam, or clay loam

Btkn horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 5 or 6, 3 to 5 moist
Chroma: 1 to 4
Texture: clay, silty clay, silty clay loam, or clay loam

Bky horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 5 to 7, 4 or 5 moist

Chroma: 1 to 4
Texture: silty clay, silty clay loam, clay loam, or loam

Cr horizon:
Notes: It is soft shale, siltstone, or mudstone bedrock.

Ekalaka Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Landform: Alluvial flats, hills, ridges, and alluvial fans
Parent material: Alluvium
Slope: 0 to 15 percent
Notes: These soils are sodic.

Taxonomic class: Coarse-loamy, mixed, superactive, frigid Typic Natrustolls

Typical pedon:
Ekalaka fine sandy loam, 2,110 feet east and 1,300 feet north of the southwest corner of sec. 15, T. 133 N., R. 83 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 6 inches; dark grayish brown (10YR 4/2) fine sandy loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, slightly sticky and nonplastic; few medium and common fine and very fine roots throughout; strongly acid; clear smooth boundary.

E—6 to 12 inches; light brownish gray (2.5Y 6/2) fine sandy loam, dark grayish brown (2.5Y 4/2) moist; weak very thin platy structure; soft, very friable, nonsticky and nonplastic; many very fine roots; slightly acid; abrupt wavy boundary.

Btn—12 to 17 inches; dark grayish brown (10YR 4/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; strong coarse columnar structure parting to strong medium angular blocky; extremely hard, firm, nonsticky and slightly plastic; common fine and many very fine roots between peds; clay bridging between sand grains and light gray (10YR 7/2) sand coats on faces of peds (10YR 4/2) moist; neutral; gradual wavy boundary.

Bz1—17 to 21 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic structure parting to moderate medium angular blocky; very hard, friable, nonsticky and slightly plastic; common very fine roots between peds; many threads and masses of salt; slight effervescence; slightly alkaline; gradual wavy boundary.

Bz2—21 to 25 inches; pale brown (10YR 6/3) loamy fine sand, dark grayish brown (10YR 4/2) moist; weak coarse prismatic structure parting to weak medium subangular blocky; very hard, friable, nonsticky and nonplastic; few very fine roots; few masses of salt; slight effervescence; slightly alkaline; clear wavy boundary.

BCz—25 to 33 inches; grayish brown (2.5Y 5/2) fine sandy loam, dark grayish brown (2.5Y 4/2) moist; massive; very hard, firm, nonsticky and nonplastic; few very fine roots throughout; few salt masses; many coarse yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/4) masses of manganese; slight effervescence; slightly alkaline; gradual wavy boundary.

C—33 to 60 inches; light gray (5Y 7/2) stratified fine sandy loam, loamy sand and sand, olive gray (5Y 4/2) moist; massive; hard, friable, nonsticky and nonplastic; few very fine roots throughout; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 25 inches
Depth to the Btn horizon: 7 to 20 inches
Notes: Some pedons have a Bk horizon. Some pedons have a Cr horizon at a depth of 40 to 60 inches.

A horizon:
Hue: 10YR or 2.5Y
Value: 4 or 5, 2 or 3 moist
Chroma: 2 or 3
Texture: fine sandy loam or loam

E horizon:
Hue: 10YR or 2.5Y
Value: 5 to 7, 3 to 5 moist
Chroma: 1 to 3
Texture: loamy fine sand, fine sandy loam, or very fine sandy loam
Notes: Some cultivated pedons do not have an E horizon.

Btn horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 4 to 6, 3 to 5 moist
Chroma: 2 to 4
Texture: sandy loam, fine sandy loam, or loam
Notes: It has lime or salts in the lower part in some pedons.

Bz horizon:
Hue: 2.5Y or 5Y
Value: 5 to 7, 3 to 6 moist
Chroma: 2 to 4
Texture: fine sandy loam, loamy fine sand, fine sand, or sandy loam

C horizon:
Hue: 2.5Y or 5Y
Value: 5 to 7, 4 to 6 moist
Chroma: 2 to 4
Texture: stratified fine sandy loam, loamy fine sand, fine sand or sandy loam

Ethridge Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Landform: Alluvial flats, hills, ridges, stream terraces, and alluvial fans
Parent material: Alluvium
Slope: 0 to 15 percent

Taxonomic class: Fine, smectitic, frigid Torrertic Argiustolls

Typical pedon:
Ethridge silt loam, 1,550 feet east and 300 feet north of the southwest corner of sec. 36, T. 139 N., R. 101 W. (Color are for dry soil unless otherwise stated.) (fig. 16)

A—0 to 3 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine pores; neutral; clear smooth boundary.

Bt—3 to 10 inches; grayish brown (10YR 5/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; very hard, friable, sticky and plastic; common very fine roots; many very fine pores; many distinct clay films on faces of peds; neutral; clear wavy boundary.

Btk1—10 to 13 inches; pale brown (10YR 6/3) silty clay loam, dark brown (10YR 4/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; very hard, friable, sticky and plastic; common very fine roots; many very fine pores; many distinct clay films on faces of peds; strong effervescence; moderately alkaline; clear wavy boundary.

Btk2—13 to 23 inches; pale brown (10YR 6/3) silty clay loam, brown (10YR 5/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; very hard, friable, sticky and plastic; common very fine roots; many very fine pores; common distinct clay films on faces of peds; common fine rounded masses of lime; strong effervescence; moderately alkaline; gradual wavy boundary.

Bk—23 to 38 inches; very pale brown (10YR 7/3) silty clay loam, brown (10YR 5/3) moist; weak coarse prismatic structure parting to moderate medium subangular blocky; very hard, friable, sticky and plastic; few very fine roots; common very fine pores; common fine rounded masses of lime; strong effervescence; moderately alkaline; gradual wavy boundary.

Bky—38 to 53 inches; light yellowish brown (2.5Y 6/3) silt loam, light olive brown (2.5Y 5/3) moist; weak medium subangular blocky structure; very hard, friable, slightly sticky and slightly plastic; few very fine pores; common fine rounded nests of gypsum; common fine rounded masses of lime; strong effervescence; moderately alkaline; gradual wavy boundary.

BC—53 to 60 inches; light yellowish brown (2.5Y 6/3) silt loam, light olive brown (2.5Y 5/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine rounded masses of lime; strong effervescence; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 14 inches
Depth to the Bk horizon: 10 to 20 inches

A horizon:
Hue: 10YR or 2.5Y
Value: 2 or 3 moist
Chroma: 2 or 3
Texture: silt loam or loam

Bt horizon:
Hue: 10YR or 2.5Y
Value: 4 or 5, 3 or 4 moist

Chroma: 2 to 4
Texture: silty clay loam, silty clay, or clay

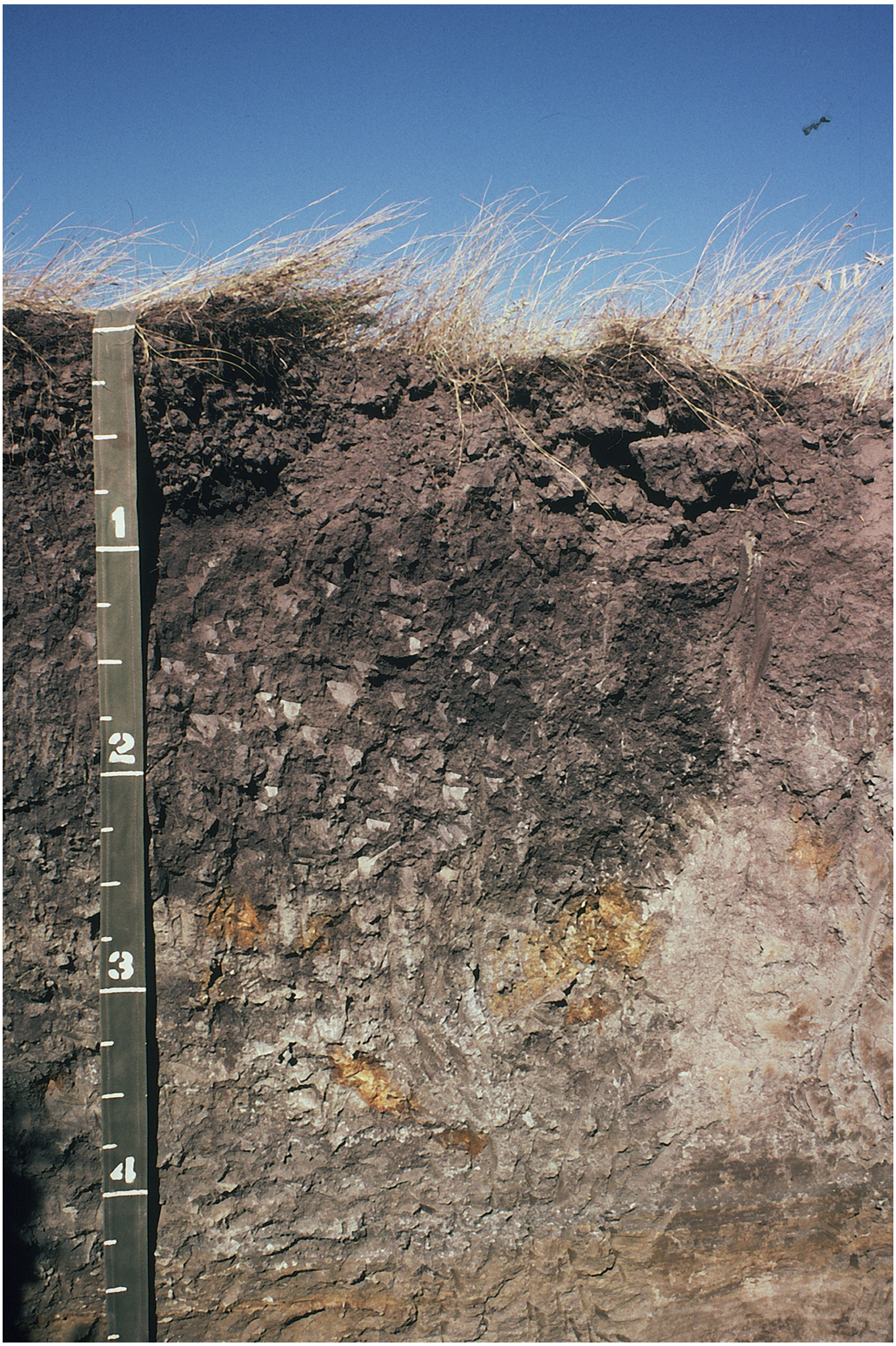

Figure 16. Typical pedon of Ethridge silt loam.

Btk horizon:
Hue: 10YR or 2.5Y
Value: 5 or 6
Chroma: 2 to 4
Texture: silty clay loam, clay, or silty clay

Bk horizon:
Hue: 10YR or 2.5Y
Value: 5 to 7, 4 to 6 moist
Chroma: 2 to 4
Texture: silty clay loam, clay loam, or clay

Bky and BC horizon:
Hue: 2.5Y or 5Y
Value: 5 to 7, 4 to 6 moist
Chroma: 2 to 4
Texture: silt loam, clay loam, or silty clay loam

Evridge Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderately rapid over slow
Landform: Pediments
Parent material: Residuum
Slope: 0 to 6 percent
Notes: These soils are sodic.

Taxonomic class: Coarse-loamy, mixed, superactive, frigid Typic Natrustolls

Typical pedon:
Evridge fine sandy loam, 900 feet east and 750 feet north of the southwest corner of sec. 22, T. 132 N., R. 82 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 12 inches: dark grayish brown (10YR 4/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots; neutral; clear wavy boundary.

E—12 to 17 inches; light brownish gray (10YR 6/2) loamy fine sand, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; loose, nonsticky and nonplastic; common very fine and fine roots; slightly alkaline; abrupt wavy boundary.

Btn—17 to 21 inches; pale brown (10YR 6/3) fine sandy loam, dark brown (10YR 4/3) moist; strong medium columnar structure parting to strong coarse subangular blocky; very hard, very firm, slightly sticky and slightly plastic; common very fine and fine roots; common distinct clay films on faces of peds; light brownish gray (10YR 6/2) coatings on tops of columns, dark grayish brown (10YR 4/2) moist; common distinct clay bridging between mineral grains; moderately alkaline; abrupt wavy boundary.

Bkz—21 to 31 inches; light brownish gray (2.5Y 6/2) fine sandy loam, dark grayish brown (2.5Y 4/2) moist; weak coarse prismatic structure parting to weak medium

subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; common fine threads of salt; common fine filaments and irregularly shaped masses of lime; slight effervescence; moderately alkaline; clear wavy boundary.

BCyz—31 to 38 inches; light brownish gray (2.5Y 6/2) loamy sand, dark grayish brown (2.5Y 4/2) moist; weak coarse subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; few very fine and fine roots; common fine threads of salt; few medium nests of gypsum; moderately alkaline; gradual wavy boundary.

Cr—38 to 60 inches; light olive gray (5Y 6/2) soft sandstone bedrock that crushes to loamy sand, olive gray (5Y 4/2) moist; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 16 inches
Depth to lime: 20 to 40 inches
Depth to soft bedrock: 20 to 40 inches

A horizon:
Hue: 10YR or 2.5Y
Value: 4 or 5, 2 or 3 moist
Chroma: 2 or 3
Texture: sandy loam or fine sandy loam

E horizon:
Hue: 10YR or 2.5Y
Value: 5 to 7, 4 to 6 moist
Chroma: 2 or 3
Texture: loamy fine sand or fine sandy loam

Btn horizon:
Hue: 10YR or 2.5Y
Value: 5 or 6, 4 or 5 moist
Chroma: 2 or 3
Texture: fine sandy loam, very fine sandy loam, sandy loam, or loam

Bk horizon:
Hue: 2.5Y or 5Y
Value: 5 to 7, 4 to 6 moist
Chroma: 2 or 3
Texture: fine sandy loam or sandy loam

BC horizon:
Hue: 2.5Y or 5Y
Value: 5 to 7, 5 or 6 moist
Chroma: 2 or 3
Texture: loamy sand or loamy fine sand

Cr horizon:
Hue: 2.5Y or 5Y
Value: 4 to 6, 4 or 5 moist
Chroma: 2 to 4

Farfeld Series

Depth class: Shallow
Drainage class: Well drained
Permeability: Moderate over very slow
Landform: Divides
Parent material: Alluvium
Slope: 0 to 6 percent

Taxonomic class: Loamy, mixed, superactive, frigid, shallow Entic Durustolls

Typical pedon:
Farfeld loam, 750 feet west and 200 feet north of the southeast corner of sec. 4, T. 142 N., R. 99 W. (Colors are for dry soil unless otherwise stated.) (fig. 17)

A—0 to 4 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine, common medium, and few coarse roots throughout; neutral; clear smooth boundary.

Bw1—4 to 8 inches; brown (10YR 4/3) loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; many very fine, few fine, and few medium roots throughout; common very fine low continuity tubular pores; 10 percent angular gravel; neutral; clear smooth boundary.

Bw2—8 to 15 inches; brown (10YR 5/3) loam, brown (10YR 4/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; many very fine, few medium, and few fine roots throughout; many very fine low continuous tubular pores; 10 percent angular gravel; neutral; abrupt wavy boundary.

2Bqm—15 to 28 inches; strongly cemented silicrete; 5 percent fine earth fraction in fractures (vertical and horizontal) is light olive brown (2.5Y 5/3) clay loam, olive brown (2.5Y 4/3) moist; moderate medium angular blocky structure; hard, firm, sticky and plastic; common very fine and few fine roots in cracks; common distinct discontinuous clay films on faces of peds and in pores; 95 percent consolidated silicrete; slightly alkaline; clear wavy boundary.

2Bkqm—28 to 37 inches; strongly cemented indurated silicrete; 10 percent fine earth fraction in fractures (vertical and horizontal) is light yellowish brown (2.5Y 6/3) clay, light olive brown (2.5Y 5/3) moist; moderate fine angular blocky structure; hard, firm, sticky and plastic; common very fine roots in cracks; very few carbonate coats on rock fragments; strong effervescence; 90 percent consolidated silicrete; moderately alkaline; clear wavy boundary.

3Bt1—37 to 42 inches; light olive brown (2.5Y 5/4) gravelly clay, olive brown (2.5Y 4/4) moist; weak coarse prismatic structure parting to weak medium subangular blocky; hard, firm, sticky and plastic; few very fine roots throughout; few faint patchy clay films on faces of peds; common fine irregular prominent strong brown (7.5YR 5/8) iron concretions and common fine irregular distinct grayish brown (2.5Y 5/2) relict iron depletions; slight effervescence; 20 percent angular gravel (cemented material); moderately alkaline; gradual wavy boundary.

3Bt2—42 to 53 inches; light olive brown (2.5Y 5/4) clay, olive brown (2.5Y 4/4) moist; weak coarse prismatic structure parting to weak medium subangular blocky; hard, firm, sticky and plastic; few very fine roots throughout; common fine

moderate continuous tubular pores; common distinct discontinuous clay films on faces of peds and in pores; horizontal bands of concentrations and depletions ranging in thickness from 1/2 to 1 1/2 inches; common prominent strong brown

Figure 17. Typical pedon of Farfeld loam.

(7.5YR 5/8) iron concretions and many prominent olive gray (5Y 5/2) iron depletions; common nests of gypsum pedogenic throughout; moderately alkaline; gradual wavy boundary.

3C1—53 to 88 inches; gray (5Y 6/1) clay, dark gray (5Y 4/1) moist; massive; hard, firm, sticky and plastic; common fine moderate continuous tubular pores; common fine irregular prominent light olive brown (2.5Y 5/6) iron concretions; few nests of gypsum pedogenic throughout; very slight effervescence; moderately alkaline; gradual wavy boundary.

3C2—88 to 120 inches; light gray (5Y 7/2) silty clay, light olive gray (5Y 6/2) moist; massive; hard, firm, sticky and plastic; common fine irregular prominent brown (7.5YR 4/4) iron concretions; 98 to 105 inches has iron-manganese concretions; slightly alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 16 inches
Depth to the Bqm horizon: 10 to 20 inches

A horizon:
Value: 2 or 3 moist
Chroma: 2 or 3
Texture: loam or silt loam

Bw horizon:
Value: 3 to 6, 2 to 4 moist
Chroma: 2 to 4
Texture: loam or silt loam

2Bqm horizon:
Hue: 2.5Y, 10YR, or 5Y
Value: 4 or 5, 3 or 4 moist
Chroma: 4 or 5, 3 or 4 moist
Texture: clay loam, clay, or loam
Notes: It is moderately cemented to very strongly cemented. It has 0 to 10 percent material less than 2 mm.

2Bkqm horizon:
Hue: 2.5Y or 5Y
Value: 5 or 6, 4 or 5 moist
Chroma: 1 to 3
Notes: It is moderately cemented to very strongly cemented. It has 0 to 10 percent material less than 2 mm.

3Bt horizon:
Hue: 2.5Y, 5Y, or neutral
Value: 5 to 7, 4 to 6 moist
Chroma: 2 to 4
Texture: clay or silty clay loam
Notes: Rock fragments range from 0 to 25 percent with the higher amounts in the upper part.

3C horizon:
Hue: 5Y, 2.5Y, or neutral

Value: 5 to 7
Texture: clay, silty clay, or silty clay loam

Farland Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Landform: Alluvial flats and alluvial fans
Parent material: Alluvium
Slope: 0 to 6 percent

Taxonomic class: Fine-silty, mixed, superactive, frigid Typic Argiustolls

Typical pedon:
Farland silt loam, 1,490 feet north and 1,200 feet west of southeast corner of sec. 1, T. 139 N., R. 91 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 4 inches; dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; weak medium and fine prismatic and fine subangular blocky structure parting to moderate fine granular; slightly hard, friable; many roots; many fine pores; neutral; gradual wavy boundary.

Bt1—4 to 11 inches; grayish brown (10YR 5/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium and fine prismatic structure parting to strong medium and fine angular blocky; hard, friable; many roots; common fine pores; faint clay films on faces of peds; neutral; clear wavy boundary.

Bt2—11 to 18 inches; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; moderate medium and fine prismatic structure parting to strong medium and fine subangular blocky; hard, friable; common roots; common fine pores; faint patchy clay films; neutral; gradual wavy boundary.

Bk1—18 to 25 inches; light yellowish brown (2.5Y 6/4) silt loam, grayish brown (2.5Y 5/2) moist; weak coarse prismatic and moderate coarse subangular blocky structure; hard, friable; few roots; common fine pores; strong effervescence; slightly alkaline; clear wavy boundary.

Bk2—25 to 34 inches; light yellowish brown (2.5Y 6/4) loam, light olive brown (2.5Y 5/4) moist; weak coarse prismatic and moderate coarse and medium subangular blocky structure; friable; few roots; few fine pores; violent effervescence; common coarse masses of lime; moderately alkaline; gradual boundary.

C—34 to 60 inches; light brownish gray (2.5Y 6/2) stratified silt loam, loam, and silty clay loam, olive brown (2.5Y 4/4) moist; weak coarse to fine subangular blocky structure parting to weak thin platy; friable; few roots; few fine pores; strong effervescence; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 16 inches
Depth to lime: 8 to 30 inches
Notes: Some pedons have a Btk or BCk horizon.

A horizon:
Value: 4 or 5, 2 or 3 moist
Chroma: 2 or 3

Bt horizon:
Value: 4 to 6
Chroma: 2 to 4
Texture: silty clay loam or clay loam

Bk horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 5 to 7, 3 to 5 moist
Chroma: 2 to 4
Texture: loam, silt loam, or silty clay loam

C horizon:
Hue: 2.5Y or 5Y
Value: 4 to 6
Chroma: 2 to 4

Farnuf Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Alluvial flats, ridges, hills, divides, alluvial fans, and stream terraces
Parent material: Alluvium
Slope: 0 to 6 percent

Taxonomic class: Fine-loamy, mixed, superactive, frigid Typic Argiustolls

Typical pedon:
Farnuf loam, 2,000 feet west and 2,200 feet north of the southeast corner of sec. 25, T. 137 N., R. 73 W. (Colors are for dry soil unless otherwise stated.)

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; moderate medium subangular blocky structure parting to moderate fine granular; soft, friable, slightly sticky and slightly plastic; many fine and medium roots; many very fine and fine tubular and vesicular pores; neutral; clear smooth boundary.

Bt1—9 to 15 inches; dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 2/2) moist; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; slightly hard, friable, sticky and plastic; common fine and medium roots; many fine and medium tubular and vesicular pores; very few patchy faint dark grayish brown (10YR 4/2) clay films on faces of peds; slightly alkaline; clear wavy boundary.

Bt2—15 to 23 inches; brown (10YR 5/3) loam, dark brown (10YR 4/3) moist; moderate medium prismatic structure parting to moderate medium and fine subangular blocky; slightly hard, friable, sticky and plastic; common fine and medium roots; many fine and very fine vesicular and tubular pores; very few patchy faint dark grayish brown (10YR 4/2) clay films on faces of peds; slightly alkaline; clear wavy boundary.

Bk—23 to 34 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; moderate medium prismatic structure parting to weak medium and fine subangular blocky; hard, friable, sticky and plastic; common fine and medium roots; many fine and very fine vesicular and tubular pores; common fine masses of lime; violent effervescence; moderately alkaline; diffuse wavy boundary.

C—34 to 60 inches; light brownish gray (10YR 6/2) loam, grayish brown (10YR 4/2) moist; massive; hard, friable, sticky and plastic; common fine and very fine vesicular and tubular pores; strong effervescence; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 15 inches

Ap horizon:
Value: 4 or 5, 2 or 3 moist

Bt horizon:
Chroma: 2 to 4 moist

Bk horizon:
Value: 5 to 7, 4 to 6 moist
Texture: loam, clay loam, or silty clay loam

C horizon:
Value: 5 to 7, 4 to 6 moist
Texture: loam, silt loam, silty clay loam, or clay loam

Felor Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate over slow
Landform: Divides
Parent material: Alluvium
Slope: 6 to 9 percent

Taxonomic class: Fine-loamy, mixed, superactive, frigid Typic Argiustolls

Typical pedon:
Felor loam, 282 feet east and 72 feet south of the northwest corner of sec. 23, T. 18 N., R. 15 E. (Colors are for dry soil unless otherwise stated.)

Ap—0 to 5 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak very coarse subangular blocky and weak fine and medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; few pebbles; many fine and medium roots; slightly acid; abrupt wavy boundary.

A—5 to 11 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak coarse prismatic structure parting to weak fine and medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common fine roots; slightly acid; clear wavy boundary.

Bt—11 to 28 inches; brown (7.5YR 5/4) sandy clay loam, dark brown (7.5YR 4/4) moist; moderate fine prismatic structure parting to moderate fine and medium subangular blocky; hard, firm, slightly sticky and plastic; few fine roots; few pebbles; shiny film on faces of peds; slightly acid; gradual wavy boundary.

2Bw—28 to 34 inches; pale yellow (5Y 7/3) silty clay, pale olive (5Y 6/3) moist; strong fine and medium prismatic structure parting to moderate fine and medium blocky; hard, firm, sticky and plastic; shiny film on faces of peds; few fine roots; slightly alkaline; abrupt wavy boundary.

2Bk—34 to 39 inches; light brown (7.5YR 6/4) and pale yellow (5Y 7/3) silty clay, brown (7.5YR 5/4) and pale olive (5Y 6/3) moist; moderate fine and medium prismatic structure parting to weak medium subangular blocky; hard, firm, sticky and plastic; common fine and medium accumulations of lime; strong effervescence; moderately alkaline; abrupt wavy boundary.

2C—39 to 60 inches; white (2.5Y 8/2) and light reddish brown (5YR 6/3) silty clay, reddish brown (5Y 5/3) and light brownish gray (2.5Y 6/2) moist; few fine distinct yellowish brown (10YR 5/6) redoximorphic concentrations; massive; laminated; hard, firm, sticky and plastic; few fine accumulations of lime; strong effervescence; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 16 inches
Depth to clayey material: 20 to 35 inches

A horizon:
Value: 4 or 5, 2 or 3 moist

Bt horizon:
Hue: 7.5YR, 10YR, or 2.5Y
Value: 4 to 7, 3 to 6 moist
Chroma: 2 to 4
Texture: clay loam or sandy clay loam

2Bk horizon:
Value: 5 to 8, 4 to 6 moist
Chroma: 2 to 4
Notes: Some pedons have a Bk horizon.

2C horizon:
Value: 5 to 8, 4 to 6 moist

Flasher Series

Depth class: Shallow
Drainage class: Somewhat excessively drained
Permeability: Rapid
Landform: Hills, rises on pediments, and ridges
Parent Material: Residuum
Slope: 3 to 70 percent

Taxonomic class: Mixed, frigid, shallow Typic Ustipsamments

Typical pedon:
Flasher loamy fine sand, 1,110 feet north and 195 feet west of southeast corner of sec. 3, T. 134 N., R. 86 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 6 inches; dark grayish brown (10YR 4/2) loamy fine sand, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; many roots; quartz grains stained; slight effervescence; slightly alkaline; gradual wavy boundary.

AC—6 to 10 inches; light olive brown (2.5Y 5/4) loamy fine sand, olive brown (2.5Y 4/4) moist; weak fine subangular blocky structure; loose, nonsticky and

nonplastic; common roots; few small hard sandstone fragments; slight effervescence; slightly alkaline; gradual smooth boundary.

Cr—10 to 60 inches; light yellowish brown (2.5Y 6/4) soft sandstone that crushes to sand, olive brown (2.5Y 4/4) and light olive brown (2.5Y 5/4) moist; slight effervescence; moderately alkaline.

Range in Characteristics

Particle-size control section: loamy fine sand, fine sand, loamy sand, or sand
Depth to soft bedrock: 7 to 20 inches

A horizon:
Hue: 10YR or 2.5Y
Value: 4 to 6, 2 to 4 moist
Chroma: 2 or 3
Texture: loamy fine sand or loamy sand

AC horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 4 to 8, 3 to 6 moist
Chroma: 2 to 4
Texture: loamy fine sand, fine sand, or loamy sand

Cr horizon:
Notes: It is soft sandstone bedrock that crushes to fine sand, sand, or loamy fine sand.

Fleak Series

Depth class: Shallow
Drainage class: Excessively drained
Permeability: Rapid
Landform: Ridges and hills
Parent material: Residuum
Slope: 6 to 70 percent

Taxonomic class: Mixed, frigid, shallow Aridic Ustipsamments

Typical pedon:
Fleak loamy fine sand, 1,790 feet east and 1,580 feet south of the northwest corner of sec. 30, T. 129 N., R. 106 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 3 inches; grayish brown (10YR 5/2) loamy fine sand, very dark grayish brown (10YR 3/2) moist; very weak fine granular structure; loose; many matted roots; neutral; clear wavy boundary.

C1—3 to 8 inches; grayish brown (2.5Y 5/2) loamy fine sand, dark grayish brown (2.5Y 4/2) moist; single grain; loose; many roots; slight effervescence; slightly alkaline; gradual smooth boundary.

C2—8 to 17 inches; light brownish gray (2.5Y 6/2) loamy fine sand, grayish brown (2.5Y 5/2) moist; single grain; common to few roots; slight effervescence; slightly alkaline; clear wavy boundary

Cr—17 to 40 inches; pale yellow (2.5Y 7/3) soft layered sandstone, light olive brown (2.5Y 5/3) moist; hard, brittle, dry, very friable moist; a few roots in upper 8 inches; slight effervescence.

Range in Characteristics

Depth to lime: 0 to 6 inches
Depth to soft bedrock: 7 to 20 inches

A horizon:
Hue: 10YR, 7.5YR, or 2.5Y
Value: 4 to 6, 3 to 5 moist
Chroma: 2 or 3

C horizon:
Hue: 10YR or 2.5Y
Chroma: 2 to 4
Texture: fine sand or loamy fine sand

Cr horizon:
Notes: In some pedons fragments of hard sandstone are in the soft sandstone.

Gerda Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Very slow
Landform: Alluvial fans, hills, ridges, and alluvial flats
Parent material: Alluvium
Slope: 0 to 9 percent
Notes: These soils are saline-sodic.

Taxonomic class: Fine, smectitic, frigid Leptic Torrertic Natrustolls

Typical pedon:
Gerda loam, 590 feet north and 710 feet west of the southeast corner of sec. 29, T. 137 N., R. 100 W. (Colors are for dry soil unless otherwise stated.)

E—0 to 2 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; moderate medium and thick platy structure; hard, friable, slightly sticky and slightly plastic; many very fine and fine roots throughout; common very fine and fine tubular pores; neutral; abrupt wavy boundary.

Btn—2 to 11 inches; dark grayish brown (2.5Y 4/2) silty clay, very dark grayish brown (2.5Y 3/2) moist; moderate coarse columnar structure parting to strong medium subangular blocky; extremely hard, extremely firm, sticky and plastic; common very fine roots between peds; common very fine tubular pores; many continuous prominent clay films on faces of peds and in pores; moderately alkaline; clear wavy boundary.

Btkny—11 to 19 inches; light olive brown (2.5Y 5/3) silty clay, olive brown (2.5Y 4/3) moist; moderate coarse prismatic structure parting to moderate medium subangular blocky; hard, firm, sticky and plastic; common very fine roots between peds; common very fine tubular pores; common discontinuous distinct clay films on vertical and horizontal faces of peds; common fine irregular masses of gypsum; common fine irregular masses of lime; violent effervescence; strongly alkaline; gradual wavy boundary.

Bky—19 to 29 inches; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; moderate medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; common very fine roots throughout; common very fine tubular pores; common fine irregular masses of gypsum; common fine irregular masses of lime; violent effervescence; strongly alkaline; gradual wavy boundary.

Bk—29 to 44 inches; light brownish gray (2.5Y 6/2) silty clay, grayish brown (2.5Y 5/2) moist; weak fine and medium subangular blocky structure; hard, firm, sticky and plastic; few very fine tubular pores; common fine irregular masses of lime; violent effervescence; strongly alkaline; gradual wavy boundary.

C—44 to 80 inches; light brownish gray (2.5Y 6/2) silt loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine tubular pores; strong effervescence; strongly alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 16 inches
Depth to gypsum or other salts: 5 to 16 inches
Notes: Some uncultivated pedons have a thin A horizon.

E horizon:
Hue: 10YR or 2.5Y
Value: 5 or 6, 3 or 4 moist
Chroma: 2 or 3
Texture: loam or silt loam

Btn horizon:
Hue: 2.5Y or 10YR
Value: 4 or 5
Chroma: 2 or 3
Texture: silty clay, clay, silty clay loam, or clay loam

Btnky horizon:
Hue: 2.5Y, 5Y, or 10YR
Value: 5 or 7, 4 or 5 moist
Chroma: 2 to 4
Texture: silty clay, silty clay loam, clay loam, or clay

Bky and Bk horizons:
Hue: 2.5Y or 5Y
Chroma: 2 or 3
Texture: silty clay loam, clay loam, or silty clay

C horizon:
Hue: 2.5Y, 5Y, or 10YR
Value: 6 or 7, 4 or 5 moist
Chroma: 2 to 4
Texture: silt loam, loam, or sandy loam

Glendive Series

Depth class: Very deep
Drainage class: Well drained

Permeability: Moderately rapid
Landform: Flood plains
Parent material: Alluvium
Slope: 0 to 6 percent
Notes: These soils are calcareous.

Taxonomic class: Coarse-loamy, mixed, superactive, calcareous, frigid Aridic Ustifluvents

Typical pedon:
Glendive fine sandy loam, 1,920 feet west and 2,540 feet south of the northeast corner of sec. 34, T. 21 N., R. 2 E. (Colors are for dry soil unless otherwise stated.)

Ap—0 to 5 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; very hard, friable, slightly sticky and plastic; many very fine roots; strong effervescence; moderately alkaline; clear smooth boundary.

C1—5 to 10 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; very hard, friable, sticky and plastic; many very fine roots; many very fine pores; strong effervescence; moderately alkaline; gradual smooth boundary.

C2—10 to 16 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; weak coarse prismatic structure; slightly hard, friable, sticky and plastic; common very fine roots; common very fine pores; strong effervescence; strongly alkaline; gradual smooth boundary.

C3—16 to 60 inches; light brownish gray (10YR 6/2) fine sandy loam that consists of thin layers of loam, sandy loam and loamy fine sand, grayish brown (2.5Y 5/2) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common fine roots grading to few in lower part; common fine pores; strong effervescence; strongly alkaline.

Range in Characteristics

Ap horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 4 to 6, 3 to 5 moist
Chroma: 2 or 3
Texture: fine sandy loam or sandy loam

C horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 5 to 7, 4 to 6 moist
Chroma: 2 to 4
Texture: loam, silt loam, fine sandy loam, or sandy loam
Notes: It has thin layers of loam, sandy loam, silt loam, loamy sand, or loamy fine sand in the lower part.

Golva Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Alluvial flats, alluvial fans, hills, ridges, and knolls

Parent material: Alluvium
Slope: 0 to 15 percent

Taxonomic class: Fine-silty, mixed, superactive, frigid Typic Haplustolls

Typical pedon:
Golva silt loam, 1,630 feet north and 2,000 feet west of the southeast corner of sec. 36, T. 133 N., R. 104 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 5 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure parting to moderate medium granular; slightly hard, friable, slightly sticky and slightly plastic; many fine roots; neutral; gradual wavy boundary.

Bw1—5 to 15 inches; grayish brown (2.5Y 5/2) silt loam, very dark grayish brown (2.5Y 3/2) moist; moderate coarse and medium prismatic structure; slightly hard, friable, slightly sticky and slightly plastic; many fine roots; slightly alkaline; gradual wavy boundary.

Bw2—15 to 21 inches; light brownish gray (2.5Y 6/2) silt loam, dark grayish brown (2.5Y 4/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; strong effervescence; moderately alkaline; clear wavy boundary.

Bk1—21 to 32 inches; pale yellow (2.5Y 7/4) silt loam, olive brown (2.5Y 4/4) moist; moderate coarse prismatic structure parting to weak medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; discontinuous thin pebble line at bottom of horizon; common masses of carbonates; violent effervescence; moderately alkaline; clear smooth boundary.

Bk2—32 to 40 inches; pale yellow (5Y 8/3) silt loam, olive (5Y 5/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common masses of carbonates; violent effervescence; moderately alkaline; abrupt wavy boundary.

C—40 to 60 inches; pale yellow (5Y 8/3) silt loam, olive (5Y 5/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; strong effervescence; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 16 inches
Depth to lime: 10 to 22 inches
10 to 40 inch particle-size control section: 18 to 30 percent clay
Notes: The depth to siltstone or silty shale is greater than 40 inches.

A horizon:
Hue: 10YR or 2.5Y
Value: 4 or 5, 2 or 3 moist
Chroma: 2 or 3
Texture: silt loam or loam

Bw horizon:
Hue: 10YR or 2.5Y
Value: 4 to 6, 3 to 5 moist
Chroma: 2 or 3
Texture: silt loam or silty clay loam
Notes: In some pedons the Bw1 horizon contains carbonates.

Bk horizon:
Hue: 2.5Y or 5Y
Value: 6 to 8, 4 to 6 moist
Chroma: 2 to 4
Texture: silt loam or silty clay loam

C horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 5 to 8, 4 to 6 moist
Chroma: 2 to 4
Texture: silt loam, silty clay loam, or loam
Notes: Some pedons have sandy loam or silty clay material between 40 and 60 inches depth.

Grail Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Landform: Swales and alluvial flats
Parent material: Alluvium
Slope: 0 to 6 percent

Taxonomic class: Fine, smectitic, frigid Vertic Argiustolls

Typical pedon:
Grail silty clay loam, 900 feet west and 900 feet south of the center of sec. 18, T. 139 N., R. 91 W. (Colors are for dry soil unless otherwise stated.)

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) silty clay loam, very dark brown (10YR 2/2) moist; weak coarse and medium subangular blocky structure; soft, friable; many roots; many pores; neutral; abrupt smooth boundary.

A—5 to 10 inches; dark gray (10YR 4/1) silty clay loam, very dark brown (10YR 2/2) moist; weak medium prismatic structure parting to moderate coarse and medium subangular blocky; slightly hard, friable; many roots; many pores; neutral; gradual wavy boundary.

Bt1—10 to 13 inches; dark gray (10YR 4/1) silty clay loam, very dark brown (10YR 2/2) moist; weak medium prismatic structure parting to moderate coarse and medium subangular blocky and moderate fine granular; firm; common roots; few pores; faint clay films on faces of prisms and blocks; neutral; gradual smooth boundary.

Bt2—13 to 24 inches; grayish brown (10YR 5/2) silty clay, very dark grayish brown (10YR 3/2) moist; moderate coarse prismatic structure parting to strong medium and fine angular blocky; very hard, firm; few roots; few pores; clay films on faces of peds; neutral; clear wavy boundary.

Bk—24 to 52 inches; light brownish gray (2.5Y 6/2) silty clay loam, grayish brown (2.5Y 5/2) moist; very weak medium prismatic structure parting to moderate coarse and medium subangular blocky; hard, firm; few pores; strong effervescence; few small masses of lime; moderately alkaline; clear wavy boundary.

C—52 to 60 inches; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; weak medium subangular blocky structure; hard, firm; strong effervescence; few small masses of lime; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 16 to more than 40 inches
Notes: Some pedons have an AB, Btk, or BCk horizon.

Ap horizon:
Value: 3 or 4, 2 or 3 moist

Bt horizon:
Value: 3 to 5, 2 to 4 moist
Chroma: 1 to 3

Bk horizon:
Hue: 10YR or 2.5Y
Value: 4 to 7, 3 to 5 moist
Chroma: 3 to 4

Hanly Series

Depth class: Very deep
Drainage class: Somewhat excessively drained
Permeability: Rapid
Landform: Flood plains
Parent material: Alluvium
Slope: 0 to 6 percent

Taxonomic class: Sandy, mixed, frigid Aridic Ustifluvents

Typical pedon:
Hanly fine sandy loam, 100 feet south and 90 feet east of the northwest corner of sec. 27, T. 135 N., R. 105 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 5 inches; light brownish gray (2.5Y 6/2) fine sandy loam, dark grayish brown (2.5Y 4/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many fine and few coarse roots; slight effervescence; slightly alkaline; clear smooth boundary.

C1—5 to 14 inches; grayish brown (2.5Y 5/2) loamy sand, dark grayish brown (2.5Y 4/2) moist; single grain; loose, nonsticky and nonplastic; common fine and few large roots; dark and light colored sand grains have salt and pepper appearance; slight effervescence; slightly alkaline; abrupt smooth boundary.

C2—14 to 16 inches; light brownish gray (2.5Y 6/2) finely stratified fine sandy loam, dark grayish brown (2.5Y 4/2) moist; few brownish yellow (10YR 6/6) stains on faces of plate-like stratifications; massive; slightly hard, very friable, slightly sticky and nonplastic; common fine roots; slight effervescence; slightly alkaline; abrupt smooth boundary.

C3—16 to 60 inches; light brownish gray and grayish brown (2.5Y 6/2 and 5/2) finely stratified loamy fine sand and loamy sand with thin bands of loam and sand, dark grayish brown (2.5Y 4/2) moist; massive; soft, nonsticky and nonplastic; slight effervescence; slightly alkaline.

Range in Characteristics

10 to 40 inch particle-size control section: loamy fine sand or loamy sand averaging less than 10 percent clay It is stratified and contains one or more very thin layers of loam, silt loam, or very fine sandy loam.
Notes: Some pedons have thin Ab horizons below a depth of 40 inches.

A horizon:
Hue: 2.5Y or 10YR
Value: 5 to 7, 4 to 6 moist
Chroma: 2 or 3
Texture: fine sandy loam or sandy loam

C horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 5 to 7, 4 to 6 moist
Chroma: 2 to 4
Notes: Some pedons contain thin coarse sand layers below a depth of 30 inches.

Haplustolls

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Stream terraces
Parent material: Alluvium
Slope: 0 to 6 percent

Taxonomic class: Haplustolls

Typical pedon:
Haplustolls gravelly loam, 2,050 feet west and 1,000 feet north of the southeast corner of sec. 13, T. 143 N., R. 100 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 12 inches; brown (10YR 4/3) gravelly loam, dark brown (10YR 3/3) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; common very fine tubular pores; 15 percent subangular-shaped gravel; neutral; clear smooth boundary.

C1—12 to 19 inches; light olive brown (2.5Y 5/4) very gravelly sandy loam, olive brown (2.5Y 4/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; 40 percent subangular-shaped gravel; common fine irregular-shaped masses of lime; slight effervescence; slightly alkaline; clear smooth boundary.

2C2—19 to 48 inches; pale yellow (5Y 7/4) fine sandy loam, olive (5Y 5/4) moist; massive; soft, very friable, nonsticky and nonplastic; neutral; gradual wavy boundary.

2C3—48 to 60 inches; light olive gray (5Y 6/2) fine sandy loam, olive gray (5Y 5/2) moist; massive; soft, very friable, nonsticky and nonplastic; neutral.

Range in Characteristics

Mollic epipedon thickness: 7 to 16 inches

A horizon:
Hue: 10YR or 2.5Y
Value: 4 or 5, 3 or 4 moist
Chroma: 2 or 3
Texture: loam or sandy loam
Notes: Rock fragments range from 0 to 25 percent.

C horizon:
Hue: 10YR or 2.5Y
Value: 5 or 6, 4 or 5 moist
Chroma: 2 to 4
Texture: sandy loam, loam, or fine sandy loam
Notes: Rock fragments range from 15 to 50 percent.

2C horizon:
Hue: 2.5Y or 5Y
Value: 5 to 7, 4 to 6 moist
Chroma: 2 to 4
Texture: fine sandy loam, loam, or sandy loam

Harriet Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Slow
Landform: Drainageways and alluvial flats
Parent material: Alluvium
Slope: 0 to 3 percent
Notes: These soils are saline-sodic.

Taxonomic class: Fine, smectitic, frigid Typic Natraquolls

Typical pedon:
Harriet silt loam, 1,650 feet east and 40 feet north of the southwest corner of sec. 34, T. 139 N., R. 79 W. (Colors are for dry soil unless otherwise stated.)

E—0 to 2 inches; very dark gray (N 3/0) silt loam, gray (N 5/0 and 6/0) dry; weak thick and medium platy structure; friable; many fine roots; common fine pores; few salt crystals visible when soil is dry; moderately alkaline; abrupt wavy boundary.

Btn—2 to 6 inches; black (N 2/0) clay loam, dark gray (N 4/0) dry; moderate medium columnar structure; extremely hard, firm; coatings of very dark gray (N 3/0) on faces of peds; gray (N 5/0 dry) on tops and sides of columns; slight effervescence on inside of columns; strongly alkaline; clear wavy boundary.

Btnz—6 to 18 inches; very dark grayish brown (2.5Y 3/2) clay loam, grayish brown (2.5Y 5/2) dry; moderate coarse prismatic and weak medium subangular blocky structure; very hard, firm; few roots; common medium pores; common fine white salt crystals; strong effervescence; strongly alkaline; gradual wavy boundary.

Bz1—18 to 28 inches; dark grayish brown (2.5Y 4/2) loam, grayish brown and light brownish gray (2.5Y 5/2 and 6/2) dry; weak coarse prismatic structure; very hard, firm; few fine roots; few medium and fine pores; fine salt crystals visible when dry; violent effervescence; strongly alkaline; abrupt smooth boundary.

2Bz2—28 to 38 inches; light olive brown (2.5Y 5/3) very fine sandy loam, light yellowish brown (2.5Y 6/3) dry; weak coarse prismatic and weak coarse and medium subangular blocky structure; very hard, friable; few fine pores; common very fine salt crystals that are visible when dry; strong effervescence; strongly alkaline; abrupt smooth boundary.

3Ab—38 to 40 inches; very dark gray (N 3/0) clay loam, dark gray (N 4/0) dry; few medium distinct olive brown (2.5Y 4/3) redoximorphic concentrations; weak coarse prismatic structure; very hard, firm; few fine roots; strong effervescence; strongly alkaline; abrupt smooth boundary.

3C—40 to 60 inches; olive brown (2.5Y 4/3) stratified loam and clay loam, light yellowish brown (2.5Y 6/3) dry; weak coarse and medium subangular blocky structure; very hard, friable; strong effervescence; strongly alkaline.

Range in Characteristics

Notes: Some pedons have an A, Bk, BCk, or C horizon.

Btn horizon:
Hue: 10YR, 2.5Y, or neutral
Value: 2 to 4 moist
Chroma: 0 to 2

Bz and 2Bz horizons:
Hue: 2.5Y or 5Y
Value: 3 to 5 moist

3C horizon:
Hue: 2.5Y or 5Y
Value: 3 to 5 moist
Notes: Some pedons do not have a 3C horizon.

Havre Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Flood plains
Parent material: Alluvium
Slope: 0 to 6 percent
Notes: These soils are calcareous.

Taxonomic class: Fine-loamy, mixed, superactive, calcareous, frigid Aridic Ustifluvents

Typical pedon:
Havre silt loam, 2,200 feet south and 810 feet west of northeast corner of sec. 27, T. 143 N., R. 105 E. (Colors are for dry soil unless otherwise stated.)

A—0 to 6 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; weak thin platy structure; soft, very friable, sticky and plastic; common very fine and fine roots; few very fine pores; strong effervescence; slightly alkaline; clear smooth boundary.

C1—6 to 10 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure parting to weak

very thin platy; slightly hard, very friable, sticky and plastic; common very fine and fine roots; common very fine pores; thin dark layers throughout; strong effervescence; slightly alkaline; abrupt smooth boundary.

C2—10 to 25 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure parting to moderate thin platy; slightly hard, very friable, sticky and plastic; common fine roots; common very fine pores; thin dark layers throughout; violent effervescence; slightly alkaline; abrupt smooth boundary.

C3—25 to 32 inches; light brownish gray (2.5Y 6/2) loam, grayish brown (2.5Y 5/2) moist; massive; soft, very friable, slightly sticky and slightly plastic; few very fine roots; few very fine pores; violent effervescence; moderately alkaline; clear wavy boundary.

C4—32 to 54 inches; light brownish gray (2.5Y 6/2) stratified silt loam and silty clay loam, dark grayish brown (2.5Y 4/2) moist; massive with strata separating to weak thin plates; slightly hard, very friable, sticky and plastic; few very fine roots; few very fine pores; strong effervescence; moderately alkaline; clear wavy boundary.

C5—54 to 60 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; massive; soft, very friable, slightly sticky and slightly plastic; thin dark layers throughout; violent effervescence; slightly alkaline.

Range in Characteristics

A horizon:
Hue: 10YR or 2.5Y
Value: 5 or 6, 4 or 5 moist
Chroma: 2 or 3
Texture: loam or silt loam

C horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 5 or 6
Chroma: 2 or 3
Texture: loam or silt loam with thin strata of silty clay loam
Notes: It has 15 to 60 percent rock fragments below a depth of 40 inches in some pedons.

Havrelon Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Flood plains
Parent material: Alluvium
Slope: 0 to 2 percent
Notes: These soils are calcareous.

Taxonomic class: Fine-loamy, mixed, superactive, calcareous, frigid Typic Ustifluvents

Typical pedon:
Havrelon silt loam, 2,565 feet south and 75 feet east of the northwest corner of sec. 2, T. 139 N., R. 81 W. (Colors are for dry soil unless otherwise stated.)

Ap—0 to 13 inches; light brownish gray (2.5Y 6/2) silt loam, dark grayish brown (2.5Y 4/2) moist; moderate medium granular structure; very friable; common roots; common fine pores; slight effervescence; slightly alkaline; abrupt smooth boundary.

C1—13 to 18 inches; grayish brown (2.5Y 5/2) silty clay loam, very dark grayish brown (2.5Y 3/2) moist; moderate medium granular structure; contains a thin stratification; friable; common fine and few large roots; common fine pores; slight effervescence; slightly alkaline; abrupt smooth boundary.

C2—18 to 26 inches; light brownish gray (2.5Y 6/2) silt loam, dark grayish brown (2.5Y 4/2) moist; moderate medium granular structure; very friable; few roots; slight effervescence; slightly alkaline; clear smooth boundary.

C3—26 to 40 inches; thinly stratified light gray (2.5Y 7/2) and light brownish gray (2.5Y 6/2) very fine sandy loam, dark grayish brown (2.5Y 4/2) moist; massive; very friable; thin strata of fine sandy loam and silty clay loam; slight effervescence; slightly alkaline; clear smooth boundary.

C4—40 to 46 inches; thinly stratified olive gray (5Y 5/2) silt loam and silty clay loam, olive gray (5Y 4/2) moist; common medium distinct reddish yellow (5YR 7/8) redoximorphic concentrations; massive; friable; slight effervescence; slightly alkaline; clear smooth boundary.

C5—46 to 60 inches; pale yellow (5Y 7/3) very fine sandy loam, olive (5Y 4/3) moist; massive; very friable; slight effervescence; slightly alkaline.

Range in Characteristics

Salinity: The soil is saline in some map units.
Notes: Some pedons have an Ab horizon.

Ap horizon:
Hue: 10YR or 2.5Y
Value: 3 or 4 moist

C horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 3 to 5 moist

Haydraw Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Landform: Alluvial fans and paleoterrraces
Parent material: Alluvium
Slope: 0 to 6 percent

Taxonomic class: Fine-silty, mixed, superactive, frigid Aridic Calciustolls

Typical pedon:
Haydraw silt loam, 1,675 feet west and 610 feet south of the northeast corner of sec. 2, T. 146 N., R. 102 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure parting to moderate

medium granular; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; slight effervescence; slightly alkaline; clear smooth boundary.

Bk1—6 to 18 inches; grayish brown (10YR 5/2) silt loam, dark grayish brown (10YR 4/2) moist; moderate coarse prismatic structure parting to moderate coarse subangular blocky; hard, firm, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores; strong effervescence; few fine masses of carbonates; moderately alkaline; clear wavy boundary.

Bk2—18 to 28 inches; light yellowish brown (2.5Y 6/3) silt loam, light olive brown (2.5Y 5/3) moist; moderate coarse prismatic structure parting to moderate coarse subangular blocky; hard, firm, slightly sticky and slightly plastic; common very fine roots; many very fine tubular pores; violent effervescence; few fine masses of carbonates; moderately alkaline; clear wavy boundary.

Bk3—28 to 41 inches; light yellowish brown (2.5Y 6/3) silt loam, light olive brown (2.5Y 5/3) moist; moderate coarse prismatic structure parting to moderate coarse subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores; violent effervescence; few fine masses of carbonates; moderately alkaline; gradual wavy boundary.

BCk—41 to 58 inches; light yellowish brown (2.5Y 6/4) silt loam, olive brown (2.5Y 4/4) moist; weak coarse prismatic structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; strong effervescence; few fine masses of carbonates; moderately alkaline; gradual wavy boundary.

C—58 to 80 inches; light yellowish brown (2.5Y 6/4) silt loam, olive brown (2.5Y 4/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine tubular pores; strong effervescence; moderately alkaline.

Range in Characteristics:

Depth to the calcic horizon: less than 16 inches
Notes: Some pedons have an ABk horizon or a calcareous Bw horizon.

A horizon:
Hue: 10YR or 2.5Y
Value: 4 or 5
Chroma: 2 or 3

Bk horizon:
Value: 5 to 7
Chroma: 2 to 4
Texture: silt loam or silty clay loam

C horizon:
Hue: 10YR or 2.5Y
Value: 6 or 7, 4 or 5 moist
Chroma: 2 to 4
Texture: silt loam, silty clay loam, or very fine sandy loam

Heil Series

Depth class: Very deep
Drainage class: Poorly drained

Permeability: Very slow
Landform: Depressions
Parent material: Alluvium
Slope: 0 to 1 percent
Notes: These soils are saline-sodic.

Taxonomic class: Fine, smectitic, frigid Typic Natraquerts

Typical pedon:
Heil silt loam, 650 feet west and 20 feet south of the northeast corner of sec. 14, T. 135 N., R. 100 W. (Colors are for dry soil unless otherwise stated.)

E—0 to 3 inches; dark gray (10YR 4/1) silt loam, light gray (10YR 6/1) dry; common fine distinct brown (10YR 5/3) and dark brown (10YR 4/3) redoximorphic concentrations; moderate fine subangular blocky and weak thin platy structure; firm; many roots; many fine pores; neutral; abrupt wavy boundary.

Btn—3 to 7 inches; very dark gray (2.5Y 3/1) silty clay, gray (2.5Y 5/1) dry; strong coarse and medium columnar structure parting to strong coarse medium and fine angular blocky; extremely hard, very firm; roots in cracks; few pores; slightly alkaline; gradual smooth boundary.

Btng—7 to 24 inches; very dark gray (5Y 3/1) silty clay, gray (5Y 5/1) dry; strong very coarse prismatic structure parting to strong coarse and medium angular blocky; extremely hard, very firm; few roots; surface of peds has a glossy appearance when moist; few tongues of E (5Y 6/1) dry; moderately alkaline; gradual wavy boundary.

Bg—24 to 38 inches; dark gray (5Y 4/1) silty clay, light gray (5Y 6/1) dry; moderate coarse angular blocky structure; extremely hard, very firm; strong effervescence; moderately alkaline; gradual wavy boundary.

Byg1—38 to 44 inches; dark gray (5Y 4/1) silty clay, light gray (5Y 6/1) dry; weak coarse and fine angular blocky structure; very firm; few fine gypsum crystals; strong effervescence; moderately alkaline; diffuse wavy boundary.

Byg2—44 to 52 inches; olive (5Y 4/3) silty clay, pale olive (5Y 6/3) dry; weak coarse subangular blocky structure; very firm; common gypsum crystals; strong effervescence; strongly alkaline; gradual wavy boundary.

Cg—52 to 60 inches; olive (5Y 5/4) silty clay, pale olive (5Y 6/3) dry; many strong brown (7.5YR 5/6) and yellowish brown (10YR 5/6) redoximorphic concentrations and gray (5Y 5/1) redoximorphic depletions; massive; few large white masses of lime; strong effervescence; strongly alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 45 inches
Depth to lime: 12 to 40 inches
Depth to the Btn horizon: 1 to 4 inches
Notes: Some pedons have an A horizon up to 3 inches thick. Some pedons have a Btkn or Bk horizon.

E horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 2 to 5, 4 to 8 dry
Chroma: 1 or 2

Btn horizon:
Hue: 10YR, 2.5Y, or 5Y

Value: 2 to 4, 4 to 6 dry
Chroma: 1 or 2
Texture: silty clay or clay

Bg and Byg horizons:
Hue: 2.5Y or 5Y
Value: 3 to 5, 4 to 7 dry
Texture: silty clay, clay, silty clay loam, or clay loam

Cg horizon:
Hue: 2.5Y or 5Y
Value: 3 to 5, 5 to 7 dry
Chroma: 1 to 4
Texture: silty clay, clay, silty clay loam, or clay loam

Janesburg Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Very slow
Landform: Pediments, divides, knolls, hills, escarpments, and ridges
Parent material: Residuum
Slope: 0 to 25 percent
Notes: These soils are sodic.

Taxonomic class: Fine, smectitic, frigid Typic Natrustrolls

Typical pedon:
Janesburg silt loam, 2,050 feet south and 50 feet east of the northwest corner of sec. 36, T. 137 N., R. 87 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; moderate fine and medium subangular blocky structure; hard, firm, sticky and plastic; many fine and very fine roots; common fine pores; slightly acid; clear wavy boundary.

E—8 to 10 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure parting to weak medium platy; slightly hard, friable, sticky and plastic; many fine and very fine roots; many fine pores; slightly acid; abrupt wavy boundary.

Btn1—10 to 16 inches; grayish brown (10YR 5/2) silty clay, very dark grayish brown (10YR 3/2) moist; strong medium columnar structure parting to strong fine angular blocky; very hard, very firm, very sticky and very plastic; common fine and very fine roots between peds; common fine pores; many faint dark grayish brown (10YR 4/2) dry clay films on faces of peds; column tops coated with light brownish gray (10YR 6/2) dry E material; slightly alkaline; clear wavy boundary.

Btn2—16 to 21 inches; light brownish gray (10YR 6/2) silty clay, dark grayish brown (2.5Y 4/2) moist; moderate medium prismatic structure parting to moderate medium angular blocky; very hard, very firm, very sticky and very plastic; few fine roots; common fine pores; few faint grayish brown (2.5Y 5/2) dry clay films on faces of peds; slightly alkaline; abrupt wavy boundary.

BCk—21 to 26 inches; light yellowish brown (2.5Y 6/4) silt loam, olive brown (2.5Y 4/4) moist; moderate medium prismatic structure parting to weak medium subangular blocky; hard, firm, slightly sticky and slightly plastic; few fine roots;

few fine pores; few medium irregular masses of lime; strong effervescence; moderately alkaline; clear wavy boundary.

Cr—26 to 60 inches; light yellowish brown (2.5Y 6/4) and olive yellow (2.5Y 6/6) soft siltstone bedrock, olive brown (2.5Y 4/4) and light olive brown (2.5Y 5/6) moist; common irregular masses of lime between siltstone stratifications; strong effervescence; moderately alkaline.

Range in Characteristics

Depth to gypsum or other salts: More than 16 inches
Depth to soft bedrock: 20 to 40 inches

A horizon:
Value: 4 or 5, 2 or 3 moist
Chroma: 2 or 3
Texture: silt loam, loam, or fine sandy loam

E horizon:
Value: 5 or 6, 3 or 4 moist
Chroma: 1 to 3
Texture: silt loam, loam, or fine sandy loam

Btn horizon:
Value: 4 to 6, 3 to 5 moist
Chroma: 2 to 4
Texture: silty clay, clay, silty clay loam, or clay loam

BCk horizon:
Hue: 2.5Y or 5Y
Value: 5 to 7, 4 to 6 moist
Chroma: 2 to 4
Texture: loam, silt loam, clay loam, silty clay loam, or silty clay

Cr horizon:
Notes: It is soft shale, siltstone, or mudstone.

Kirby Series

Depth class: Very deep
Drainage class: Excessively drained
Permeability: Rapid
Landform: Hills and ridges
Parent material: Residuum
Slope: 6 to 70 percent
Notes: These soils are calcareous.

Taxonomic class: Loamy-skeletal over fragmental, mixed, superactive, calcareous, frigid Aridic Ustorthents

Typical pedon:
Kirby very channery loam, 700 feet north and 700 feet east of the southwest corner of sec. 35, T. 7 S., R. 42 E. (Colors are for dry soil unless otherwise stated.)

A—0 to 4 inches; reddish brown (5YR 5/4) very channery loam, reddish brown (5YR 4/4) moist; weak fine granular structure; soft, very friable, slightly sticky and

slightly plastic; many fine and very fine roots; 40 percent porcelanite channers; slight effervescence; moderately alkaline; clear wavy boundary.

Bk—4 to 12 inches; reddish brown (5YR 5/4) extremely channery loam, reddish brown (5YR 4/4) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots between and matted on top of channers; 70 percent porcelanite channers, 5 percent flagstones; common distinct lime coats on rock fragments; strong effervescence; moderately alkaline; gradual wavy boundary.

2C—12 to 60 inches; light red (2.5YR 6/6) hard, shattered and fractured porcelanite, red (2.5YR 5/6) moist; few fine roots in cracks; common faint lime coats on lower surfaces of fragments in the upper few inches of the horizon.

Range in Characteristics

Depth to fragmental material: 11 to 20 inches
10 to 40 inch particle-size control section: 40 to 90 percent porcelanite rock fragments

A horizon:
Hue: 5YR or 7.5YR
Value: 5 or 6, 4 or 5 moist
Chroma: 3 to 6
Notes: Rock fragments range from 15 to 60 percent. The fragments are 0 to 10 percent flagstones and stones and 15 to 70 percent channers.

Bk horizon:
Hue: 2.5YR, 5YR, or 7.5YR
Value: 5 to 7, 4 to 6 moist
Chroma: 3 to 6
Texture: loam or sandy loam
Notes: Rock fragments range from 40 to 90 percent. The fragments are 5 to 20 percent flagstones and cobbles and 35 to 70 percent channers.

2C horizon:
Notes: It consists of highly fractured and displaced porcelanite. The fragments are flagstones, stones, and channers. Rock fragments range from 90 to 95 percent.

Korell Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Flood plains
Parent material: Alluvium
Slope: 0 to 2 percent

Taxonomic class: Fine-loamy, mixed, superactive, frigid Fluventic Haplustolls

Typical pedon:
Korell silt loam, 2,200 feet east and 50 feet south of the northwest corner of sec. 36, T. 138 N., R. 86 W. (Colors are for dry soil unless otherwise stated.)

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak medium prismatic structure parting to weak medium

subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine pores; slightly alkaline; abrupt smooth boundary.

Bw—8 to 15 inches; light olive brown (2.5Y 5/3) loam, olive brown (2.5Y 4/3) moist; weak medium prismatic structure parting to weak medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine pores; strong effervescence; moderately alkaline; clear wavy boundary.

Bk—15 to 27 inches; light yellowish brown (2.5Y 6/3) loam, olive brown (2.5Y 4/3) moist; weak coarse prismatic structure parting to weak medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine pores; common fine irregularly shaped masses of lime; violent effervescence; moderately alkaline; abrupt smooth boundary.

Ab—27 to 32 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak coarse prismatic structure parting to weak medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine pores; many fine irregularly shaped masses of lime; violent effervescence; moderately alkaline; clear smooth boundary.

Bk'—32 to 48 inches; light yellowish brown (2.5Y 6/3) silt loam, olive brown (2.5Y 4/3) moist; weak coarse prismatic structure parting to weak medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine pores; many fine irregularly shaped masses of lime; violent effervescence; moderately alkaline; gradual wavy boundary.

C—48 to 60 inches; light yellowish brown (2.5Y 6/3) stratified silt loam, olive brown (2.5Y 4/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine pores; common fine irregularly shaped masses of lime; violent effervescence; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 15 inches
Notes: The organic carbon decreases irregularly with depth. An Ab horizon up to 6 inches thick is allowed.

A horizon:
Value: 4 or 5, 2 or 3 moist
Chroma: 1 or 2
Texture: loam or silt loam

Bw horizon:
Hue: 10YR or 2.5Y
Value: 5 or 6
Chroma: 2 or 3
Texture: loam or silt loam

BCk, Bk, or C horizons:
Hue: 10YR or 2.5Y
Value: 5 or 6, 4 or 5 moist
Chroma: 2 or 3
Texture: loam or silt loam
Notes: The C horizon is stratified.

Kremlin Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Alluvial flats, alluvial fans, hills, stream terraces, ridges, escarpments, and paleoterraces
Parent material: Alluvium
Slope: 0 to 25 percent

Taxonomic class: Fine-loamy, mixed, superactive, frigid Aridic Haplustolls

Typical pedon:
Kremlin loam, 1,000 feet south and 1,700 feet east of the northwest corner of sec. 23, T. 30 N., R. 10 E. (Colors are for dry soil unless otherwise stated.)

Ap—0 to 6 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, sticky and plastic; many fine and very fine roots; neutral; abrupt smooth boundary.

A—6 to 11 inches; dark grayish brown (2.5Y 4/2) loam, very dark grayish brown (2.5Y 3/2) moist; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; slightly hard, very friable, sticky and plastic; many very fine roots; many very fine pores; neutral; clear smooth boundary.

Bw—11 to 19 inches; grayish brown (2.5Y 5/2) loam, dark grayish brown (2.5Y 4/2) moist; weak medium subangular blocky structure; slightly hard, friable, sticky and plastic; many very fine roots; many very fine pores; neutral; clear smooth boundary.

Bk1—19 to 31 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/4) moist; weak fine subangular blocky structure; hard, friable, sticky and plastic; many very fine roots; many very fine pores; few fine masses of lime; strong effervescence; moderately alkaline; clear smooth boundary.

Bk2—31 to 60 inches; light yellowish brown (2.5Y 6/4) loam, grayish brown (2.5Y 5/2) moist; weak fine subangular blocky structure; hard, friable, sticky and plastic; common very fine roots; common very fine pores; common fine masses of lime; violent effervescence; moderately alkaline; gradual boundary.

Range in Characteristics

Mollic epipedon thickness: 7 to 15 inches
Depth to the Bk horizon: 10 to 24 inches

A horizons:
Value: 4 or 5, 3 or 4 moist
Chroma: 2 or 3
Texture: loam or silt loam

Bw horizon:
Hue: 10YR or 2.5Y
Value: 4 to 6, 3 to 5 moist
Chroma: 2 to 4
Texture: loam, silt loam, or clay loam

Bk horizon:
Hue: 10YR, 2.5Y, or 5Y

Value: 5 to 8, 4 to 6 moist
Chroma: 2 to 4
Texture: loam, silt loam, or clay loam

Lallie Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Slow
Landform: Drainageways
Parent material: Alluvium
Slope: 0 to 2 percent
Notes: These soils are calcareous.

Taxonomic class: Fine, smectitic, calcareous, frigid Vertic Fluvaquents

Typical pedon:
Lallie silty clay loam, 2,630 feet east and 1,300 feet south of the northwest corner of sec. 21, T. 151 N., R. 61 W. (Colors are for moist soil unless otherwise stated.)

A—0 to 2 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate medium and fine granular structure; slightly hard, friable, sticky and plastic; many roots; common fine flecks of salt; strong effervescence; slightly alkaline; abrupt smooth boundary.

Cg —2 to 24 inches; dark gray (5Y 4/1) silty clay loam, light gray and gray (5Y 6/1) dry; common medium prominent dark yellowish brown (10YR 4/4) redoximorphic concentrations; weak coarse prismatic structure parting to moderate fine subangular blocky; slightly hard, friable, sticky and plastic; common fine roots; few fine flecks of salt; violent effervescence; slightly alkaline; abrupt wavy boundary.

Ab—24 to 32 inches; black (N 2/0) silty clay, very dark gray (5Y 3/1) dry; weak coarse prismatic structure parting to moderate medium and fine subangular blocky; hard, firm, very sticky and very plastic; few fine roots; common fine flecks of salt; few snail shell fragments; strong effervescence; moderately alkaline; gradual wavy boundary.

Cg'—32 to 60 inches; olive gray (5Y 4/2) silty clay, light gray and gray (5Y 6/1) dry; common fine prominent yellowish brown (10YR 5/4) redoximorphic concentrations; massive; very hard, very firm, very sticky and very plastic; few flecks of salt; common snail fragments; strong effervescence; slightly alkaline.

Range in Characteristics

10 to 40 inch particle-size control section average: 35 to 60 percent clay
Notes: Some pedons have an O horizon.

A horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 2 to 4, 3 to 6 dry
Chroma: 1 or 2

Cg horizon:
Hue: 2.5Y, 5Y, or neutral
Value: 3 to 6, 4 to 8 dry
Chroma: 0 to 2
Texture: silty clay loam, silty clay, or clay

Lambert Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Landform: Alluvial fans
Parent material: Alluvium
Slope: 0 to 15 percent
Notes: These soils are calcareous.

Taxonomic class: Fine-silty, mixed, superactive, calcareous, frigid Typic Ustorthents

Typical pedon:
Lambert silt loam, 550 feet west and 600 feet north of the south 1/4 corner of sec. 7, T. 1 S., R. 27 E. (Colors are for dry soil unless otherwise stated.)

A—0 to 5 inches; grayish brown (2.5Y 5/2) silt loam, dark grayish brown (2.5Y 4/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine interstitial pores; slight effervescence; moderately alkaline; gradual boundary.

C1—5 to 22 inches; light brownish gray (2.5Y 6/2) silt loam, dark grayish brown (2.5Y 4/2) moist; weak medium prismatic structure grading with increased depth to massive; many grading to few very fine roots; common very fine and fine tubular pores; strong effervescence; moderately alkaline; gradual boundary.

C2—22 to 36 inches; light olive gray (5Y 6/2) silt loam, olive gray (5Y 4/2) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine and fine tubular pores; strong effervescence; moderately alkaline; gradual boundary.

C3—36 to 60 inches; light olive gray (5Y 6/2) very fine sandy loam, olive gray (5Y 4/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; strong effervescence.

Range in Characteristics

A horizon:
Hue: 5Y, 2.5Y, or 10YR
Value: 5 or 6
Chroma: 2 or 3

C horizon:
Hue: 5Y, 2.5Y, or 10YR
Value: 6 or 7
Chroma: 2 or 3

Lawther Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Landform: Alluvial flats
Parent material: Alluvium
Slope: 0 to 2 percent
Notes: These soils are calcareous.

Taxonomic class: Fine, smectitic, frigid Udic Haplusterts

Typical pedon:
Lawther silty clay, 2,195 feet south and 1,440 feet east of the northwest corner of sec. 25, T. 131 N., R. 98 W. (Colors are for dry soil unless otherwise stated.)

Ap—0 to 4 inches; dark grayish brown (2.5Y 4/2) silty clay, very dark grayish brown (2.5Y 3/2) moist; weak medium and coarse subangular blocky structure parting to moderate medium granular; very hard, firm, sticky and very plastic; common very fine pores; slightly alkaline; abrupt smooth boundary.

A—4 to 10 inches; dark grayish brown (2.5Y 4/2) silty clay, very dark grayish brown (2.5Y 3/2) moist; moderate coarse subangular blocky structure; very hard, very firm, sticky and very plastic; common very fine roots; common very fine pores; slightly alkaline; clear wavy boundary.

Bss1—10 to 21 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; weak coarse prismatic structure parting to moderate fine and medium subangular blocky; very hard, firm, very sticky and very plastic; common very fine roots; common very fine pores; very dark grayish brown (2.5Y 3/2) coatings on faces of peds; 1 inch wide cracks filled with A horizon material; common slickensides; very slight effervescence; slightly alkaline; gradual wavy boundary.

Bss2—21 to 33 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; weak coarse and medium subangular blocky structure parting to moderate fine subangular blocky; very hard, firm, very sticky and very plastic; few very fine roots; common very fine pores; 1/2 inch wide cracks filled with A horizon material; common slickensides; few medium irregularly shaped masses of lime; strong effervescence; moderately alkaline; clear wavy boundary.

Bk—33 to 47 inches; light brownish gray (2.5Y 6/2) silty clay, dark grayish brown (2.5Y 4/2) moist; weak coarse subangular blocky structure; very hard, firm, very sticky and very plastic; few very fine roots; common very fine pores; 1/2 inch wide cracks filled with A horizon material; common slickensides; common fine irregularly shaped masses of lime; strong effervescence; moderately alkaline; abrupt wavy boundary.

C—47 to 60 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; weak coarse prismatic structure; very hard, firm, very sticky and very plastic; few very fine roots; many very fine pores; common fine irregularly shaped masses of lime; strong effervescence; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 45 inches
Depth to lime: 0 to 30 inches
Notes: When the soil is dry, cracks 1/2 to 2 inches wide and several feet long extend downward through the Bss horizon. Some pedons have a By horizon up to 15 inches thick.

A horizon:
Hue: 10YR or 2.5Y
Value: 3 to 5, 2 or 3 moist

Bss horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 3 to 6, 2 to 4 moist

Chroma: 1 to 3
Texture: clay, silty clay, or silty clay loam

Bk horizon:
Hue: 2.5Y or 5Y
Value: 4 to 6, 2 to 5 moist
Chroma: 1 or 2
Texture: silty clay, clay, or silty clay loam
Notes: Some pedons do not have a Bk horizon.

C horizon:
Hue: 2.5Y or 5Y
Value: 4 to 7, 3 to 6 moist
Chroma: 1 to 3
Texture: clay loam, silty clay, clay, or silty clay loam

Lefor Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Landform: Pediments
Parent material: Residuum
Slope: 0 to 6 percent

Taxonomic class: Fine-loamy, mixed, semiactive, frigid Typic Argiustolls

Typical pedon:
Lefor fine sandy loam, 2,555 feet south and 290 feet east of the northwest corner of sec. 13, T. 137 N., R. 94 W. (Colors are for dry soil unless otherwise stated.)

Ap—0 to 7 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure parting to moderate medium and fine granular; hard, friable, slightly sticky; many roots; many fine pores; medium acid; abrupt smooth boundary.

B/E—7 to 15 inches; brown (10YR 5/3) (B) and dark grayish brown (10YR 4/2) (E) fine sandy loam, dark brown (10YR 3/3) moist; strong coarse prismatic structure parting to weak coarse to fine subangular blocky; hard, friable, slightly sticky; many roots; many fine pores; slightly acid; clear wavy boundary.

Bt1—15 to 24 inches; light yellowish brown (2.5Y 6/3) sandy clay loam, olive brown (2.5Y 4/4) moist; brown (10YR 5/3) coatings on faces of prisms; strong very coarse prismatic structure parting to moderate medium angular blocky; very hard, friable, slightly sticky and slightly plastic; common roots; many fine pores; neutral; gradual wavy boundary.

Bt2—24 to 30 inches; light yellowish brown (2.5Y 6/4) sandy clay loam, olive brown (2.5Y 4/4) moist; thin grayish brown (2.5Y 5/2) coatings on faces of prisms; strong very coarse prismatic structure parting to moderate medium angular blocky; very hard, friable, slightly sticky and slightly plastic; few fine roots; common fine pores; slightly alkaline; clear wavy boundary.

Bk—30 to 36 inches; pale yellow (2.5Y 7/4) fine sandy loam, light olive brown (2.5Y 5/4) moist; strong very coarse prismatic structure parting to moderate medium angular blocky; hard, friable, slightly sticky and slightly plastic; few roots;

common fine and medium pores; few fine masses of carbonates; strong effervescence; moderately alkaline; clear wavy boundary.

Cr—36 to 60 inches; pale yellow and white (2.5Y 7/4 and 8/4 and 5Y 8/2) soft sandstone, light yellowish brown and light gray (2.5Y 6/4 and 5Y 7/2) moist; gypsum crystals in some layers; slight effervescence in some layers and no effervescence in others; moderately alkaline.

Range in Characteristics

Depth to soft bedrock: 20 to 40 inches.
Notes: Some pedons have a Bw horizon below the Bt horizon. Some pedons have a BC or C horizon above the Cr horizon.

A horizon:
Hue: 10YR or 2.5Y
Value: 4 or 5, 2 or 3 moist
Chroma: 2 or 3
Texture: loam, sandy loam, or fine sandy loam

B/E horizon:
Hue: 10YR or 2.5Y
Value: 4 to 6, 2 to 5 moist
Chroma: 2 to 4
Texture: fine sandy loam, loam, or sandy loam

Bt horizon:
Hue: 10YR or 2.5Y
Value: 5 to 7, 4 to 6 moist
Chroma: 2 to 6
Texture: sandy clay loam or loam
Notes: It averages between 15 and 30 percent silt and 25 and 65 percent fine sand and coarser sand. The peds have faint to distinct clay films and have stains of organic matter.

Bk horizon:
Hue: 2.5Y or 10YR
Value: 5 to 8, 4 to 6 moist
Chroma: 2 to 8
Texture: fine sandy loam, sandy loam, loam, or sandy clay loam

Lehr Series

Depth class: Very deep
Drainage class: Somewhat excessively drained
Permeability: Moderately rapid over very rapid
Landform: Stream terraces
Parent material: Alluvium
Slope: 0 to 25 percent

Taxonomic class: Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Haplustolls

Typical pedon:
Lehr loam, 1,490 feet north and 625 feet west of the southeast corner of sec. 12, T. 156 N., R. 93 W. (Colors are for dry soil unless otherwise stated.)

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots; about 2 percent gravel; slightly alkaline; abrupt smooth boundary.

Bw—6 to 11 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic structure parting to weak fine and medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; about 5 percent gravel; slightly alkaline; gradual wavy boundary.

Bk1—11 to 15 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; few distinct very dark grayish brown (10YR 3/2) coatings on faces of peds; moderate medium prismatic structure parting to weak medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; about 10 percent gravel; common medium irregular masses and filaments of lime; thin crusts of lime on undersides of pebbles; violent effervescence; moderately alkaline; clear smooth boundary.

2Bk2—15 to 22 inches; light yellowish brown (10YR 6/4) and white (10YR 8/1) gravelly loamy coarse sand, yellowish brown (10YR 5/4) moist; weak medium prismatic structure parting to weak medium subangular blocky; slightly hard, very friable, nonsticky and nonplastic; about 30 percent gravel; many medium irregular masses and filaments of lime; thin crusts of lime on undersides of pebbles; violent effervescence; moderately alkaline; clear smooth boundary.

2C—22 to 60 inches; light brownish gray (2.5Y 6/2) and pale yellow (2.5Y 7/4) very gravelly coarse sand, grayish brown (2.5Y 5/2) and light yellowish brown (2.5Y 6/4) moist; single grain; loose, nonsticky and nonplastic; about 40 percent gravel; thin crusts of lime on undersides of pebbles; strong effervescence; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 16 inches
Depth to sand and gravel: 14 to 20 inches
Notes: Some pedons have a 2BCk horizon.

Ap horizon:
Value: 3 or 4, 2 or 3 moist

Bw horizon:
Hue: 10YR or 2.5Y
Value: 4 or 5, 3 or 4 moist
Chroma: 2 to 4

Bk horizon:
Notes: Rock fragments range from 2 to 30 percent.

2Bk horizon:
Notes: Rock fragments range from 20 to 55 percent.

2C horizon:
Hue: 10YR or 2.5Y
Value: 5 or 6, 4 or 5 moist
Notes: Rock fragments range from 15 to 60 percent.

Lihen Series

Depth class: Very deep
Drainage class: Somewhat excessively drained
Permeability: Rapid
Landform: Alluvial fans, stream terraces, and alluvial flats
Parent material: Alluvium
Slope: 0 to 6 percent

Taxonomic class: Sandy, mixed, frigid Entic Haplustolls

Typical pedon:
Lihen loamy fine sand, 2,680 feet south and 2,600 feet west of the northeast corner of sec. 14, T. 29 N., R. 53 E. (Colors are for dry soil unless otherwise stated.)

A1—0 to 4 inches; dark grayish brown (10YR 4/2) loamy fine sand, very dark brown (10YR 2/2) moist; weak fine platy structure; soft, very friable, nonsticky and nonplastic; many fine roots; many fine and medium tubular pores; 2 percent pebbles; slightly alkaline; clear smooth boundary.

A2—4 to 9 inches; grayish brown (10YR 5/2) loamy fine sand, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; many fine roots; common fine pores and few medium pores; 10 percent pebbles; slightly alkaline; clear smooth boundary.

A3—9 to 24 inches; grayish brown (10YR 5/2) loamy sand, very dark grayish brown (10YR 3/2) moist; single grain; loose, very friable, nonsticky and nonplastic; common fine roots; few pores; 10 percent pebbles; few lime cutans on lower surfaces of pebbles; slight effervescence; moderately alkaline; clear smooth boundary.

Bk—24 to 32 inches; light brownish gray (2.5Y 6/2) sand, dark grayish brown (2.5Y 4/2) moist; single grain; loose, nonsticky and nonplastic; few roots; 10 percent pebbles; common lime cutans on lower surfaces of pebbles; strong effervescence; moderately alkaline; clear smooth boundary.

C—32 to 60 inches; light brownish gray (2.5Y 6/2) sand, dark grayish brown (2.5Y 4/2) moist; single grain; loose, nonsticky and nonplastic; few roots; disseminated lime; strong effervescence; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 12 to 30 inches
Depth to the Bk horizon: 10 to 36 inches

A horizon:
Hue: 10YR or 2.5Y
Value: 3 to 5
Chroma: 2 or 3
Texture: loamy sand, sand, or loamy fine sand

Bk horizon:
Hue: 10YR or 2.5Y
Value: 5 to 7, 3 to 6 moist
Chroma: 2 to 4
Texture: loamy fine sand, loamy sand, fine sand, or sand

C horizon:
Hue: 10YR or 2.5Y
Value: 5 to 7, 4 to 6 moist
Chroma: 2 or 3
Texture: loamy fine sand, loamy sand, fine sand, or sand

Littlemo Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate over moderately rapid or rapid
Landform: Paleoterraces
Parent material: Alluvium
Slope: 0 to 6 percent

Taxonomic class: Fine-loamy, mixed, superactive, frigid Aridic Haplustolls

Typical pedon:
Littlemo silt loam, 2,500 feet south and 200 feet east of the northwest corner of sec. 33, T. 138 N., R. 102 W. (Colors are for dry soil unless otherwise stated.)

Ap—0 to 6 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; neutral; abrupt smooth boundary.

Bw1—6 to 10 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; neutral; abrupt smooth boundary.

Bw2—10 to 17 inches; light olive brown (2.5Y 5/4) loam, olive brown (2.5Y 4/4) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; neutral; clear smooth boundary.

Bk1—17 to 22 inches; light yellowish brown (2.5Y 6/4) loam, olive brown (2.5Y 4/4) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; violent effervescence; moderately alkaline; clear smooth boundary.

Bk2—22 to 28 inches; light gray (2.5Y 7/2) clay loam, light yellowish brown (2.5Y 6/4) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; few fine and medium irregularly shaped masses of carbonates; violent effervescence; moderately alkaline; clear wavy boundary.

2C1—28 to 34 inches; white (2.5Y 8/2) gravelly sandy clay loam, pale yellow (2.5Y 7/4) moist; single grain; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; about 15 percent gravel; few fine irregularly shaped masses of carbonates on undersides of pebbles; violent effervescence; moderately alkaline; clear wavy boundary.

2C2—34 to 60 inches; light yellowish brown (2.5Y 6/4) very gravelly coarse sandy loam, olive brown (2.5Y 4/4) moist; single grain; loose, nonsticky and nonplastic; few very fine roots; about 40 percent gravel; strong effervescence; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 16 inches
Depth to lime: 13 to 20 inches
Depth to loamy-skeletal material: 20 to 40 inches
Notes: Textures of loamy coarse sand and loamy sand are below depths of 40 inches in some pedons.

A horizon:
Value: 4 or 5
Chroma: 2 or 3
Texture: silt loam or loam

Bw horizon:
Value: 4 or 5, 2 to 4 moist
Texture: silt loam or loam

Bk horizon:
Value: 5 to 7
Chroma: 2 to 4

2C horizon:
Value: 5 to 8, 3 to 7 moist
Texture: sandy clay loam, coarse sandy loam, or loam
Notes: Rock fragments range from 15 to 70 percent. It has textures of loamy coarse sand and loamy sand below depths of 40 inches in some pedons.

Lonna Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Alluvial flats, alluvial fans, stream terraces, hills, and ridges
Parent material: Alluvium
Slope: 0 to 25 percent
Notes: These soils are calcareous.

Taxonomic class: Fine-silty, mixed, superactive, frigid Aridic Haplustepts

Typical pedon:
Lonna silt loam, 100 feet east and 1,700 feet north of the southwest corner of sec. 28, T. 139 N., R. 101 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 2 inches; grayish brown (2.5Y 5/2) silt loam, very dark grayish brown (2.5Y 3/2) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; common very fine tubular pores; 18 percent clay; neutral; clear smooth boundary.

Bw—2 to 11 inches; light yellowish brown (2.5Y 6/3) silt loam, olive brown (2.5Y 4/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, friable, slightly sticky and slightly plastic; many very fine roots; common very fine tubular pores; 22 percent clay; strong effervescence; slightly alkaline; clear wavy boundary.

Bk1—11 to 17 inches; light yellowish brown (2.5Y 6/3) silt loam, olive brown (2.5Y 4/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, friable, slightly sticky and slightly plastic;

common very fine roots; common very fine tubular pores; 21 percent clay; common fine rounded masses of lime; strong effervescence; moderately alkaline; clear wavy boundary

Bk2—17 to 34 inches; pale yellow (2.5Y 7/4) silt loam, light olive brown (2.5Y 5/4) moist; weak medium prismatic structure parting to moderate medium subangular blocky; hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores; 21 percent clay; common fine rounded masses of lime; violent effervescence; moderately alkaline; gradual wavy boundary.

C—34 to 60 inches; light yellowish brown (2.5Y 6/4) silt loam, light olive brown (2.5Y 5/4) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine roots; few very fine tubular pores; 22 percent clay; few fine rounded masses of lime; violent effervescence; moderately alkaline.

Range in Characteristics

Depth to the Bk horizon: 10 to 16 inches
Notes: Some pedons have a By horizon.

A horizon:
Hue: 10YR or 2.5Y
Value: 5 or 6, 3 to 5 moist
Chroma: 2 to 4
Texture: silt loam or loam

Bw horizon:
Value: 5 or 6, 4 or 5 moist
Chroma: 2 to 4
Texture: silt loam or silty clay loam

Bk horizon:
Value: 5 to 7, 4 to 6 moist
Chroma: 2 to 4
Texture: silt loam or silty clay loam

C horizon:
Value: 5 to 7, 4 or 5 moist
Chroma: 2 to 4
Texture: silt loam or silty clay loam

Magnus Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Slow
Landform: Flood plains
Parent material: Alluvium
Slope: 0 to 2 percent

Taxonomic class: Fine, smectitic, frigid Vertic Haplustolls

Typical pedon:
Magnus silty clay, 2,360 feet east and 2,060 feet north of southwest corner of sec. 26, T. 138 N., R. 80 W. (Colors are for dry soil unless otherwise stated.)

Ap—0 to 7 inches; grayish brown (2.5Y 5/2) silty clay, very dark grayish brown (2.5Y 3/2) moist; strong fine granular structure; hard, friable; few large and common fine roots; many fine pores; slight effervescence; moderately alkaline; abrupt smooth boundary.

A1—7 to 15 inches; dark grayish brown (2.5Y 4/2) silty clay, very dark grayish brown (2.5Y 3/2) moist; weak coarse prismatic and moderate and strong medium and very fine angular blocky structure; very hard, firm; common roots; many fine pores; black (10YR 2/1) moist thin layers; slight effervescence; moderately alkaline; clear smooth boundary.

A2—15 to 26 inches; dark gray (10YR 4/1) silty clay, very dark gray (10YR 3/1) crushed, black (10YR 2/1) moist; moderate coarse prismatic and strong medium and fine angular blocky structure; very hard, firm; common fine pores; shiny pressure faces on surface of peds; few small carbonate nodules; slight effervescence; moderately alkaline; gradual wavy boundary.

Bw—26 to 36 inches; grayish brown (2.5Y 5/2) silty clay, very dark grayish brown (2.5Y 3/2) moist; weak coarse prismatic and strong medium angular blocky structure; very hard, firm; shiny pressure faces on vertical faces of prisms; common fine carbonate nodules; slight effervescence; moderately alkaline; gradual wavy boundary.

BC—36 to 54 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; moderate medium and fine angular blocky structure; very hard, firm; a few vertical cracks with pressure faces; common fine carbonate nodules, slight effervescence; moderately alkaline; gradual boundary.

C—54 to 60 inches; light brownish gray (2.5Y 6/2) and light yellowish brown (2.5Y 6/4) stratified silty clay, silt loam, and silty clay loam, olive brown (2.5Y 4/4) and dark grayish brown (2.5Y 4/2) moist; massive; firm; few medium carbonate nodules; strong effervescence; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 16 to 40 inches
Notes: The control section has one or more dark colored buried surface layers. Some pedons have Bk and BCk horizons. Gypsum segregations are in the C horizon in some pedons.

A horizon:
Value: 3 to 5
Notes: Some pedons have chroma of 1 in the lower part of the A horizon. In some pedons, the A horizon does not have carbonates.

Bw or BC horizon:
Hue: 10YR or 2.5Y
Value: 3 to 5, 2 or 3 moist
Chroma: 1 or 2
Texture: silty clay or clay
Notes: These horizons contain few to common fine nodules or threads of carbonates.

C horizon:
Notes: Some pedons contain thin strata of loam or sandy loam.

Maltese Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Very slow
Landform: Alluvial flats, alluvial fans, hills, and ridges
Parent material: Alluvium
Slope: 0 to 25 percent
Notes: These soils are sodic.

Taxonomic class: Fine, smectitic, frigid Torrertic Natrustolls

Typical pedon:
Maltese silt loam, 2,300 feet north and 1,700 feet west of the southeast corner of sec. 36, T. 138 N., R. 101 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 7 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky and weak fine platy; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine tubular pores; slightly acid; clear smooth boundary.

E—7 to 10 inches; light yellowish brown (2.5Y 6/3) silt loam, dark olive brown (2.5Y 3/3) moist; moderate coarse platy structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular pores; slightly acid; abrupt smooth boundary.

Btn—10 to 16 inches; light olive brown (2.5Y 5/3) silty clay, dark olive brown (2.5Y 3/3) moist; strong medium columnar structure parting to strong fine angular blocky; extremely hard, extremely firm, very sticky and very plastic; common very fine roots; common very fine tubular pores; many distinct clay films on faces of peds; slightly alkaline; clear smooth boundary.

Btkn—16 to 20 inches; light yellowish brown (2.5Y 6/3) silty clay, olive brown (2.5Y 4/3) moist; moderate medium prismatic structure parting to moderate medium angular blocky; very hard, very firm, sticky and plastic; few very fine roots; common very fine tubular pores; common distinct clay films on faces of peds; common fine irregularly shaped masses of carbonates; violent effervescence; slightly alkaline; clear wavy boundary.

Btkny—20 to 33 inches; light yellowish brown (2.5Y 6/3) silty clay loam, olive brown (2.5Y 4/3) moist; moderate medium prismatic structure parting to moderate medium angular blocky; very hard, very firm, sticky and plastic; few very fine roots; common very fine tubular pores; common distinct clay films on faces of peds; many fine and medium irregularly shaped nests of gypsum; few fine rounded masses of carbonates; strong effervescence; strongly alkaline; gradual wavy boundary.

BCy—33 to 45 inches; light olive brown (2.5Y 5/3) silty clay loam, olive brown (2.5Y 4/3) moist; weak medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; few very fine tubular pores; common fine irregularly shaped nests of gypsum; slight effervescence; strongly alkaline; gradual wavy boundary.

Cy—45 to 60 inches; light olive gray (5Y 6/2) silty clay loam, olive gray (5Y 4/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine irregularly shaped nests of gypsum; slight effervescence; strongly alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 23 inches
Depth to lime: 7 to 20 inches
Depth to gypsum or other salts: 16 to 36 inches
Notes: Combined A and E horizons range from 4 to 12 inches thick. Some pedons have an AE horizon or a Bw horizon below the A horizon. Some pedons have a Btny horizon or a BCky horizon.

A horizon:
Chroma: 2 or 3
Texture: silt loam or loam

E horizon:
Hue: 10YR or 2.5Y
Value: 5 to 7, 3 to 5 moist
Chroma: 2 to 4

Btn horizon:
Hue: 10YR or 2.5Y
Value: 4 or 5, 3 or 4 moist
Chroma: 2 or 3
Texture: silty clay or clay

Btk horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 4 to 6, 3 to 5 moist
Chroma: 2 or 3
Texture: silty clay loam, silty clay, clay loam, or clay

BCy horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 5 to 7, 3 to 5 moist
Chroma: 2 to 4
Texture: silty clay loam, silt loam, or loam
Notes: It is fine sandy loam below a depth of 40 inches.

C horizon:
Hue: 2.5Y or 5Y
Value: 6 or 7, 4 or 5 moist
Chroma: 2 or 3
Notes: Some pedons have a loamy fine sand 2C horizon below a depth of 40 inches.

Manning Series

Depth class: Very deep
Drainage class: Somewhat excessively drained
Permeability: Moderately rapid over very rapid
Landform: Stream terraces and escarpments
Parent material: Alluvium
Slope: 0 to 15 percent

Taxonomic class: Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Haplustolls

Typical pedon:
Manning fine sandy loam, 2,040 feet west and 100 feet south of the northeast corner of sec. 15, T. 139 N., R. 97 W. (Colors are for dry soil unless otherwise stated.)

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to moderate medium granular; slightly hard, very friable, slightly sticky and slightly plastic; many fine roots; many fine pores; few pebbles; neutral; abrupt smooth boundary.

Bw1—5 to 12 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 3/3) moist; moderate coarse and medium prismatic structure parting to moderate medium subangular blocky; hard, very friable, slightly sticky and slightly plastic; common fine roots; many fine pores; few faint clay films on faces of peds; few pebbles; neutral; gradual wavy boundary.

Bw2—12 to 18 inches; brown (10YR 5/3) fine sandy loam, brown (10YR 4/3) moist; moderate coarse and medium prismatic structure parting to weak medium subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; common fine roots; common fine pores; few faint clay films on faces of prisms; few pebbles and cobbles; neutral; clear wavy boundary.

Bk—18 to 25 inches; light brownish gray (2.5Y 6/2) fine sandy loam, dark grayish brown (2.5Y 4/2) moist; weak coarse prismatic structure parting to weak medium subangular blocky; slightly hard, very friable, slightly sticky and nonplastic; few roots; common fine pores; about 10 percent gravel; violent effervescence; common fine masses of lime; moderately alkaline; clear wavy boundary.

2C1—25 to 40 inches; light yellowish brown (2.5Y 6/4) sand and gravel, olive brown (2.5Y 4/3) moist; single grain; loose; few fine roots; about 25 percent gravel coarser than 3/4 inch; few cobbles; thin coating of lime on undersides of some pebbles and cobbles; strong effervescence in upper part and slight effervescence in lower part; moderately alkaline; clear wavy boundary.

2C2—40 to 60 inches; light brownish gray (2.5Y 6/2) sand and strata of fine gravel, dark grayish brown (2.5Y 4/2) moist; single grain; loose; about 10 percent gravel; slight effervescence; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 16 inches
Depth to lime: 13 to 28 inches
Depth to sand and gravel: 24 to 40 inches

A horizon:
Value: 3 to 5, 2 or 3 moist
Chroma: 2 or 3
Notes: Rock fragments range up to 3 percent.

Bw horizon:
Hue: 10YR or 2.5Y
Value: 4 to 6
Chroma: 2 to 4
Texture: fine sandy loam or loam
Notes: Rock fragments range from 1 to 10 percent.

Bk horizon:
Hue: 10YR or 2.5Y

Value: 5 to 8, 3 to 6 moist
Chroma: 2 or 3
Texture: fine sandy loam or loam
Notes: Rock fragments range from 2 to 15 percent.

2C horizon:
Hue: 2.5Y or 5Y
Value: 4 to 7, 3 to 6 moist
Chroma: 2 to 4
Texture: fine sand, loamy sand, coarse sand, sand, or loamy coarse sand
Notes: Rock fragments range up to 75 percent.

Marysland Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate over rapid
Landform: Drainageways
Parent material: Alluvium
Slope: 0 to 1 percent
Notes: These soils are highly calcareous.

Taxonomic class: Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Calciaquolls

Typical pedon:
Marysland loam, 900 feet east and 200 feet north of the southwest corner of sec. 4, T. 121 N., R. 40 W. (Colors are for moist soil unless otherwise stated.)

A—0 to 9 inches; black (10YR 2/1) loam, dark gray (10YR 4/1) dry; weak medium subangular blocky structure; very friable; many roots; slight effervescence; moderately alkaline; abrupt wavy boundary.

Ak—9 to 12 inches; black (10YR 2/1) loam, dark gray (10YR 4/1) dry; weak fine granular structure; very friable; many roots; strong effervescence; moderately alkaline; abrupt wavy boundary.

Bkg1—12 to 15 inches; olive gray (5Y 4/2) loam; many fine faint olive gray (5Y 5/2) and dark gray (5Y 4/1) redoximorphic depletions; weak fine subangular blocky structure; very friable; few roots; strong effervescence; moderately alkaline; clear irregular boundary.

Bkg2—15 to 20 inches; olive gray (5Y 4/2) loam; few fine prominent olive yellow (2.5Y 6/6) redoximorphic concentrations; weak fine and medium subangular blocky structure; very friable; few dark brown (10YR 4/3) coatings in root channels; few small lime masses; strong effervescence; moderately alkaline; clear wavy boundary.

Bkg3—20 to 27 inches; light olive gray (5Y 6/2) loam; few fine prominent olive yellow (2.5Y 6/6) redoximorphic concentrations; weak medium and fine subangular blocky structure; friable; few grayish brown (2.5Y 5/2) root channel fillings; few small lime and dark-colored masses; strong effervescence; moderately alkaline; clear wavy boundary.

2Cg1—27 to 40 inches; grayish brown (2.5Y 5/2) sand; many fine and medium faint light brownish gray (2.5Y 6/2) and common medium prominent yellowish brown (10YR 5/8) redoximorphic concentrations; single grain; loose; slight effervescence; moderately alkaline; gradual wavy boundary.

2Cg2—40 to 60 inches; grayish brown (2.5Y 5/2) sand; many medium faint light brownish gray (2.5Y 6/2) redoximorphic depletions and few medium prominent red (2.5YR 4/8) redoximorphic concentrations; single grain; loose; slight effervescence; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 24 inches
Depth to the calcic horizon: 0 to 12 inches
Depth to sand and gravel: 20 to 40 inches

A horizon:
Hue: 10YR, 2.5Y, 5Y, or neutral
Value: 2 or 3
Chroma: 0 or 1

Bkg horizon:
Hue: 10YR, 2.5Y, 5Y, or neutral
Value: 3 to 6, 4 to 7 dry
Chroma: 0 to 2

2Cg horizon:
Hue: 2.5Y or 5Y
Value: 3 to 6, 4 to 8 dry
Notes: It has 1 to 35 percent gravel.

Maschetah Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Landform: Alluvial flats, alluvial fans, hills, and ridges
Parent material: Alluvium
Slope: 0 to 15 percent
Notes: These soils are highly calcareous.

Taxonomic class: Fine-silty, mixed, superactive, frigid Typic Calciustolls

Typical pedon:
Maschetah silt loam, 1,800 feet east and 1,125 feet south of the northwest corner of sec. 7, T. 146 N., R. 104 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 7 inches; grayish brown (2.5Y 5/2) silt loam, very dark grayish brown (2.5Y 3/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; strong effervescence; slightly alkaline; clear smooth boundary.

Bk1—7 to 19 inches; light brownish gray (2.5Y 6/2) silt loam, dark grayish brown (2.5Y 4/2) moist; weak medium prismatic structure parting to weak medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine tubular pores; common fine masses of lime; violent effervescence; moderately alkaline; gradual wavy boundary.

Bk2—19 to 34 inches; light brownish gray (2.5Y 6/2) silt loam, dark grayish brown (2.5Y 4/2) moist; weak medium prismatic structure parting to weak medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic;

common very fine roots; many very fine tubular pores; common fine masses of lime; violent effervescence; moderately alkaline; gradual wavy boundary.

Bk3—34 to 48 inches; pale yellow (2.5Y 7/3) silt loam, light olive brown (2.5Y 5/3) moist; weak medium prismatic structure parting to weak medium subangular blocky; very hard, firm, sticky and plastic; few very fine roots; many very fine tubular pores; common fine masses of lime; violent effervescence; moderately alkaline; gradual wavy boundary.

C—48 to 90 inches; pale yellow (2.5Y 7/4) silty clay loam, light olive brown (2.5Y 5/4) moist; massive; very hard, very firm, sticky and plastic; common very fine tubular pores; few fine masses of lime; violent effervescence; moderately alkaline.

Range in Characteristics

Notes: A calcareous Bw horizon up to 10 inches thick is allowed.

A horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 4 or 5, 3 or 4 moist
Chroma: 2 or 3

Bk horizon:
Hue: 10YR, 2.5Y, or 5Y
Chroma: 2 to 4
Notes: Rock fragments range from 0 to 5 percent pebbles.

C horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 6 or 7, 4 or 5 moist
Chroma: 2 to 4
Texture: silt loam or silty clay loam
Notes: Rock fragments range from 0 to 5 percent pebbles.

Minnewaukan Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Rapid
Landform: Flood plains
Parent material: Alluvium
Slope: 0 to 3 percent

Taxonomic class: Mixed, frigid Typic Psammaquents

Typical pedon:
Minnewaukan loamy fine sand, 1,055 feet south and 150 feet west of the northeast corner of sec. 17, T. 151 N., R. 63 W. (Colors are for moist soil unless otherwise stated.)

A—0 to 3 inches; black (10YR 2/1) loamy fine sand, dark gray (10YR 4/1) dry; weak fine subangular blocky and granular structure; soft, very friable, slightly sticky and nonplastic; many roots; about 1 percent gravel; slight effervescence; slightly alkaline; abrupt smooth boundary.

AC—3 to 5 inches; dark grayish brown and very dark grayish brown (2.5Y 4/2 and 2.5Y 3/2) loamy coarse sand, grayish brown (2.5Y 5/2) dry; single grain;

nonsticky and nonplastic; many roots; about 15 percent gravel; slight effervescence; slightly alkaline; clear smooth boundary.

C—5 to 16 inches; dark grayish brown with olive brown (2.5Y 4/2 with 2.5Y 4/4) loamy sand, light brownish gray (2.5Y 6/2) dry; many fine distinct dark yellowish brown (10YR 4/4) redoximorphic concentrations; weak coarse prismatic structure parting to weak medium subangular blocky; soft, very friable, slightly sticky and nonplastic; few roots; about 1 percent gravel; slight effervescence; slightly alkaline; clear wavy boundary.

Cg1—16 to 28 inches; olive gray and olive (5Y 4/2 and 5Y 4/3) loamy sand, light gray and light olive gray (5Y 6/1 and 5Y 6/2) dry; very weak coarse prismatic structure; slightly sticky and nonplastic; few fine roots; about 10 percent pebbles; about 30 percent of sand and pebbles is shale fragments; few fine masses of lime; slight effervescence; slightly alkaline; clear wavy boundary.

Cg2—28 to 36 inches; olive gray and gray (5Y 5/2 and 5Y 5/1) fine sand, light gray (5Y 7/2) dry; single grain; nonsticky and nonplastic; about 1 percent gravel; slight effervescence; slightly alkaline; clear smooth boundary.

Cg3—36 to 50 inches; dark brown (10YR 3/3) fine sand, brown (10YR 4/3 and 10YR 5/3) dry; single grain; nonsticky and nonplastic; few small iron and manganese concretions; slight effervescence; moderately alkaline; clear smooth boundary.

Cg4—50 to 60 inches; olive (5Y 4/3) fine sand, pale olive (5Y 6/3) dry; single grain; nonsticky and nonplastic; slight effervescence; moderately alkaline.

Range in Characteristics

10 to 40 inch particle-size control section: Loamy fine sand, loamy sand, fine sand, or sand
Notes: Some pedons have horizons that contain 1 to 20 percent gravel.

A and AC horizons:
Hue: 10YR, 2.5Y, or 5Y
Value: 3 to 6

C horizon:
Hue: 10YR, 2.5Y, 5Y, or 5GY

Moreau Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Slow
Landform: Ridges, hills, and pediments
Parent material: Residuum
Slope: 3 to 25 percent

Taxonomic class: Fine, smectitic, frigid Vertic Haplustolls

Typical pedon:
Moreau silty clay, 350 feet north and 200 feet east of the southwest corner of sec. 22, T. 129 N., R. 90 W. (Colors are for dry soil unless otherwise stated.)

Ap—0 to 6 inches; dark grayish brown (2.5Y 4/2) silty clay, very dark grayish brown (2.5Y 3/2) moist; weak fine granular structure; slightly hard, friable, very sticky

and very plastic; few very fine roots; slight effervescence; slightly alkaline; abrupt wavy boundary.

Bw—6 to 13 inches; light olive brown (2.5Y 5/3) silty clay, olive brown (2.5Y 4/3) moist; weak coarse prismatic structure parting to moderate medium subangular blocky; very hard, firm, very sticky and very plastic; few very fine roots; 1 to 2 inch wide cracks filled with A material throughout; strong effervescence; slightly alkaline; clear wavy boundary.

Bk—13 to 27 inches; light yellowish brown (2.5Y 6/3) silty clay, light olive brown (2.5Y 5/3) moist; weak coarse prismatic structure parting to weak medium subangular blocky; slightly hard, firm, very sticky and very plastic; 1 to 2 inch wide cracks filled with A material in upper 10 inches; common medium irregularly shaped masses of carbonates; violent effervescence; moderately alkaline; gradual wavy boundary.

BCk—27 to 35 inches; light brownish gray (2.5Y 6/2) silty clay, dark grayish brown (2.5Y 4/2) moist; weak medium subangular blocky structure; slightly hard, firm, very sticky and very plastic; common olive yellow (2.5Y 6/6) iron stains; about 50 percent fine fragments of unweathered shale; few medium irregularly shaped masses of carbonates; strong effervescence; moderately alkaline; gradual wavy boundary.

Cr—35 to 60 inches; light olive gray (5Y 6/2) soft shale, olive gray (5Y 4/2) moist; common yellow (2.5Y 6/6) iron stains between bedrock laminations; slight effervescence; moderately alkaline.

Range in Characteristics

Depth to lime: 0 to 10 inches
Depth to soft bedrock: 20 to 40 inches
Notes: Some pedons have a By or C horizon.

A horizon:
Hue: 10YR or 2.5Y
Value: 4 or 5, 2 or 3 moist
Texture: silty clay or clay

Bw horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 5 or 6, 3 to 5 moist
Chroma: 2 to 4
Texture: silty clay, clay, or silty clay loam
Notes: It typically averages between 45 and 55 percent clay.

Bk and BCk horizons:
Hue: 2.5Y or 5Y
Value: 5 or 6
Chroma: 1 to 3
Texture: silty clay, clay, or silty clay loam
Notes: They contain nests of gypsum in some pedons.

Cr horizon:
Hue: 2.5Y or 5Y
Value: 5 to 7, 3 to 6 moist
Chroma: 2 to 4

Notes: It is laminated in some pedons and massive in others. It commonly has nests or lenses of gypsum.

Morton Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Landform: Pediments
Parent material: Residuum
Slope: 3 to 6 percent

Taxonomic class: Fine-silty, mixed, superactive, frigid Typic Argiustolls

Typical pedon:
Morton silt loam, 300 feet east and 60 feet south of the northwest corner of sec. 35, T. 141 N., R. 85 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 5 inches; very dark grayish brown (10YR 3/2) silt loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure in the upper part and weak medium prismatic structure parting to moderate medium granular in the lower part; slightly hard, friable; many roots; few fine pores; neutral; clear wavy boundary.

Bt1—5 to 10 inches; dark brown (10YR 4/3) silty clay loam, very dark grayish brown (10YR 3/2) moist; very dark brown (10YR 2/2) moist coatings on faces of peds; moderate medium prismatic structure parting to moderate medium and fine angular blocky; hard, friable; many roots; common fine pores; faint continuous clay films on faces of peds; neutral; gradual smooth boundary.

Bt2—10 to 15 inches; brown (10YR 5/3) silty clay loam, dark brown (10YR 4/3) moist; very dark grayish brown (10YR 3/2) moist coatings on faces of peds; moderate medium prismatic structure parting to moderate coarse to fine subangular blocky; hard, friable; common roots; many fine pores; faint patchy clay films on faces of peds; neutral; gradual smooth boundary.

Bk1—15 to 18 inches; light olive brown (2.5Y 5/4) silty clay loam, dark grayish brown (2.5Y 4/2) moist; few very dark grayish brown (10YR 3/2) moist coatings on faces of peds; moderate medium subangular blocky structure; hard, friable; common roots; many fine pores; few faint clay films on faces of peds; few masses of carbonates; slight effervescence; moderately alkaline; gradual smooth boundary.

Bk2—18 to 33 inches; light gray (2.5Y 7/2) loam, grayish brown (2.5Y 5/2) moist; weak coarse prismatic structure parting to weak coarse subangular blocky; hard, friable; few fine roots; common fine pores; many large masses of carbonates; violent effervescence; moderately alkaline; clear smooth boundary.

Cr—33 to 60 inches; soft consolidated siltstone and mudstone.

Range in Characteristics

Depth to lime: 11 to 30 inches
Depth to soft bedrock: 20 to 40 inches
Notes: Some pedons have a C horizon above the Cr horizon.

A horizon:
Hue: 10YR or 2.5Y
Value: 3 to 5, 2 or 3 moist
Chroma: 2 or 3

Bt horizon:
Hue: 7.5YR, 10YR, or 2.5Y
Value: 4 to 6, 3 or 4 moist
Chroma: 2 to 4
Texture: loam, silt loam, or silty clay loam

Bk horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 4 to 6 moist

Parshall Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately rapid
Landform: Alluvial flats, alluvial fans, swales, ridges, hills, and stream terraces
Parent material: Alluvium
Slope: 0 to 15 percent

Taxonomic class: Coarse-loamy, mixed, superactive, frigid Pachic Haplustolls

Typical pedon:
Parshall fine sandy loam, 1,550 feet north and 950 feet east of southwest corner of sec. 33, T. 139 N., R. 81 W. (Colors are for dry soil unless otherwise stated.)

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) fine sandy loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; common very fine and few fine pores; neutral; abrupt smooth boundary.

A—7 to 12 inches; dark grayish brown (10YR 4/2) fine sandy loam, very dark brown (10YR 2/2) moist; moderate coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine and few medium roots; many fine and very fine and few medium pores; neutral; clear wavy boundary.

Bw1—12 to 20 inches; dark grayish brown (10YR 4/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; moderate coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine and few medium roots; many very fine and fine and few medium pores; slightly alkaline; clear wavy boundary.

Bw2—20 to 29 inches; light olive brown (2.5Y 5/3) fine sandy loam, dark olive brown (2.5Y 3/3) moist; moderate coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common very fine and few fine roots; many very fine and few fine pores; neutral; abrupt smooth boundary.

Bk1—29 to 42 inches; grayish brown (2.5Y 5/2) fine sandy loam, dark grayish brown (2.5Y 4/2) moist; moderate coarse prismatic structure parting to weak medium subangular blocky; soft, very friable, slightly sticky and slightly plastic; common

very fine and few fine roots; many very fine and few fine pores; few fine filaments of lime; strong effervescence; moderately alkaline; clear smooth boundary.

Bk2—42 to 48 inches; light brownish gray (2.5Y 6/2) fine sandy loam, dark grayish brown (2.5Y 4/2) moist; weak coarse prismatic structure parting to weak medium subangular blocky; soft, very friable, slightly sticky and nonplastic; few fine and very fine roots; common very fine pores; common fine filaments of lime; strong effervescence; moderately alkaline; abrupt wavy boundary.

BCk—48 to 60 inches; light yellowish brown (2.5Y 6/3) loamy fine sand, olive brown (2.5Y 4/3) moist; weak coarse subangular blocky structure; soft, very friable, slightly sticky and nonplastic; few fine and very fine roots; few very fine pores; few fine irregularly shaped masses and common fine filaments of lime; violent effervescence; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 16 to 40 inches
Notes: Some pedons have an Ab horizon below a depth of 50 inches. Some pedons have a C horizon.

A horizon:
Value: 3 or 4
Texture: fine sandy loam or loam

Bw horizon:
Chroma: 2 to 4

Bk horizon:
Hue: 10YR or 2.5Y
Texture: fine sandy loam or loamy fine sand

Patent Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Alluvial fans
Parent material: Alluvium
Slope: 0 to 25 percent
Notes: These soils are calcareous.

Taxonomic class: Fine-loamy, mixed, superactive, calcareous, frigid Aridic Ustorthents

Typical pedon:
Patent loam, 1,850 feet east and 50 feet north (of road edge) of the southwest corner of sec. 1, T. 139 N., R. 101 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 1 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; weak very fine granular structure; soft, very friable; many fine roots; many fine pores; slightly alkaline; gradual wavy boundary.

AC—1 to 7 inches; light brownish gray (2.5Y 6/2) loam, olive brown (2.5Y 4/4) moist; weak medium subangular blocky and weak fine platy structure; hard, very friable; common fine roots; few fine pores; slight effervescence; moderately alkaline; clear smooth boundary.

C—7 to 60 inches; light yellowish brown (2.5Y 6/3) thinly stratified loam, very fine sandy loam and clay loam, olive brown (2.5Y 4/3) moist; massive but parts to weak plates along the laminae; hard, friable; few fine roots; few fine pores; strong effervescence; moderately alkaline.

Range in Characteristics

Depth to lime: 0 to 10 inches
10 to 40 inch particle-size control section: 18 to 35 percent clay
Notes: Strata of contrasting texture less than 2 inches thick are common. Some pedons contain rock fragments and porcelanite material.

A horizon:
Hue: 10YR or 2.5Y
Value: 4 to 7, 3 to 5 moist
Chroma: 1 to 3
Texture: loam or silt loam

C horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 6 or 7, 4 or 5 moist
Chroma: 2 to 4
Texture: stratified loam, fine sandy loam, clay loam, very fine sandy loam, or silty clay loam

Peta Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landform: Alluvial flats
Parent material: Alluvium
Slope: 0 to 2 percent

Taxonomic class: Fine-loamy, mixed, superactive, frigid Pachic Argiustolls

Typical pedon:
Peta loam, 2,150 feet east and 1,900 feet south of the northwest corner of sec. 23, T. 142 N., R. 99 W. (Colors are for dry soil unless otherwise stated.)

Ap—0 to 5 inches; very dark grayish brown (10YR 3/2) loam, very dark brown (10YR 2/2) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; 18 percent clay; neutral; clear smooth boundary.

A—5 to 10 inches; very dark grayish brown (10YR 3/2) loam, very dark brown (10YR 2/2) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots throughout; common very fine tubular pores; 18 percent clay; neutral; clear smooth boundary.

Bt1—10 to 20 inches; brown (10YR 4/3) loam, dark brown (10YR 3/3) moist; weak medium prismatic structure parting to moderate medium subangular blocky; moderately hard, friable, slightly sticky and slightly plastic; common very fine roots throughout; common very fine tubular pores; 25 percent clay; few distinct discontinuous very dark grayish brown (10YR 3/2) clay films throughout; common fine rounded distinct dark yellowish brown (10YR 4/6) dry

redoximorphic concentrations from 16 to 20 inches; neutral; clear wavy boundary.

Bt2—20 to 26 inches; light olive brown (2.5Y 5/4) clay loam, olive brown (2.5Y 4/4) moist; weak medium prismatic structure parting to moderate medium subangular blocky; moderately hard, friable, slightly sticky and slightly plastic; common very fine roots throughout; common very fine tubular pores; 23 percent clay; few distinct discontinuous dark brown (10YR 3/3) clay films throughout; common fine rounded prominent strong brown (7.5YR 4/6) dry redoximorphic concentrations throughout; neutral; clear wavy boundary.

BC—26 to 36 inches; light olive brown (2.5Y 5/4) fine sandy loam, olive brown (2.5Y 4/4) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; common very fine roots throughout; common very fine tubular pores; 15 percent clay; common fine rounded prominent strong brown (7.5YR 4/6) dry redoximorphic concentrations throughout; neutral; gradual wavy boundary.

C1—36 to 48 inches; light olive brown (2.5Y 5/4) fine sandy loam, brown (2.5Y 4/4) moist; massive; slightly hard, very friable, slightly sticky and nonplastic; few very fine roots throughout; common very fine tubular pores; 11 percent clay; common fine rounded prominent strong brown (7.5YR 4/6) dry redoximorphic concentrations throughout and common fine rounded prominent light olive gray (5Y 6/2) dry redoximorphic depletions throughout; slightly alkaline; gradual wavy boundary.

C2—48 to 53 inches; light yellowish brown (2.5Y 6/3) loam, light olive brown (2.5Y 5/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots throughout; 18 percent clay; common fine rounded prominent strong brown (7.5YR 4/6) dry redoximorphic concentrations throughout and common fine rounded distinct light olive gray (5Y 6/2) dry redoximorphic depletions throughout; common fine rounded masses of lime pedogenic throughout; strong effervescence; moderately alkaline; gradual wavy boundary.

C3—53 to 80 inches; light brownish gray (2.5Y 6/2) fine sandy loam, grayish brown (2.5Y 5/2) moist; massive; soft, very friable, slightly sticky and nonplastic; 9 percent clay; common fine rounded prominent strong brown (7.5YR 4/6) dry redoximorphic concentrations throughout; slight effervescence; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 16 to 40 inches
Percent rock fragments: Less than 1 percent
Depth to redoximorphic features: 7 to 32 inches

A horizon:
Value: 3 or 4, 2 or 3 moist
Chroma: 1 to 3

Bt horizon:
Chroma: 2 to 4
Texture: loam, clay loam, or sandy clay loam

BC horizon:
Hue: 10YR or 2.5Y
Value: 5 or 6, 4 or 5 moist

Chroma: 2 to 4
Texture: fine sandy loam, sandy loam, or sandy clay loam

C horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 5 to 7
Texture: fine sandy loam, loam, sandy loam, or loamy sand

Reeder Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Landform: Pediments and ridges
Parent material: Residuum
Slope: 0 to 15 percent

Taxonomic class: Fine-loamy, mixed, superactive, frigid Typic Argiustolls

Typical pedon:
Reeder loam, 1,575 feet south and 475 feet west of the northeast corner of sec. 14, T. 129 N., R. 100 W. (Colors are for dry soil unless otherwise stated.)

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak coarse and fine subangular blocky structure parting to weak fine granular; friable; many roots; many fine pores; neutral; abrupt smooth boundary.

Bt1—8 to 12 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; moderate coarse and medium prismatic and moderate medium angular blocky structure; friable; common roots, many fine pores; many faint clay films on vertical faces of peds; many clay films on horizontal faces of peds; neutral; clear smooth boundary.

Bt2—12 to 17 inches; brown (10YR 5/3) clay loam, dark grayish brown (10YR 4/2) moist; moderate medium prismatic and moderate medium angular blocky structure; friable; many clay films on faces of peds; neutral; gradual wavy boundary.

Bk1—17 to 32 inches; light brownish gray (2.5Y 6/3) loam, dark grayish brown (2.5Y 4/3) moist; weak coarse and medium prismatic and moderate medium subangular blocky structure; friable; few roots; many fine pores; common masses of lime; strong effervescence; moderately alkaline; gradual wavy boundary.

Bk2—32 to 36 inches; light yellowish brown (2.5Y 6/4) loam, light olive brown (2.5Y 5/4) moist; weak medium subangular blocky structure; friable; few fine roots; many fine threads of lime; strong effervescence; moderately alkaline; gradual wavy boundary.

Cr—36 to 60 inches; pale yellow (5Y 7/3) soft sandstone and siltstone, olive (5Y 5/3) moist; few masses of lime; slight effervescence; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 16 inches
Depth to soft bedrock: 20 to 40 inches
Notes: Some pedons have a stratified loam, clay loam, or silty clay loam C horizon.

Ap horizon:
Value: 3 to 5, 2 or 3 moist

Bt horizon:
Hue: 7.5YR, 10YR, or 2.5Y
Value: 4 to 6, 3 to 5 moist
Chroma: 2 to 4

Bk horizon:
Notes: Some pedons do not have a Bk horizon.

Regan Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderately slow
Landform: Drainageways and rim of depressions
Parent material: Alluvium
Slope: 0 to 3 percent
Notes: These soils are highly calcareous.

Taxonomic class: Fine-silty, mixed, superactive, frigid Typic Calciaquolls

Typical pedon:
Regan silty clay loam, 1,650 feet south and 1,000 feet east of the northwest corner of sec. 34, T. 144 N., R. 78 W. (Colors are for moist soil unless otherwise stated.)

A1—0 to 4 inches; very dark gray (2.5Y 3/1) silty clay loam, dark gray (2.5Y 4/1) dry; moderate fine granular structure; hard, friable, slightly sticky and slightly plastic; many roots; slight effervescence; moderately alkaline; clear wavy boundary.

A2—4 to 9 inches; very dark gray (5Y 3/1) silty clay loam, gray (5Y 5/1) dry; strong fine and very fine subangular blocky structure parting to strong fine granular; hard, friable, sticky and slightly plastic; common roots; strong effervescence; moderately alkaline; clear very wavy boundary.

Bkg1—9 to 16 inches; gray (5Y 5/1) silty clay loam, light gray (5Y 6/1) dry; moderate medium granular structure; very hard, friable, sticky and slightly plastic; common roots; violent effervescence; moderately alkaline; gradual wavy boundary.

Bkg2—16 to 28 inches; dark gray (5Y 4/1) silty clay loam, gray (5Y 5/1) dry; massive; extremely hard, firm; few roots; violent effervescence; moderately alkaline; gradual wavy boundary.

2Cg1—28 to 54 inches; olive gray (5Y 4/2) clay loam, gray (5Y 5/1) dry; massive; extremely hard, friable; few roots; few pores; few salt crystals; strong effervescence; moderately alkaline; clear smooth boundary.

2Cg2—54 to 60 inches; olive gray (5Y 4/2) sandy clay loam, gray (5Y 5/1) dry; few fine distinct dark yellowish brown (10YR 4/4) redoximorphic concentrations; massive; stratified with clay loam and sandy loam layers; strong effervescence; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 16 inches

A horizon:
Hue: 10YR, 2.5Y, or 5Y

Value: 2 or 3
Chroma: 1 or 2
Texture: silt loam or loam

Bkg horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 3 to 6, 4 to 7 dry
Chroma: 1 or 2
Texture: silt loam or silty clay loam

2Cg horizon:
Value: 3 to 5, 5 to 7 dry
Chroma: 1 to 4

Regent Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Slow
Landform: Pediments, hills, knolls, and ridges
Parent material: Residuum
Slope: 0 to 25 percent

Taxonomic class: Fine, smectitic, frigid Vertic Argiustolls

Typical pedon:
Regent silty clay loam, northwest corner of sec. 3, T. 139 N., R. 97 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 10 inches; dark grayish brown (10YR 4/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky and moderate fine granular structure; firm, plastic; common fine roots; common fine pores; neutral; clear smooth boundary.

Bt1—10 to 18 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; weak coarse prismatic structure separating to strong fine angular blocky; firm, plastic; few roots; common fine pores; dark grayish brown (10YR 4/2) dry clay films on faces of peds; slightly alkaline; clear wavy boundary.

Bt2—18 to 26 inches; dark grayish brown (2.5Y 4/2) silty clay, olive brown (2.5Y 4/3) moist; weak coarse prismatic structure separating to moderate medium subangular blocky; firm, plastic; few roots; common very fine pores; faint clay films on faces of peds; few faint white masses of lime; slightly alkaline; gradual wavy boundary.

Bk—26 to 39 inches; pale olive (5Y 6/3) silty clay loam, olive (5Y 5/3) moist; weak coarse prismatic structure separating to moderate medium subangular blocky; firm, plastic; few fine pores; common fine threads and few masses of lime; strong effervescence; moderately alkaline; clear wavy boundary.

Cr—39 to 62 inches; pale olive (5Y 6/3) dry soft shale; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 16 inches
Depth to soft bedrock: 24 to 40 inches

Ap horizon:
Value: 4 or 5, 2 or 3 moist

Bt horizon:
Hue: 10YR or 2.5Y
Value: 4 to 6, 2 to 4 moist
Chroma: 2 to 4

Bk horizon:
Notes: Some pedons do not have a Bk horizon.

Cr horizon:
Notes: It is soft siltstone or shale.

Rhame Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderately rapid
Landform: Pediments, hills, escarpments, and ridges
Parent material: Residuum
Slope: 1 to 50 percent

Taxonomic class: Coarse-loamy, mixed, superactive, frigid Aridic Haplustolls

Typical pedon:
Rhame fine sandy loam, 2,030 feet north and 260 feet east of the southwest corner of sec. 16, T. 131 N., R. 106 W. (Colors are for dry soil unless otherwise stated.)

A1—0 to 3 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable; many very fine roots, almost matted; neutral; clear wavy boundary.

A2—3 to 8 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium and fine subangular blocky structure; slightly hard, very friable; many very fine roots; neutral; gradual wavy boundary.

Bw—8 to 19 inches; brown (10YR 5/3) fine sandy loam, brown (10YR 4/3) moist; weak coarse prismatic structure parting to weak coarse and medium subangular blocky; slightly hard, very friable; many fine roots; neutral; gradual wavy boundary.

BC—19 to 26 inches; light yellowish brown (2.5Y 6/4) fine sandy loam, olive brown (2.5Y 4/4) moist; weak coarse prismatic structure parting to weak coarse and medium subangular blocky; slightly hard, very friable; common very fine roots; neutral; clear wavy boundary.

C—26 to 34 inches; pale yellow (2.5Y 7/3) fine sandy loam, light olive brown (2.5Y 5/4) moist; weak coarse and medium subangular blocky structure; hard, very friable; common very fine roots; few fine specks of carbonates; slight effervescence; moderately alkaline; clear wavy boundary.

Cr—34 to 60 inches; pale yellow (5Y 7/3) very soft bedded sandstone, olive (5Y 5/3) moist; massive; slightly hard and hard in strata and brittle when dry, very friable; strong effervescence.

Range in Characteristics

Mollic epipedon thickness: 7 to 14 inches
Depth to lime: 10 to 30 inches
Depth to the soft bedrock: 20 to 40 inches
10 to 40 inch particle-size control section: fine sandy loam or sandy loam.

A horizon:
Value: 4 or 5
Chroma: 2 or 3
Texture: fine sandy loam or sandy loam

Bw and BC horizons:
Value: 4 to 6, 3 to 5 moist
Chroma: 2 to 4
Texture: fine sandy loam or sandy loam

C horizon:
Texture: fine sandy loam or sandy loam
Notes: It does not have lime in some pedons.

Rhoades Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Very slow
Landform: Alluvial flats, alluvial fans, stream terraces, and ridges
Parent material: Alluvium
Slope: 0 to 9 percent
Notes: These soils are saline-sodic.

Taxonomic class: Fine, smectitic, frigid Leptic Vertic Natrustolls

Typical pedon:
Rhoades silt loam, 350 feet south and 125 feet east of the northwest corner of sec. 16, T. 131 N., R. 96 W. (Colors are for dry soil unless otherwise stated.)

E—0 to 3 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; moderate thin and medium platy structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine and few coarse roots; common fine and few coarse pores; slightly acid; abrupt smooth boundary.

Btn—3 to 8 inches; dark grayish brown (2.5Y 4/2) silty clay, very dark grayish brown (2.5Y 3/2) moist; strong medium columnar structure parting to strong fine and very fine angular blocky; extremely hard, very firm, very sticky and very plastic; common fine roots on faces of peds; common fine pores; light brownish gray (10YR 6/2) coatings on tops of columns; many faint clay films on faces of peds; moderately alkaline; clear wavy boundary.

Btknyz—8 to 14 inches; grayish brown (2.5Y 5/2) silty clay, very dark grayish brown (2.5Y 3/2) moist; moderate coarse prismatic structure parting to moderate fine angular blocky; very hard, very firm, very sticky and very plastic; common fine roots on faces of peds; common fine pores; common faint clay films on faces of peds; common fine flecks of gypsum and other salt crystals; few fine masses of carbonates; strong effervescence; strongly alkaline; gradual wavy boundary.

Bkyz—14 to 24 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; weak coarse prismatic structure parting to moderate medium subangular blocky; very hard, very firm, very sticky and very plastic; common fine roots; common fine pores; few faint clay films on faces of peds; common fine flecks of gypsum and other salt crystals; few fine masses of carbonates; strong effervescence; strongly alkaline; gradual wavy boundary.

Bky1—24 to 40 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; weak coarse prismatic structure parting to weak medium subangular blocky; very hard, very firm, very sticky and very plastic; few fine roots; common fine pores; common fine gypsum accumulations; common fine masses of carbonates; strong effervescence; strongly alkaline; gradual wavy boundary.

Bky2—40 to 46 inches; light yellowish brown (2.5Y 6/4) silty clay, light olive brown (2.5Y 5/4) moist; few fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; weak coarse subangular structure; hard, firm, very sticky and very plastic; few fine pores; few fine gypsum accumulations; common fine masses of carbonates; strong effervescence; strongly alkaline; clear wavy boundary.

C—46 to 60 inches; pale yellow (2.5Y 7/4) stratified silt loam and silty clay loam, light yellowish brown (2.5Y 6/4) moist; few fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; massive; hard, firm, sticky and plastic; few fine masses of carbonates; violent effervescence; strongly alkaline.

Range in Characteristics

Notes: Some pedons have a thin A horizon. Combined A and E horizon thickness is 1 to 5 inches.

E horizon:
Value: 4 to 6, 2 to 5 moist
Chroma: 2 or 3
Texture: loam or silt loam

Btn horizon:
Hue: 10YR or 2.5Y
Value: 3 to 5, 2 to 4 moist
Chroma: 2 or 3
Texture: silty clay loam, clay loam, clay, or silty clay

Bky horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 4 to 7, 3 to 5 moist
Chroma: 2 to 4
Texture: clay loam, loam, silty clay loam, silty clay, or clay
Notes: It does not have gypsum in some pedons.

C horizon:
Hue: 10YR, 5Y, or 2.5Y
Value: 4 to 7, 3 to 6 moist
Chroma: 1 to 4
Texture: silt loam, loam, clay loam, silty clay loam, silty clay, or clay
Notes: It has salt or gypsum in some pedons. Some pedons do not have C horizon within a depth of 60 inches.

Ringling Series

Depth class: Very deep
Drainage class: Excessively drained
Permeability: Moderately rapid over rapid
Landform: Rises on pediments
Parent material: Residuum
Slope: 2 to 6 percent

Taxonomic class: Loamy-skeletal over fragmental, mixed, superactive, frigid Typic Haplustolls

Typical pedon:
Ringling loam, 2,600 feet west and 700 feet south of the northeast corner of sec. 22, T. 3 S., R. 42 E. (Colors are for dry soil unless otherwise stated.)

A—0 to 5 inches; reddish brown (5YR 4/3) loam, dark reddish brown (5YR 3/3) moist; weak fine granular structure; soft, friable, nonsticky and nonplastic; common medium fine and very fine roots; 30 percent channers; slightly alkaline; clear smooth boundary.

Bw—5 to 17 inches; reddish brown (5YR 4/4) very channery loam, dark reddish brown (2.5YR 3/4) moist; weak very fine subangular blocky structure; soft, friable, nonsticky and nonplastic; common medium, fine, and very fine roots; 50 percent channers and 5 percent flagstones; slightly alkaline; clear smooth boundary.

2Ck—17 to 42 inches; pale red (10R 6/3) dry, highly fractured baked sandstone and shale with less than 5 percent fine material in the voids; few medium, fine, and very fine roots along faces of fragments mainly in the upper part; lime casts on coarse fragments mainly in the upper part; gradual wavy boundary.

3C—42 to 60 inches; pale red (10R 6/3) dry, highly fractured baked sandstone; less than 3 percent fine material in the voids.

Range in Characteristics

Mollic epipedon thickness: 7 to 14 inches thick
Depth to fragmental material: 12 to 20 inches

A horizon:
Hue: 7.5YR, 5YR, 2.5YR, or 10R
Value: 4 or 5, 2 or 3 moist
Chroma: 2 or 3
Notes: Rock fragments range from 10 to 80 percent. It consists of 0 to 15 percent flagstones and 10 to 65 percent channers.

Bw horizon:
Hue: 7.5YR, 5YR, 2.5YR, or 10R
Value: 4 or 5, 3 or 4 moist
Chroma: 2 to 4
Notes: Rock fragments range from 35 to 80 percent. It consists of 5 to 25 percent flagstones and 30 to 55 percent channers.

2Ck and 3C horizons:
Notes: Rock fragments range from 95 to 100 percent. It consists of 90 to 95 percent flagstones and 5 to 10 percent channers.

Savage Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Landform: Alluvial flats, alluvial fans, hills, terraces, ridges, divides, and knolls
Parent material: Alluvium
Slope: 0 to 9 percent

Taxonomic class: Fine, smectitic, frigid Vertic Argiustolls

Typical pedon:
Savage silty clay loam, 280 feet south and 395 feet east of the northwest corner of sec. 13, T. 132 N., R. 92 W. (Colors are for dry soil unless otherwise stated.)

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) silty clay loam, very dark brown (10YR 2/2) moist; moderate very fine and fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; neutral; abrupt smooth boundary.

A—5 to 7 inches; dark grayish brown (10YR 4/2) silty clay loam, very dark brown (10YR 2/2) moist; moderate medium subangular blocky structure parting to moderate very fine and fine granular; hard, firm, slightly sticky and slightly plastic; many very fine roots; neutral; clear wavy boundary.

Bt1—7 to 11 inches; grayish brown (10YR 5/2) silty clay, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic structure parting to moderate very fine subangular blocky; slightly hard, friable, very sticky and very plastic; many very fine roots; many faint clay films on faces of peds; neutral; clear wavy boundary.

Bt2—11 to 18 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; moderate medium prismatic structure parting to moderate very fine subangular blocky; hard, firm, very sticky and very plastic; common very fine roots; common distinct clay films on faces of peds; mildly alkaline; gradual wavy boundary.

Bt3—18 to 25 inches; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; weak medium prismatic structure parting to weak very fine and fine subangular blocky; hard, firm, very sticky and very plastic; common very fine roots; common distinct clay films on faces of peds; mildly alkaline; abrupt smooth boundary.

Bk1—25 to 36 inches; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; weak coarse prismatic structure; hard, firm, sticky and plastic; common very fine roots; very few distinct clay films on faces of peds; common medium irregularly shaped soft masses of lime; violent effervescence; moderately alkaline; gradual wavy boundary.

Bk2—36 to 51 inches; pale olive (5Y 6/3) silty clay loam, olive (5Y 5/3) moist; weak very coarse prismatic structure; very hard, very firm, very sticky and very plastic; few very fine roots; very few lignite channers; few fine irregularly shaped soft masses of lime; violent effervescence; moderately alkaline; clear wavy boundary.

C—51 to 80 inches; light yellowish brown (2.5Y 6/4) silty clay loam, olive brown (2.5Y 6/4) moist; massive; very hard, very firm, sticky and plastic; about 1 percent shale channers; strong effervescence; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 16 inches
Depth to lime: 12 to 30 inches

A horizon:
Hue: 10YR or 2.5Y
Value: 4 or 5, 2 or 3 moist
Chroma: 2 or 3
Texture: silty clay loam, silt loam, or clay loam
Notes: The range in rock fragments is 0 to 5 percent.

Bt horizon:
Hue: 10YR or 2.5Y
Value: 3 to 6, 2 to 4 moist
Chroma: 2 to 4
Texture: silty clay, silty clay loam, or clay
Notes: Rock fragments range from 0 to 5 percent.

Bk or C horizon:
Hue: 2.5Y or 5Y
Chroma: 2 to 4
Texture: silty clay loam, silty clay, or clay
Notes: Rock fragments range from 0 to 10 percent.

Scairt Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Very slow
Landform: Pediments, hills, and ridges
Parent material: Residuum
Slope: 0 to 15 percent
Notes: These soils are saline-sodic.

Taxonomic class: Fine, smectitic, frigid Aridic Leptic Natrustolls

Typical pedon:
Scairt silt loam, 1,775 feet east and 150 feet north of the southwest corner of sec. 7, T. 143 N., R. 100 W. (Colors are for dry soil unless otherwise stated.)

E—0 to 2 inches; grayish brown (2.5Y 5/2) silt loam, very dark grayish brown (2.5Y 3/2) moist; moderate thin platy structure parting to moderate fine granular; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots throughout; many very fine low continuity tubular pores; 25 percent clay; neutral; abrupt smooth boundary.

Btn—2 to 6 inches; dark grayish brown (2.5Y 4/2) silty clay, very dark grayish brown (2.5Y 3/2) moist; moderate medium columnar structure parting to moderate fine and medium angular blocky; very hard, very firm, very sticky and very plastic; common very fine and fine roots throughout; many very fine low continuity tubular pores; 42 percent clay; grayish brown (2.5Y 5/2) dry coats on tops of columns and common faint discontinuous clay films on faces of peds; moderately alkaline; clear wavy boundary.

Btnz—6 to 13 inches; light olive brown (2.5Y 5/3) silty clay loam, olive brown (2.5Y 4/3) moist; moderate medium prismatic structure parting to moderate fine and medium angular blocky; hard, firm, sticky and plastic; common very fine roots throughout; common very fine low continuity tubular pores; 38 percent clay; few faint patchy clay films on faces of peds; common fine threads of salt masses pedogenic throughout; few fine gypsum crystals pedogenic throughout; slight effervescence; moderately alkaline; clear wavy boundary.

Bkz—13 to 22 inches; light yellowish brown (2.5Y 6/3) silty clay loam, olive brown (2.5Y 4/3) moist; weak medium prismatic structure parting to weak medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots throughout; common very fine low continuity tubular pores; 33 percent clay; common fine irregular salt masses pedogenic throughout; few fine gypsum crystals pedogenic throughout; common fine irregular masses of lime pedogenic throughout; strong effervescence; strongly alkaline; gradual wavy boundary.

BCy—22 to 28 inches; light olive gray (5Y 6/2) silty clay loam, olive gray (5Y 4/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots throughout; common very fine low continuity tubular pores; 33 percent clay; common fine irregular nests of gypsum pedogenic throughout; very slight effervescence; strongly alkaline; abrupt wavy boundary.

Cr—28 to 60 inches; light gray (5Y 7/2) and light olive gray (5Y 6/2) weathered soft bedrock, olive gray (5Y 4/2) moist.

Range in Characteristics

Mollic epipedon thickness: 7 to 16 inches
Depth to gypsum or other salts: 7 to 16 inches
Depth to soft bedrock: 20 to 40 inches
Notes: Some pedons have an AE or Btkny horizon.

E horizon:
Hue: 2.5Y or 10YR
Value: 5 or 6, 3 or 4 moist
Chroma: 2 or 3
Texture: silt loam or loam

Btn horizon:
Hue: 2.5Y or 10YR
Value: 4 to 6, 3 to 5 moist
Texture: silty clay, silty clay loam, clay, or clay loam

Bk and BC horizons:
Hue: 2.5Y, 10YR, or 5Y
Value: 4 to 6, 4 or 5 moist
Chroma: 1 to 4
Texture: silty clay loam, silty clay, or silt loam

Cr horizon:
Hue: 5Y, 2.5Y, or 7.5YR
Value: 6 or 7, 4 or 5 moist
Chroma: 1 to 4

Schaller Series

Depth class: Very deep
Drainage class: Excessively drained
Permeability: Rapid
Landform: Escarpments
Parent material: Glaciofluvial deposits
Slope: 6 to 25 percent

Taxonomic class: Sandy, mixed, frigid Entic Haplustolls

Typical pedon:
Schaller sandy loam, 700 feet east and 90 feet south of the northwest corner of sec. 18, T. 131 N., R. 84 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 9 inches; dark brown (10YR 3/3) sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; common fine roots; 5 percent gravel; neutral; clear wavy boundary.

Bk—9 to 15 inches; grayish brown (10YR 5/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; single grain; loose, nonsticky and nonplastic; few fine roots; 5 percent gravel; fine masses of lime; strong effervescence; slightly alkaline; abrupt wavy boundary.

C—15 to 60 inches; light yellowish brown (2.5Y 6/4) gravelly loamy coarse sand, light olive brown (2.5Y 5/4) moist; single grain; loose, nonsticky and nonplastic; few very fine roots; 20 percent gravel; slightly alkaline.

Range in Characteristics

Mollic epipedon thickness: 10 to 16 inches
Depth to lime: 5 to 15 inches

A horizon:
Value: 2 or 3 moist
Texture: sandy loam or fine sandy loam

Bk horizon:
Notes: Some pedons do not have a Bk horizon.

C horizon:
Hue: 10YR or 2.5Y
Value: 5 to 7, 4 to 6 moist
Chroma: 2 to 4
Texture: sand, loamy coarse sand, loamy sand, or coarse sand
Notes: Rock fragments range from 2 to 35 percent.

Searing Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Hills, ridges, and pediments
Parent material: Alluvium
Slope: 0 to 15 percent

Taxonomic class: Fine-loamy over fragmental, mixed, superactive, frigid Typic Haplustolls

Typical pedon:
Searing loam, 1,960 feet east and 970 feet north of the southwest corner of sec. 20, T. 145 N., R. 94 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 8 inches; brown (7.5YR 4/2) loam, dark brown (7.5YR 3/2) moist; weak medium subangular blocky structure parting to fine granular; slightly hard, friable, slightly sticky and slightly plastic; many fine and medium roots; neutral; abrupt smooth boundary.

Bw—8 to 23 inches; reddish brown (5YR 4/4) loam, dark reddish brown (5YR 3/4) moist; strong coarse prismatic structure parting to moderate medium and coarse subangular blocky; hard, friable, slightly sticky and slightly plastic; common fine roots; slightly alkaline; clear smooth boundary.

C1—23 to 33 inches; reddish yellow (5YR 6/6) channery loam, yellowish red (5YR 4/6) moist; massive; soft, friable, slightly sticky and slightly plastic; common fine roots; 15 percent porcelanite channers; slight effervescence; slightly alkaline; abrupt smooth boundary.

2C2—33 to 60 inches; reddish yellow (5YR 7/6) shattered porcelanite, yellowish red (5YR 5/6) moist; strong effervescence; moderately alkaline.

Range in Characteristics

Depth to lime: 10 to 24 inches
Depth to shattered porcelanite: 20 to 40 inches
Notes: Some pedons have a Bk horizon.

Ap horizon:
Hue: 5YR, 7.5YR, or 10YR
Value: 4 or 5, 2 or 3 moist
Chroma: 2 or 3
Texture: loam or silt loam

B horizon:
Hue: 5YR, 7.5YR, or 10YR
Value: 4 to 6, 3 or 4 moist
Chroma: 2 to 4
Texture: loam, silt loam, or clay loam

C horizon:
Texture: loam or clay loam
Notes: Rock fragments range from 5 to 30 percent.

2C horizon:
Notes: It is shattered porcelanite.

Sen Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Landform: Pediments, hills, knolls, and ridges

Parent material: Residuum
Slope: 0 to 25 percent

Taxonomic class: Fine-silty, mixed, superactive, frigid Typic Haplustolls

Typical pedon:
Sen silt loam, 180 feet west and 1,990 feet north of the southeast corner of sec. 36, T. 139 N., R. 99 W. (Colors are for dry soil unless otherwise stated.)

Ap—0 to 6 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; slightly hard, friable, slightly sticky and nonplastic; common roots; neutral; abrupt smooth boundary.

Bw1—6 to 10 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak coarse prismatic structure parting to moderate coarse and medium subangular blocky; slightly hard, friable, slightly sticky and nonplastic; common roots; neutral; clear wavy boundary.

Bw2—10 to 17 inches; light yellowish brown (2.5Y 6/3) silt loam, olive brown (2.5Y 4/3) moist; moderate coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, sticky and slightly plastic; common roots; slightly alkaline; clear wavy boundary.

Bk1—17 to 23 inches; pale yellow (2.5Y 7/3) silt loam, light olive brown (2.5Y 5/4) moist; weak coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, sticky and slightly plastic; common roots; medium generally rounded masses of carbonates; violent effervescence; slightly alkaline; clear wavy boundary.

Bk2—23 to 34 inches; white (2.5Y 8/2) silt loam, light yellowish brown (2.5Y 6/4) moist; weak medium subangular blocky structure; slightly hard, friable, sticky and slightly plastic; common roots; many small iron concretions; strong effervescence; moderately alkaline; clear wavy boundary.

Cr—34 to 60 inches; pale yellow (5Y 7/3) and pale olive (5Y 6/3) soft stratified siltstone, pale olive (5Y 6/3) moist; slight effervescence.

Range in Characteristics

Depth to lime: 10 to 30 inches
Depth to soft bedrock: 20 to 40 inches

A horizon:
Value: 3 to 5, 2 or 3 moist
Chroma: 2 or 3
Texture: loam or silt loam

Bw horizon:
Value: 3 to 6, 3 to 5 moist
Chroma: 2 to 4
Texture: silt loam, loam, or silty clay loam

Bk horizon:
Hue: 2.5Y or 5Y
Value: 5 to 8, 4 to 6 moist
Texture: silt loam, silty clay loam, or loam

Seroco Series

Depth class: Very deep
Drainage class: Excessively drained
Permeability: Rapid
Landform: Alluvial fans
Parent material: Eolian
Slope: 3 to 9 percent

Taxonomic class: Mixed, frigid Typic Ustipsamments

Typical pedon:
Seroco loamy fine sand, 1,056 feet south and 60 feet east of the northwest corner of sec. 13, T. 144 N., R. 86 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 3 inches; dark grayish brown (10YR 4/2) loamy fine sand, very dark brown (10YR 3/2) moist; weak medium subangular blocky structure; loose; many fine roots; slightly acid; gradual wavy boundary.

C1—3 to 20 inches; brown (10YR 5/3) fine sand, brown (10YR 4/3) moist; single grain; common fine roots; neutral; gradual wavy boundary.

C2—20 to 60 inches; brown (10YR 5/3) fine sand, brown (10YR 4/3) moist; single grain; few roots; neutral.

Range in Characteristics

Depth to lime: 30 to more than 60 inches
10 to 40 inch particle-size control section: loamy fine sand, loamy sand, or fine sand
Percent rock fragments: 0 to 10 percent
Notes: Some pedons have AC horizons.

A horizon:
Value: 4 to 6, 3 or 4 moist
Chroma: 2 or 3

C horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 5 to 7, 4 to 6 moist
Chroma: 2 to 4

Sham Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Landform: Alluvial fans
Parent material: Alluvium
Slope: 1 to 15 percent
Notes: These soils are calcareous.

Taxonomic class: Coarse-loamy, mixed, superactive, calcareous, frigid Aridic Ustorthents

Typical pedon:
Sham loam, 500 feet north and 600 feet west of the southeast corner of sec. 19, T. 7 N., R. 9 W. (Colors are for dry soil unless otherwise stated.)

A1—0 to 4 inches; grayish brown (2.5Y 5/2) loam, dark grayish brown (2.5Y 4/2) moist; weak medium and fine granular and weak thin platy structure; hard, friable; many roots; moderately alkaline; clear wavy boundary.

A2—4 to 10 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; weak medium and fine subangular blocky structure; hard, friable; common roots; few pores; slight effervescence; moderately alkaline; clear wavy boundary.

C1—10 to 14 inches; light brownish gray (2.5Y 6/2) stratified fine sandy loam, grayish brown (2.5Y 5/2) moist; massive; very hard, friable; few roots; few pores; strong effervescence; strongly alkaline; clear wavy boundary.

C2—14 to 60 inches; light olive gray (5Y 6/2) stratified loam, silt loam, very fine sandy loam, and fine sandy loam, olive gray (5Y 5/2) moist; massive; very hard, friable; few fine roots in upper part; few masses of carbonates; strong effervescence; strongly alkaline.

Range in Characteristics

10 to 40 inch particle-size control section: Averages loam, silt loam or very fine sandy loam with 10 to 18 percent clay. It is stratified with 2 to 5 cm thick lenses.

A horizon:
Hue: 10YR or 2.5Y

C horizon:
Texture: stratified fine sandy loam to silt loam
Notes: Coarser or finer textures are below depths of 40 inches in some pedons.

Shambo Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Alluvial flats, alluvial fans, ridges, hills, knolls, and stream terraces
Parent material: Alluvium
Slope: 0 to 35 percent

Taxonomic class: Fine-loamy, mixed, superactive, frigid Typic Haplustolls

Typical pedon:
Shambo loam, about 1,800 feet south and 1,150 feet east of the northwest corner of sec. 27, T. 131 N., R. 90 W. (Colors are for dry soil unless otherwise stated.)

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many fine roots; neutral; abrupt smooth boundary.

Bw1—9 to 13 inches; dark brown (10YR 4/3) loam, very dark grayish brown (10YR 3/2) moist; moderate coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common fine roots; neutral; clear wavy boundary.

Bw2—13 to 20 inches; brown (10YR 5/3) loam, dark grayish brown (10YR 4/2) moist; moderate coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common fine roots; slightly alkaline; gradual wavy boundary.

Bw3—20 to 29 inches; light olive brown (2.5Y 5/4) loam, dark grayish brown (2.5Y 4/2) moist; moderate coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common fine roots; slightly alkaline; clear wavy boundary.

Bk—29 to 42 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; strong effervescence; moderately alkaline; gradual smooth boundary.

BCk—42 to 48 inches; light gray (2.5Y 7/2) loam, light brownish gray (2.5Y 6/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; strong effervescence; moderately alkaline; gradual smooth boundary.

C—48 to 60 inches; light gray (2.5Y 7/2) loam, light yellowish brown (2.5Y 6/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; strong effervescence; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 16 inches
Depth to lime: 10 to 35 inches
Notes: Some pedons have an Ab horizon. Some pedons have a loamy fine sand, gravelly loam, or gravelly loamy sand 2C horizon at a depth of more than 40 inches. Some pedons have a Cr horizon below a depth of 40 inches.

A horizon:
Value: 3 to 5, 2 or 3 moist
Chroma: 2 or 3
Texture: loam or silt loam

Bw horizon:
Value: 4 to 6, 3 to 5 moist
Texture: loam, silt loam, or clay loam

Bk horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 5 to 7, 4 to 6 moist
Chroma: 2 to 4
Texture: loam, silt loam, silty clay loam, or clay loam
Notes: Some pedons do not have a BCk horizon.

C horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 5 to 7, 4 to 6 moist
Chroma: 2 to 4
Texture: loam, or is stratified with sandy loam, fine sandy loam, very fine sandy loam, silty clay loam, sandy clay loam, or clay loam

Shibah Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate over rapid
Landform: Alluvial fans and ridges
Parent material: Alluvium
Slope: 3 to 50 percent

Taxonomic class: Loamy-skeletal, mixed, superactive, frigid Torriorthentic Haplustolls

Typical pedon:
Shibah loam, 2,500 feet north and 150 feet west of the southeast corner of sec. 17, T. 139 N., R. 103 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 4 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots throughout; common very fine low continuity tubular pores; 19.0 percent clay; neutral; clear smooth boundary.

Bw—4 to 8 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots throughout; common very fine low continuity tubular pores; 19.0 percent clay; 20 percent limestone-sandstone gravel and 5 percent limestone-sandstone cobbles; slightly alkaline; clear smooth boundary.

Bk—8 to 13 inches; light yellowish brown (2.5Y 6/3) very cobbly loam, olive brown (2.5Y 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots throughout; 19.0 percent clay; common irregular fine masses of lime; few carbonate coats on rock fragments; common fine irregular masses of lime pedogenic throughout; violent effervescence; 20 percent limestone-sandstone gravel and 20 percent limestone-sandstone cobbles; moderately alkaline; gradual wavy boundary.

BCk—13 to 18 inches; light yellowish brown (2.5Y 6/3) very cobbly loam, light olive brown (2.5Y 5/3) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots throughout; 18.0 percent clay; few carbonate coats on rock fragments; violent effervescence; 30 percent limestone-sandstone cobbles and 20 percent limestone-sandstone gravel; moderately alkaline; gradual wavy boundary.

C—18 to 80 inches; light yellowish brown (2.5Y 6/3) very cobbly loam, light olive brown (2.5Y 5/3) moist; massive; soft, very friable, slightly sticky and slightly plastic; common very fine roots throughout; 18.0 percent clay; few carbonate coats on rock fragments; violent effervescence; 30 percent limestone-sandstone cobbles and 20 percent limestone-sandstone gravel; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 10 inches
Depth to lime: 7 to 10 inches
Depth to loamy-skeletal material: less than 10 inches
Notes: Some pedons have a 2C horizon.

A horizon:
Value: 4 or 5, 3 or 4 moist
Chroma: 2 or 3
Texture: loam or silt loam
Notes: Rock fragments from 0 to 30 percent.

Bw horizon:
Hue: 10YR or 2.5Y
Value: 4 to 6, 3 to 5 moist
Notes: Rock fragments range from 20 to 50 percent.

Bk horizon:
Hue: 2.5Y or 10YR
Value: 5 or 6
Chroma: 2 or 3
Texture: loam or silt loam
Notes: Rock fragments range from 30 to 55 percent.

C horizon:
Hue: 2.5Y or 10YR
Value: 5 to 7, 4 or 5 moist
Chroma: 2 to 4
Texture: loam, sandy loam, or sandy clay loam
Notes: Rock fragments range from 35 to 70 percent.

Stady Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate over very rapid
Landform: Escarpments and stream terraces
Parent material: Alluvium
Slope: 0 to 9 percent

Taxonomic class: Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Haplustolls

Typical pedon:
Stady loam, 220 feet north and 115 feet east of the southwest corner of sec. 35, T. 133 N., R. 100 W. (Colors are for dry soil unless otherwise stated.)

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; friable; many roots and very fine pores; neutral; abrupt smooth boundary.

Bw1—6 to 12 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; strong coarse prismatic and moderate medium subangular blocky structure; friable; common roots; common very fine pores; faint clay films on prism faces; neutral; gradual smooth boundary.

Bw2—12 to 15 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; moderate coarse prismatic structure; friable; few roots; common very fine pores; neutral; clear wavy boundary.

Bk1—15 to 18 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; weak coarse prismatic and moderate coarse and medium subangular blocky structure; friable; few roots; strong effervescence; slightly alkaline; clear wavy boundary.

Bk2—18 to 29 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; weak coarse prismatic and weak coarse subangular blocky structure; friable; few roots; few stones; common masses of lime; violent effervescence; moderately alkaline; clear wavy boundary.

2Bk3—29 to 42 inches; light brownish gray (2.5Y 6/2) sand and gravel, grayish brown (2.5Y 5/2) moist; single grain; loose; thin lime crusts coat bottom of all pebbles; violent effervescence; moderately alkaline; gradual boundary.

2C—42 to 60 inches; light yellowish brown (10YR 6/4) sand and gravel, dark yellowish brown (10YR 4/4) moist; single grain; loose; strong effervescence; moderately alkaline.

Range in Characteristics

Depth to lime: 15 to 25 inches
Depth to sand and gravel: 20 to 40 inches

Ap horizon:
Value: 3 to 5, 2 or 3 moist

Bw horizon:
Value: 4 to 6, 2 to 4 moist
Chroma: 2 to 4

Bk horizon:
Hue: 10YR or 2.5Y
Value: 6 or 7, 4 or 5 moist
Chroma: 2 to 4

2Bk and 2C horizons:
Value: 4 or 5

Straw Series

Depth class: Very deep
Drainage class: Well
Permeability: Moderate
Landform: Flood plains and alluvial flats
Parent material: Alluvium
Slope: 0 to 6 percent

Taxonomic class: Fine-loamy, mixed, superactive, frigid Cumulic Haplustolls

Typical pedon:
Straw loam, 1,800 feet west and 30 feet south of the northeast corner of sec. 10, T. 136 N., R. 94 E. (Colors are for dry soil unless otherwise stated.)

Ap—0 to 5 inches; very dark grayish brown (10YR 3/2) loam, very dark brown (10YR 2/2) moist; weak medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; neutral; clear wavy boundary.

A1—5 to 10 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak coarse prismatic structure parting to weak medium subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; neutral; clear wavy boundary.

A2—10 to 23 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; many very fine and common fine roots; mildly alkaline; clear wavy boundary.

A3—23 to 30 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak coarse prismatic structure parting to moderate medium subangular blocky; hard, friable, slightly sticky and slightly plastic; common very fine roots; disseminated lime throughout; slight effervescence; moderately alkaline; gradual wavy boundary.

C—30 to 36 inches; pale brown (10YR 6/3) clay loam, brown (10YR 4/3) moist; massive; very hard, firm, sticky and plastic; common very fine roots; few pebbles; few fine and medium rounded soft masses of lime; strong effervescence; moderately alkaline; gradual wavy boundary.

Ab—36 to 40 inches; grayish brown (10YR 5/2) clay loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; hard, firm, sticky and plastic; few very fine roots; common fine and medium irregularly shaped soft masses of lime; strong effervescence; moderately alkaline; gradual wavy boundary.

C'—40 to 60 inches; pale brown (10YR 6/3) clay loam, brown (10YR 4/3) moist; massive; very hard, firm, sticky and plastic; few very fine roots; few fine and medium irregularly shaped soft masses of lime; strong effervescence; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 16 to 40 inches
Depth to the Bk horizon: 13 to 30 inches
Notes: The soil may be noncalcareous to a depth of 25 inches. Some pedons have Bw or Ab horizons. This soil has a range of 0 to 10 percent gravel.

Ap and A horizons:
Hue: 10YR or 2.5Y
Value: 3 to 5, 2 or 3 moist
Chroma: 2 or 3
Texture: loam, clay loam, silt loam, sandy clay loam, or silty clay loam
Notes: This horizon has less than 15 to 35 percent fine and coarser sand.

Bk horizon:
Hue: 10YR or 2.5Y
Value: 4 to 6, 3 to 5 moist
Chroma: 2 to 4
Texture: loam, silt loam, silty clay loam, or clay loam
Notes: This horizon has less than 15 to 35 percent fine and coarser sand.

C horizon:
Hue: 10YR or 2.5Y
Value: 5 or 6, 4 or 5 moist
Chroma: 2 to 4

Texture: loam, silt loam, or clay loam stratified with sandy loam, or fine sandy loam

2C horizon:
Hue: 10YR or 2.5Y
Value: 5 to 7, 4 to 6 moist
Chroma: 2 to 4
Texture: stratified loam to loamy sand but, mainly sandy loam or loamy sand

Tally Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately rapid
Landform: Alluvial fans, alluvial flats, ridges, stream terraces, escarpments, and hills
Parent material: Alluvium
Slope: 0 to 15 percent

Taxonomic class: Coarse-loamy, mixed, superactive, frigid Typic Haplustolls

Typical pedon:
Tally fine sandy loam, 1,200 feet east and 2,000 feet south of the northwest corner of sec. 7, T. 20 N., R. 56 E. (Colors are for dry soil unless otherwise stated.)

Ap—0 to 6 inches; dark brown (10YR 3/3) fine sandy loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common fine and very fine roots; neutral; abrupt smooth boundary.

Bw1—6 to 14 inches; dark brown (10YR 3/3) fine sandy loam, very dark brown (10YR 2/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common fine and very fine roots; many fine and very fine pores; neutral; clear smooth boundary.

Bw2—14 to 32 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and nonplastic; common fine and very fine roots; many fine and very fine pores; neutral; clear smooth boundary.

Bk1—32 to 38 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 4/3) moist; massive; slightly hard, friable, slightly sticky and nonplastic; common very fine roots; common very fine pores; strong effervescence; moderately alkaline; clear smooth boundary.

Bk2—38 to 60 inches; light yellowish brown (2.5Y 6/4) fine sandy loam, light olive brown (2.5Y 5/4) moist; massive; slightly hard, friable, slightly sticky and nonplastic; few very fine roots; common very fine pores; violent effervescence; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 16 inches
Percent rock fragments: Up to 15 percent above 40 inches and up to 25 percent below 40 inches
Depth to the Bk horizon: 15 to 35 inches
Depth to loamy fine sand and coarser material: More than 20 inches
Notes: Some pedons have a C horizon.

Ap horizon:
Hue: 7.5YR, 10YR, or 2.5Y
Value: 3 to 5, 2 to 4 moist
Texture: fine sandy loam or sandy loam

Bw horizon:
Hue: 7.5YR, 10YR, or 2.5Y
Texture: fine sandy loam or sandy loam

Bk horizon:
Hue: 7.5YR, 10YR, or 2.5Y
Value: 5 to 7, 4 to 6 moist
Chroma: 2 to 4
Texture: fine sandy loam or sandy loam
Notes: It has textures of loamy fine sand, loamy sand, or fine sand below a depth of 40 inches in some pedons.

Tanna Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Slow
Landform: Pediments and ridges
Parent material: Residuum
Slope: 0 to 35 percent

Taxonomic class: Fine, smectitic, frigid Aridic Argiustolls

Typical pedon:
Tanna clay loam, 400 feet north and 150 feet east of the southwest corner of sec. 34, T. 22 N., R. 3 E. (Colors are for dry soil unless otherwise stated.)

Ap—0 to 6 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; hard, very friable, sticky and plastic; many fine and very fine roots; neutral; abrupt wavy boundary.

Bt—6 to 17 inches; brown (10YR 5/3) clay loam, dark brown (10YR 4/3) moist; moderate medium prismatic structure parting to strong fine and medium blocky; very hard, friable, sticky and plastic; many fine and very fine roots; many fine and very fine pores; many distinct clay films on faces of peds; 5 percent channers; slightly alkaline; clear wavy boundary.

Bk1—17 to 27 inches; light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist; moderate medium and coarse prismatic structure; very hard, friable, sticky and plastic; common fine and very fine roots; many fine and very fine pores; 5 percent channers; continuous distinct lime coating on channers; common fine masses of segregated lime; strong effervescence; moderately alkaline; gradual wavy boundary.

Bk2—27 to 31 inches; pale brown (10YR 6/3) very channery loam, brown (10YR 4/3) moist; massive; hard, very friable, slightly sticky and nonplastic; common fine and very fine roots; many fine and very fine pores; 55 percent channers; continuous distinct lime coating on channers; few fine masses of lime; strong effervescence; moderately alkaline; gradual wavy boundary.

Cr—31 to 60 inches; semiconsolidated shale and mudstone interbedded with layers of hard sandstone.

Range in Characteristics

Mollic epipedon thickness: 7 to 12 inches
Depth to the Bk horizon: 10 to 20 inches
Depth to soft bedrock: 20 to 40 inches
Notes: Some pedons have a Bky horizon.

Ap horizon:
Hue: 10YR or 2.5Y
Value: 2 or 3 moist
Chroma: 2 or 3
Notes: Rock fragments range from 0 to 25 percent. The fragments are 0 to 15 percent cobbles and 0 to 10 percent channers or pebbles.

Bt horizon:
Hue: 10YR or 2.5Y
Value: 4 to 6, 3 or 4 moist
Chroma: 2 or 3
Texture: clay loam, silty clay loam, clay, or silty clay
Notes: Rock fragments range from 0 to 10 percent. The fragments are 0 to 5 percent cobbles and 0 to 5 percent channers.

Bk1 horizon:
Hue: 10YR or 2.5Y
Value: 5 or 6, 4 or 5 moist
Chroma: 2 or 3
Texture: clay loam, silty clay loam or clay
Notes: Rock fragments range from 0 to 10 percent. The fragments are 0 to 5 percent cobbles and 0 to 5 percent channers.

Bk2 horizon:
Hue: 10YR or 2.5Y
Value: 5 to 7, 4 to 6 moist
Chroma: 1 to 4
Texture: loam, clay loam, clay, or silty clay loam
Notes: Rock fragments range from 0 to 60 percent. The fragments are 0 to 5 percent cobbles and 0 to 55 percent channers.

Telfer Series

Depth class: Very deep
Drainage class: Somewhat excessively drained
Permeability: Rapid
Landform: Hills, ridges, alluvial flats, and alluvial fans
Parent material: Alluvium
Slope: 0 to 25 percent

Taxonomic class: Sandy, mixed, frigid Entic Haplustolls

Typical pedon:
Telfer fine sandy loam, 265 feet north and 150 feet west of the center of sec. 32, T. 138 N., R. 79 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 6 inches; dark grayish brown (10YR 4/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; single grain; loose; many roots; neutral; clear smooth boundary.

AC—6 to 14 inches; grayish brown (10YR 5/2) fine sand, very dark grayish brown (10YR 3/2) moist; single grain; loose; common roots; neutral; gradual boundary.

C—14 to 60 inches; light olive brown (2.5Y 5/4) fine sand, dark grayish brown (2.5Y 4/2) moist; single grain; loose; few roots at top and few fine roots at 40 inches; neutral.

Range in Characteristics

Mollic epipedon thickness: 10 to 20 inches

A horizon:
Value: 3 to 5, 2 or 3 moist
Texture: fine sandy loam or sandy loam

AC horizon:
Value: 4 or 5
Texture: loamy sand, fine sand, or loamy fine sand

C horizon:
Hue: 10YR or 2.5Y
Value: 4 to 7, 4 or 5 moist
Texture: fine sand or sand

Tinsley Series

Depth class: Very deep
Drainage class: Excessively drained
Permeability: Rapid
Landform: Paleoterraces and escarpments
Parent material: Alluvium
Slope: 3 to 35 percent

Taxonomic class: Sandy-skeletal, mixed, frigid Aridic Ustorthents

Typical pedon:
Tinsley very gravelly sandy loam, 2,500 feet south and 2,000 feet east of the northwest corner of sec. 26, T. 12 N., R. 51 E. (Colors are for dry soil unless otherwise stated.)

A—0 to 3 inches; brown (10YR 4/3) very gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, slightly sticky and nonplastic; many very fine roots; 10 percent cobbles, 45 percent gravel; neutral; clear boundary.

C1—3 to 11 inches; brown (10YR 5/3) extremely gravelly loamy sand, dark grayish brown (10YR 4/2) moist; single grain; soft, very friable, nonsticky and nonplastic; many very fine roots; 10 percent cobbles, 55 percent gravel; neutral; clear smooth boundary.

C—11 to 60 inches; pale brown (10YR 6/3) extremely gravelly loamy sand, brown (10YR 4/3) moist; single grain; loose, nonsticky and nonplastic; common very

fine roots in the upper 13 inches and few very fine roots below that depth; 10 percent cobbles, 50 percent gravel; very slight effervescence; moderately alkaline.

Range in Characteristics

A horizon:
Hue: 10YR or 2.5Y
Value: 4 or 5, 3 or 4 moist
Chroma: 2 to 4
Texture: sandy loam or loamy sand
Notes: Rock fragments range from 15 to 60 percent.

C horizon:
Hue: 10YR or 2.5Y
Value: 5 to 7, 4 to 6 moist
Chroma: 2 to 4
Texture: sand or loamy sand
Notes: Rock fragments range from 35 to 80 percent.

Trembles Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderately rapid
Landform: Flood plains
Parent material: Alluvium
Slope: 0 to 2 percent
Notes: These soils are calcareous.

Taxonomic class: Coarse-loamy, mixed, superactive, calcareous, frigid Typic Ustifluvents

Typical pedon:
Trembles fine sandy loam, 1,480 feet south and 1,320 feet east of the northwest corner of sec. 8, T. 23 N., R. 60 E. (Colors are for dry soil unless otherwise stated.)

Ap—0 to 9 inches; grayish brown (2.5Y 5/2) fine sandy loam, dark grayish brown (2.5Y 4/2) moist; moderate coarse subangular blocky structure parting to moderate coarse granular; hard, friable, slightly sticky and slightly plastic; common very fine roots throughout; very slight effervescence; slightly alkaline; abrupt smooth boundary.

C1—9 to 15 inches; light yellowish brown (2.5Y 6/3) stratified fine sandy loam, olive brown (2.5Y 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; stratification are 1 to 2 mm thick; few very fine roots throughout; common fine irregular dark yellowish brown (10YR 4/6) iron concretions pedogenic throughout; slight effervescence; slightly alkaline; clear smooth boundary.

C2—15 to 23 inches; light brownish gray (2.5Y 6/2) stratified silt loam, very fine sandy loam, and loam, grayish brown (2.5Y 5/2) moist; massive; hard, friable, slightly sticky and slightly plastic; stratification are 1 to 2 mm thick; few very fine roots throughout; common medium irregular strong brown (7.5YR 4/6) iron concretions pedogenic throughout; few fine irregular masses of lime pedogenic throughout; strong effervescence; moderately alkaline; clear smooth boundary.

C3—23 to 27 inches; light yellowish brown (2.5Y 6/3) fine sandy loam, light olive brown (2.5Y 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; stratification are 1 to 2 mm thick; few very fine roots throughout; many fine irregular dark yellowish brown (10YR 4/6) iron concretions pedogenic throughout; strata of organic matter or coal 1 mm thick throughout; strong effervescence; moderately alkaline; clear smooth boundary.

C4—27 to 48 inches; light brownish gray (2.5Y 6/2) fine sandy loam, grayish brown (2.5Y 5/2) moist; massive; soft, very friable, nonsticky and nonplastic; stratification are 1 to 2 mm thick; few very fine roots throughout; strata of organic matter or coal 1 mm thick throughout; slight effervescence; moderately alkaline; clear smooth boundary.

C5—48 to 59 inches; light brownish gray (2.5Y 6/2) stratified very fine sandy loam, silt loam, and fine sandy loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; stratification are 1 to 2 mm thick; strong effervescence; moderately alkaline; clear smooth boundary.

2C6—59 to 63 inches; light brownish gray (2.5Y 6/2) stratified sand, grayish brown (2.5Y 5/2) moist; single grain; loose, nonsticky and nonplastic; stratification are 1 to 2 mm thick; common fine irregular dark yellowish brown (10YR 4/6) iron concretions pedogenic throughout; slight effervescence; strata of organic matter or coal 1 mm thick throughout; moderately alkaline; clear smooth boundary.

2C7—63 to 80 inches; light brownish gray (2.5Y 6/2) sand, grayish brown (2.5Y 5/2) moist; single grain; loose, nonsticky and nonplastic; common fine irregular dark yellowish brown (10YR 4/6) iron concretions pedogenic throughout; strata of coal 1 mm thick throughout; slight effervescence; moderately alkaline.

Range in Characteristics

Ap horizon:
Hue: 10YR or 2.5Y

C horizon:
Hue: 2.5Y or 10YR
Texture: fine sandy loam, very fine sandy loam, sandy loam, loam, or silt loam

Tusler Series

Depth class: Moderately deep
Drainage class: Somewhat excessively drained
Permeability: Rapid
Landform: Pediments and ridges
Parent material: Residuum
Slope: 3 to 35 percent

Taxonomic class: Mixed, frigid Aridic Ustipsamments

Typical pedon:
Tusler loamy fine sand, 1,820 feet east and 1,630 feet south of the northwest corner of sec. 30, T. 129 N., R. 106 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 3 inches; grayish brown (10YR 5/2) loamy fine sand, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; loose; many roots; neutral; abrupt smooth boundary.

C1—3 to 10 inches; grayish brown (10YR 5/2) loamy fine sand, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; loose; many roots; slight effervescence; slightly alkaline; clear wavy boundary.

C2—10 to 19 inches; brown (10YR 5/3) loamy fine sand, brown (10YR 4/3) moist; weak medium subangular blocky structure; loose; few roots; slight effervescence; slightly alkaline; gradual wavy boundary.

C3—19 to 27 inches; light yellowish brown (2.5Y 6/4) loamy fine sand, light olive brown (2.5Y 5/4) moist; weak medium subangular blocky structure parting to single grain; loose; few roots; strong effervescence; moderately alkaline; clear wavy boundary.

Cr—27 to 60 inches; light gray (2.5Y 7/2) soft sandstone that crushes to loamy fine sand, grayish brown (2.5Y 5/2) moist; hard and brittle when dry; strong effervescence; moderately alkaline.

Range in Characteristics

Depth to lime: 0 to 12 inches
Depth to soft bedrock: 20 to 40 inches
10 to 40 inch particle-size control section: loamy fine sand, fine sand, or loamy sand

A horizon:
Hue: 10YR or 2.5Y
Value: 5 or 6, 3 or 4 moist
Chroma: 2 or 3

C horizon:
Texture: loamy fine sand, fine sandy loam, or sandy loam

Cr horizon:
Hue: 2.5Y or 5Y
Value: 6 or 7, 5 or 6 moist
Chroma: 2 or 3
Notes: It is weakly consolidated and crushes to loamy fine sand or fine sand.

Ustorthents

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Stream terraces
Parent material: Alluvium
Slope: 0 to 6 percent

Taxonomic class: Ustorthents

Typical pedon:
Ustorthents fine sandy loam, 650 feet east and 400 feet north of the southwest corner of sec. 2, T. 137 N., R. 100 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 3 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; slightly hard,

friable, slightly sticky and nonplastic; common very fine roots; neutral; clear smooth boundary.

C1—3 to 17 inches: pale brown (2.5Y 6/3, 80 percent) and grayish brown (2.5Y 5/2, 20 percent) fine sandy loam, olive brown (2.5Y 4/3) and very dark grayish brown (2.5Y 3/2) moist; massive; slightly hard, friable, slightly sticky and nonplastic; common very fine roots; slightly alkaline; gradual wavy boundary.

C2—17 to 60 inches; pale brown (2.5Y 6/3) sandy loam, olive brown (2.5Y 4/3) moist; massive; slightly hard, friable, slightly sticky and nonplastic; few very fine roots in the upper 10 inches; slightly alkaline.

Range in Characteristics

A horizon:
Hue: 10YR or 2.5Y
Value: 4 to 6, 3 to 5 moist
Chroma: 2 to 4
Texture: fine sandy loam or sandy loam

C horizon:
Hue: 10YR or 2.5Y
Value: 4 to 7, 3 to 6 moist
Chroma: 2 to 4

Vebar Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderately rapid
Landform: Pediments, divides, knolls, hills, and ridges
Parent material: Residuum
Slope: 0 to 50 percent

Taxonomic class: Coarse-loamy, mixed, superactive, frigid Typic Haplustolls

Typical pedon:
Vebar fine sandy loam, 2,570 feet west and 355 feet south of the northeast corner of sec. 16, T. 138 N., R. 95 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 5 inches; dark grayish brown (10YR 4/2) fine sandy loam, very dark brown (10YR 2/2) moist; weak coarse and medium prismatic structure parting to weak fine subangular blocky; slightly hard, very friable, slightly sticky and nonplastic; many roots; many fine pores; slightly acid; gradual wavy boundary.

Bw1—5 to 14 inches; dark grayish brown (10YR 4/2) fine sandy loam, dark brown (10YR 3/3) moist; moderate coarse prismatic structure parting to weak medium subangular blocky; slightly hard, very friable, slightly sticky and nonplastic; many fine roots; many fine pores; slightly acid; gradual wavy boundary.

Bw2—14 to 19 inches; brown (10YR 5/3) fine sandy loam, brown (10YR 4/3) moist; moderate coarse prismatic structure parting to weak medium and fine subangular blocky; slightly hard, very friable, slightly sticky and nonplastic; common fine roots; common fine pores; neutral; clear wavy boundary.

Bw3—19 to 26 inches; brown (10YR 5/3) fine sandy loam, brown (10YR 4/3) moist; weak coarse prismatic structure; slightly hard, very friable, nonsticky and nonplastic; few roots; common fine pores; neutral; clear wavy boundary.

BCk—26 to 32 inches; light yellowish brown (2.5Y 6/4) fine sandy loam, light olive brown (2.5Y 5/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few hard sandstone fragments; few small sandstone fragments; few small lime accumulations; strong effervescence; slightly alkaline; clear wavy boundary.

Cr—32 to 60 inches; light yellowish brown (2.5Y 6/4) dry soft sandstone; strong effervescence in upper part and slight effervescence in lower part; lenses of hard sandstone 3 inches thick at 43 inches with lime accumulations around hard fragments; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 16 inches
Depth to soft bedrock: 20 to 40 inches
Notes: Some pedons have an A horizon that is extremely stony fine sandy loam or extremely stony sandy loam.

A horizon:
Value: 3 to 5, 2 or 3 moist
Texture: fine sandy loam or sandy loam

Bw horizon:
Hue: 10YR or 2.5Y
Value: 4 to 6
Chroma: 2 to 4

C horizon:
Hue: 10YR or 2.5Y
Value: 5 to 7, 4 to 6 moist
Chroma: 2 to 4
Texture: fine sandy loam or loamy fine sand

Velva Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately rapid
Landform: Flood plains
Parent material: Alluvium
Slope: 0 to 2 percent

Taxonomic class: Coarse-loamy, mixed, superactive, frigid Fluventic Haplustolls

Typical pedon:
Velva fine sandy loam, 1,090 feet west and 90 feet north of the southeast corner of sec. 13, T. 144 N., R. 87 W. (Colors are for dry soil unless otherwise stated.)

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) fine sandy loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many roots; many fine pores; neutral; abrupt smooth boundary.

AC—6 to 12 inches; dark grayish brown (10YR 4/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak very coarse prismatic structure parting to weak coarse subangular blocky; slightly hard, very friable, slightly sticky and

slightly plastic; many roots; many fine pores; slightly alkaline; abrupt smooth boundary.

Ab—12 to 13 inches; very dark grayish brown (10YR 3/2) fine sandy loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many roots; many fine pores; slight effervescence; slightly alkaline; clear smooth boundary.

C1—13 to 15 inches; grayish brown (2.5Y 5/2) fine sandy loam, very dark grayish brown (2.5Y 3/2) moist; weak coarse prismatic structure parting to weak coarse and medium subangular blocky; hard, friable, slightly sticky and slightly plastic; common roots; common fine pores; strong effervescence; slightly alkaline; clear smooth boundary.

C2—15 to 36 inches; grayish brown (2.5Y 5/2) fine sandy loam with thin strata of loam and loamy fine sand less than 1 inch thick, dark grayish brown (2.5Y 4/2) moist; weak very coarse prismatic structure parting to weak coarse and medium subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; common roots; common fine pores; strong effervescence; slightly alkaline; clear smooth boundary.

C3—36 to 52 inches; grayish brown (2.5Y 5/2) loamy fine sand, very dark grayish brown (2.5Y 3/2) moist; single grain; few roots; strong effervescence; moderately alkaline; clear smooth boundary.

C4—52 to 60 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; weak coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few roots; few pores; strong effervescence; moderately alkaline.

Range in Characteristics

10 to 40 inch particle-size control section: averages 7 to 18 percent clay and 25 and 60 percent fine sand and coarser sand
Notes: Some pedons have Bw or Bk horizons.

Ap horizon:
Hue: 10YR or 2.5Y
Value: 3 to 5, 2 or 3 moist
Chroma: 1 to 3

C horizon:
Hue: 10YR or 2.5Y
Value: 4 to 7, 3 to 5 moist
Chroma: 2 to 4
Texture: averages fine sandy loam, very fine sandy loam, or loam

Wabek Series

Depth class: Very deep
Drainage class: Excessively drained
Permeability: Very rapid
Landform: Escarpments and stream terraces
Parent material: Alluvium
Slope: 3 to 25 percent

Taxonomic class: Sandy-skeletal, mixed, frigid Entic Haplustolls

Typical pedon:
Wabek loam, 2,490 feet north of the southeast corner of sec. 1, T. 140 N., R. 77 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 5 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many roots; about 3 percent rock fragments; neutral; gradual wavy boundary.

Bk—5 to 9 inches; light brownish gray (10YR 6/2) gravelly coarse sandy loam, brown (10YR 4/3) moist; single grain; common roots; about 25 percent rock fragments; lime crusts coat undersides of rock fragments; strong effervescence; slightly alkaline; diffuse boundary.

C—9 to 60 inches; pale brown (10YR 6/3) very gravelly coarse sand, grayish brown (10YR 5/2) moist; stratified with varying amounts and mixtures of gravel and cobblestones; single grain; few roots in upper 10 inches; about 50 percent rock fragments; strong effervescence decreasing to slight effervescence in the lower part; slightly alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 11 inches
Depth to sand and gravel: 7 to 14 inches

Ap horizon:
Value: 3 or 4, 2 or 3 moist
Notes: Rock fragments range up to 45 percent.

Bk horizon:
Hue: 10YR or 2.5Y
Value: 4 to 8, 2 to 6 moist
Chroma: 2 to 4
Notes: Rock fragments range from 5 to 60 percent.

C horizon:
Hue: 10YR or 2.5Y
Value: 4 to 7, 3 to 6 moist
Chroma: 2 to 4
Notes: Rock fragments range from 20 to 70 percent.

Wayden Series

Depth class: Shallow
Drainage class: Well drained
Permeability: Slow
Landform: Ridges, hills, rises on pediments, and divides
Parent material: Residuum
Slope: 3 to 25 percent
Notes: These soils are calcareous.

Taxonomic class: Clayey, smectitic, calcareous, frigid, shallow Typic Ustorthents

Typical pedon:
Wayden silty clay, 475 feet north and 130 feet west of the southeast corner of sec. 13, T. 131 N., R. 102 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 3 inches; light gray (2.5Y 7/2) silty clay, grayish brown (2.5Y 5/2) moist; strong very fine granular structure; hard, friable, sticky and plastic; many fine and very fine roots; slight effervescence; moderately alkaline; clear wavy boundary.

Bk—3 to 7 inches; light gray (5Y 7/2) silty clay, olive gray (5Y 5/2) moist; moderate coarse and medium subangular blocky structure parting to moderate fine subangular blocky; very hard, friable, sticky and plastic; common fine and very fine roots; common fine pores; strong effervescence; moderately alkaline; gradual smooth boundary.

By—7 to 15 inches; light gray (5Y 7/2) silty clay, olive gray (5Y 5/2) moist; weak coarse subangular blocky structure parting to moderate fine subangular blocky; very hard, friable, sticky and plastic; common fine and very fine roots; many gypsum crystals; few soft shale chips; slight effervescence; moderately alkaline; gradual wavy boundary.

Cr—15 to 60 inches; olive (5Y 5/3) stratified silty clay shale, pale olive (5Y 6/3) moist; yellowish brown (10YR 5/6) moist stains on plates in places; extremely hard, very fine; slakes in water; slight effervescence; moderately alkaline.

Range in Characteristics

Depth to soft bedrock: 10 to 20 inches
Notes: Some pedons have an AC or ABk horizon. Some pedons have C horizons above the Cr.

A horizon:
Hue: 2.5Y or 5Y
Value: 5 to 7, 3 to 5 moist
Chroma: 2 or 3
Texture: silty clay or clay
Notes: Some uncultivated pedons have a chroma of 1.

Bk and By horizons:
Hue: 2.5Y or 5Y
Value: 5 to 8, 4 to 6 moist
Chroma: 1 to 4
Texture: silty clay, silty clay loam, clay, or clay loam
Notes: Some pedons do not have Bk or By horizons.

Wolf Point Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Landform: Flood plains
Parent material: Alluvium
Slope: 0 to 2 percent
Notes: These soils are calcareous.

Taxonomic class: Fine, smectitic, calcareous, frigid Torrertic Ustifluvents

Typical pedon:
Wolf Point silty clay loam, 160 feet south and 825 feet east of the northwest corner of sec. 25, T. 132 N., R. 107 W. (Colors are for dry soil unless otherwise stated.)

A1—0 to 1 inch; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; platy structure; soft, friable, sticky and plastic; neutral; abrupt smooth boundary.

A2—1 to 5 inches; grayish brown (2.5Y 5/2) silty clay loam, very dark grayish brown (2.5Y 3/2) moist; weak medium and fine angular blocky structure; extremely hard, very firm, very sticky and very plastic; neutral; gradual wavy boundary.

A3—5 to 10 inches; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; moderate very fine angular blocky structure; extremely hard, very firm, very sticky and very plastic; slightly alkaline; gradual wavy boundary.

C1—10 to 18 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; massive; extremely hard, very firm, very sticky and very plastic; few masses of lime; slightly alkaline; diffuse wavy boundary.

C2—18 to 29 inches; olive gray (5Y 5/2) clay, olive gray (5Y 4/2) moist; weak fine blocky structure; extremely hard, very firm, very sticky and very plastic; many segregations of gypsum and lime; slightly alkaline; diffuse wavy boundary.

C3—29 to 60 inches; olive gray (5Y 5/2) silty clay, olive (5Y 5/3) moist; massive; very hard, very sticky and very plastic; common segregations of gypsum and lime; slight effervescence; moderately alkaline.

Range in Characteristics

Depth to lime: 0 to 10 inches
Notes: Some pedons have Ab horizons.

A horizon:
Hue: 10YR or 2.5Y
Value: 5 or 6
Chroma: 1 or 2

C horizon:
Value: 5 to 7, 4 to 6 moist
Texture: silty clay loam, silty clay, or clay
Notes: Some pedons have coarser textures below depths of 40 inches.

Yawdim Series

Depth class: Shallow
Drainage class: Well drained
Permeability: Slow
Landform: Ridges and rises on pediments
Parent material: Residuum
Slope: 3 to 25 percent
Notes: These soils are calcareous.

Taxonomic class: Clayey, smectitic, calcareous, frigid, shallow Aridic Ustorthents

Typical pedon:
Yawdim silty clay, 910 feet south and 375 feet west of the northeast corner of sec. 34, T. 130 N., R. 104 W. (Colors are for dry soil unless otherwise stated.)

A—0 to 3 inches; gray (N 5/0) silty clay, dark grayish brown (2.5Y 4/2) moist; weak fine subangular blocky structure parting to moderate fine granular; very hard, friable, sticky and plastic; many roots; slightly alkaline; clear smooth boundary.

C1—3 to 9 inches; light brownish gray (2.5Y 6/2) silty clay, dark grayish brown (2.5Y 4/2) moist; few fine distinct light olive brown (2.5Y 5/4) moist mottles; weak coarse prismatic structure parting to moderate medium and fine subangular blocky; very hard, firm, sticky and plastic; common fine roots; common pores; slight effervescence; moderately alkaline; clear wavy boundary.

C2—9 to 15 inches; light gray (5Y 7/1) silty clay, gray (5Y 5/1) moist; weak medium angular blocky structure parting to weak fine platy; very hard, firm, sticky and plastic; few roots; few pores; few masses of carbonates; slight effervescence; moderately alkaline; clear wavy boundary.

Cr1—15 to 22 inches; light gray (5Y 7/2) partly weathered soft platy shale which crushes to silty clay; few roots between plates; slight effervescence; many gypsum crystals; few masses of carbonates; gradual boundary.

Cr2—22 to 60 inches; pale yellow (5Y 7/3) and light gray (5Y 7/1) platy shale; light yellowish brown (10YR 5/4) and black (10YR 2/1) stains on faces of plates; slight effervescence.

Range in Characteristics

Depth to soft bedrock: 10 to 20 inches.
Notes: The soil is silty clay loam, clay loam, silty clay, or clay averaging between 35 and 50 percent clay throughout.

A horizon:
Hue: 10YR, 2.5Y, or neutral
Value: 5 or 6, 3 or 4 moist

C horizon:
Hue: 10YR, 2.5Y, or 5Y
Value: 5 to 8, 4 to 6 moist

Cr horizon:
Notes: It is soft, calcareous siltstone or shale.

Zeona Series

Depth class: Very deep
Drainage class: Excessively drained
Permeability: Rapid
Landform: Dunes
Parent material: Eolian
Slope: 1 to 9 percent

Taxonomic class: Mixed, frigid Aridic Ustipsamments

Typical pedon:
Zeona loamy fine sand, 220 feet west and 100 feet south of the northeast corner of sec. 14, T. 14 N., R. 9 E. (Colors are for dry soil unless otherwise stated.)

A—0 to 3 inches; grayish brown (2.5Y 5/2) loamy fine sand, dark grayish brown (2.5Y 4/2) moist; single grain; soft, very friable; moderately acid; clear smooth boundary.

C1—3 to 27 inches; light gray (10YR 6/1) fine sand, gray (10YR 5/1) moist; single grain; soft, very friable; neutral; gradual wavy boundary.

C2—27 to 44 inches; light brownish gray (2.5Y 6/2) fine sand, grayish brown (2.5Y 5/2) moist; single grain; soft, very friable; neutral; gradual wavy boundary.

C3—44 to 60 inches; light brownish gray (2.5Y 6/2) loamy fine sand, dark grayish brown (2.5Y 4/2) moist; single grain; loose, very friable; slight effervescence; slightly alkaline.

Range in Characteristics

Percent rock fragments: 0 to 15 percent
Notes: Some pedons have Ab horizons of varying textures.

A horizon:
Hue: 5Y to 7.5YR
Value: 4 to 7, 3 to 6 moist
Chroma: 2 to 6
Texture: loamy sand or loamy fine sand

C horizon:
Hue: 5Y, 2.5Y, 10YR, or 7.5YR
Value: 5 to 7
Chroma: 1 to 4

Agronomy

About 20 percent of Billings County is cultivated. In 2001, acreages planted to the principle close-grown crops were as follows: spring wheat, 19,000 acres; durum wheat, 5,000 acres; canola, 1,000 acres; barley, 3,800 acres; and oats, 11,000 acres. The main row crop was sunflowers planted on 1,500 acres. Alfalfa and other hay crops were grown on 84,100 acres. Small acreages were planted to buckwheat, mustard, lentils, millet, safflower, soybeans, and dry edible beans (Hartwig and Meyer, 2002).

Cropland limitations and general management practices needed for crops and hay and pasture are discussed in this section. Soil interpretive groups used by the Natural Resources Conservation Service for important farmlands, soil productivity indexes, land capability, pasture and hay, and windbreaks are explained. Soil quality and the management of saline and sodic soils are also discussed.

Planners of management systems for individual fields or farms should consider obtaining specific information from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Cropland Limitations and Management

Management concerns affecting the use of detailed map units in the survey area for crops are shown in the “Potential Cropland Limitations and Hazards” table. The primary concerns in managing cropland are conserving moisture, controlling wind and water erosion, and maintaining or improving soil fertility and tilth.

Moisture at planting time is critical to the success of the crop during the growing season. In years where the amount of available soil moisture is low at planting time, crop success for the year is greatly reduced. Measures that reduce evaporation and runoff rates, increase the rate of water infiltration, and control weeds conserve moisture.

Applying conservation tillage and conservation cropping systems, farming on the contour, stripcropping, establishing field windbreaks, trapping snow, and leaving crop residue on the surface also conserve moisture. When fallow is used to carry moisture over to the next season, a cover of crop residue is essential during winter to guard against moisture loss and erosion.

Wind erosion may be a hazard on most of the soils in Billings County. It is severe on the coarse textured and moderately coarse textured soils. These primarily are the Chinook, Flasher, Glendive, Rhame, Tally, and Vebar soils. Certain soils have a relatively high content of lime. These primarily are the Cabba, Cabbart, Chama, Havre, Lambert, Lonna, Maschetah, and Patent soils. They are susceptible to wind erosion in the spring if they have been bare throughout the winter. Because of freezing and thawing, soil structure can break down, resulting in aggregates that are susceptible to movement. This can also cause fine textured soils such as Heil, Moreau, Wayden, and Wolf Point to have a severe wind erosion hazard. Nearly all soils can be damaged by wind erosion if they are not protected by residue.

Water erosion is a severe hazard on moderately sloping and steeper soils. These primarily are the Cabba, Cabbart, Chama, Dogtooth, Flasher, Janesburg, Lonna, and Vebar soils. The hazard is greatest when the surface is bare.

Conservation practices that control both wind and water erosion are those that maintain a protective cover on the surface. An example is conservation tillage systems that keep a protective amount of crop residue on the surface. Applications of approved herbicides can help to eliminate the need for summer fallow tillage. Cover crops are also effective in controlling both wind and water erosion. Field windbreaks, annual vegetative barriers, and stripcropping help to control wind erosion. Inclusion of grasses and legumes in the cropping sequence, grassed waterways, diversions, terraces, contour farming, and field stripcropping across the slope help to control water erosion. A management system that includes several measures is the best means of protecting the soil. For example, conservation tillage can control soil blowing during years when the amount of crop residue is adequate, but windbreaks are needed during years when the amount of residue is low.

Measures effective in maintaining or improving soil fertility and tilth include utilizing a nutrient management system that includes applying fertilizer, both organic and inorganic, including manure; incorporating crop residue or green manure crops into the soil; and using proper crop rotations. Wind and water erosion reduce productivity of soils. If the surface layer is lost, most of the available plant nutrients also are lost. As a result, applications of fertilizer are needed to maintain adequate crop production.

Of equal concern is the loss of organic matter through erosion. Soil structure, water infiltration, available water capacity, and tilth are all negatively affected by this loss. As organic matter is lost and the subsoil is exposed and tilled, the remaining soil becomes increasingly susceptible to both wind and water erosion. Controlling erosion helps prevent loss of organic matter and plant nutrients and helps maintain productivity. The level of fertility may be reduced even in areas where erosion is controlled. All soils used for crops generally respond well to a nutrient management system. Proper management of soils includes measures that maintain good tilth. These measures are especially needed on the Belfield, Daglum, Desart, Dogtooth, Ekalaka, Evridge, Gerda, Janesburg, Maltese, Rhoades, and Scairt soils that have a sodic subsoil and on the Moreau and Wayden soils that have a silty clay surface layer. Measures that maintain the content of organic matter are very important if good tilth is to be maintained. The traditional practice of clean-tilled summer fallow contributes to the loss of organic matter partly because it increases the susceptibility to erosion.

Additional limitations and management practices are as follows:

Alkalinity. This limitation reduces availability of selected nutrients and is associated with restricted seedling emergence and water infiltration. This limitation can be reduced with a nutrient management system and timely tillage operations. Tilling when the soil is neither too wet nor too dry helps to maintain tilth and prevent surface compaction. Maintaining crop residue on the surface and adding organic material to the plow layer help increase organic matter, prevent surface crusting, and maintain or improve tilth and fertility.

This limitation exists if the soil's pH is more that 7.8 at the surface.

Areas of rock outcrop. These areas are usually not accessible for cultivation and generally are unsuited to cultivated crops and hay and pasture. Farming around these areas may reduce the impact of this limitation on farming operations.

This limitation exists if "rock outcrop" is included in the name of the map unit.

Channels. These areas consist of meandering streams and oxbows. Most areas are isolated by streams or are irregularly shaped and often have standing water in the spring. These areas generally are unsuited to cultivated crops.

This limitation exists if "channeled" is included in the name of the map unit.

Dense layer. This limitation slows water infiltration and restricts root penetration. It can be managed by using a cropping system that includes deep-rooted legumes,

such as alfalfa and sweetclover, and deep tillage to improve root and water penetration. Incorporating organic material into the soil also helps to improve root and water penetration.

This limitation exists if the bulk density is greater than 1.7 in any soil layer.

Depth to rock. This limitation restricts rooting depth. It can be managed by planting shallow-rooted, moisture-efficient crops adapted to the area. A moisture conservation program may be effective on these areas. Some areas that are less than 20 inches to bedrock are not suitable for cultivated crops.

This limitation exists if soft or hard bedrock is within a depth of 40 inches.

Depth to sand and gravel. This limitation restricts rooting depth and may increase the potential for pesticide and nutrient leaching. It can be managed by planting shallow-rooted, moisture-efficient crops adapted to the area. A moisture conservation program may be effective in these areas. Some areas less than 12 inches to sand and gravel are not suitable for cultivated crops.

This limitation exists if there is more than 35 percent gravel in any soil layer at a depth of less than 40 inches.

Excessive saturated hydraulic conductivity. This limitation may cause deep leaching of nutrients and pesticides. A nutrient and pesticide management system with a moisture conservation program, which includes following pesticide labels and fertilizing based on soil nutrient tests, can help manage these areas. Some areas may be unsuitable for cultivated crops.

This limitation exists if the saturated hydraulic conductivity of any soil layer is 6 inches per hour or more.

Flooding. This limitation can affect the timely seeding and survival of crops. In some situations this limitation can be managed by protecting the soil from flooding by diking or by building water retention structures and by planting vegetation that is adapted to flooded conditions. Some areas may be unsuitable for cultivated crops or protection measures may not be economical.

This limitation exists if the map unit is either occasionally flooded for long or very long periods or frequently flooded.

Gullies. This limitation makes cultivation difficult and hazardous. Generally, gullies are so deep that extensive reshaping is necessary for most uses. They generally are unsuited to cultivated crops, hay, and pasture.

This limitation exists if “gullied” is included in the name of the map unit.

High sodium content. This limitation restricts root, air, and water penetration in the subsoil. It may cause poor tilth and compaction. Tillage at the proper moisture content helps to maintain tilth. Tillage that loosens the dense, sodic subsoil or growing deep-rooted legumes, such as alfalfa and sweetclover, may improve soil physical conditions. For additional information about managing these soils see “Management of Saline and Sodic Soils.”

This limitation exists if the sodium adsorption ratio (SAR) is more than 15 within a depth of 30 inches or if the soil is classified as an Aridic Leptic, Leptic, Leptic Vertic, Leptic Torrertic, Torrertic, or Vertic Natrustolls.

High water table. Wetness in undrained areas can delay tillage, seeding, and harvest operations in most years and prevent them in some years. Drained areas are suited to cultivated crops but locating suitable drainage outlets generally is difficult. Planting crops that are tolerant to wetness minimizes the impact of the high water table.

This limitation exists if the water table is within a depth of 36 inches.

Lime content. High lime content at the surface may cause increased wind erosion and surface crusting. It may also reduce availability of selected nutrients. This limitation can be managed by a system of conservation tillage that leaves crop residue on the surface, field windbreaks, stripcropping, and annual buffer strips to

help control wind erosion. Field windbreaks planted on slopes greater than 8 percent may contribute to water erosion by concentrating spring runoff. Crops may respond well to a nutrient management system that includes additions of phosphate fertilizer.

This limitation exists if the soil is assigned to wind erodibility group 4L or has more than 5 percent $CaCO_3$ in the upper 10 inches.

Limited available water capacity. This limitation reduces the capacity of the soil to retain moisture for plant use. A moisture conservation program can help manage these areas.

This limitation exists if the available water capacity calculated to a depth of 40 inches or to a root-limiting layer is 6.3 inches or less or the electrical conductivity (EC) is more than 8 at less than 30 inches and the soil is moderately well drained or better.

Limited organic matter. This limitation may cause an increase in surface crusting and reduce the soil's natural fertility. Soil organic matter can be managed by utilizing a nutrient management system, incorporating crop residue or green manure crops into the soil, and using proper crop rotations.

This limitation exists if the content of organic matter is 1 percent or less in the surface layer.

Pesticide and nutrient leaching. This limitation increases the hazard of contaminating aquifers, springs, and local water tables. A nutrient and pesticide management system with a moisture conservation program, which includes following pesticide labels and fertilizing based on soil nutrient tests, can help manage these areas. Some areas may be unsuitable for cultivated crops.

This limitation exists if the depth to the water table is 48 inches or less, depth to bedrock is less than 60 inches, or saturated hydraulic conductivity of any soil layer is 6 inches per hour or more.

Pesticide and nutrient runoff. This limitation increases the hazard of contaminating surface waters, such as lakes, ponds, steams, and rivers. It can be managed with nutrient, pesticide, and conservation tillage systems which include leaving crop residue on the surface, following pesticide labels, and fertilizing based on soil nutrient testing. Limiting row crops on slopes of more than 8 percent reduces the rate of runoff of pesticides and nutrients. Runoff from upland areas can concentrate pesticides on ponded soils. Draining ponded areas may adversely affect the receiving surface waters.

This limitation exists if the soil is occasionally flooded or frequently flooded; is subject to ponding; is assigned to hydrologic group C or D and has a slope of more than 2 percent; is assigned to hydrologic group A and has a slope of more than 6 percent; or is assigned to hydrologic group B, has a slope of 3 percent or more and has a K factor of more than 0.17.

Ponding. This limitation can affect the timely seeding, harvesting, and survival of crops. Because of wetness and ponding, this soil generally is unsuited to cultivated crops, hay and pasture, and range.

This limitation exists if ponding occurs on the soil.

Poor tilth and compaction. This limitation restricts seedling emergence and water infiltration. It can be managed by timely tillage operations, maintaining crop residue on the surface, and adding organic material to the plow layer to increase soil organic matter. A cropping system that includes deep-rooted legumes, such as alfalfa and sweetclover, may improve root and water penetration.

This limitation exists if the upper 10 inches of the soil has more than 35 percent clay; has less than 1 percent organic matter; or has SAR of 5 or more.

Restricted saturated hydraulic conductivity. This limitation restricts root penetration and water saturated hydraulic conductivity. It can be managed with timely tillage operations and by using a cropping system that includes deep-rooted

legumes, such as alfalfa and sweetclover, to improve root and water penetration. Incorporating organic material into the soil also helps to improve root and water penetration.

This limitation exists if saturated hydraulic conductivity is 0.06 inch per hour or less within a depth of 40 inches.

Root limiting. This limitation reduces the effectiveness of roots when the soil dries and increases moisture stress during extended dry periods. It can be managed with a cropping system that includes deep-rooted legumes, such as alfalfa and sweetclover, and deep tillage to improve root and water penetration in the subsoil. Tillage when the soil is neither too wet nor too dry helps to maintain tilth. A moisture conservation system may be beneficial. For additional information about managing these soils see "Management of Saline and Sodic Soils."

This limitation exists if the soil is classified as a Glossic Natrustoll.

Salt content. This limitation interferes with plant growth by restricting nutrient uptake and reducing available water. Using nutrient management and moisture conservation systems and growing salt-tolerant crops, such as barley, can help manage these areas. For additional information about managing these soils see "Management of Saline and Sodic Soils."

This limitation exists if the soil has an EC of more than 4 in the surface layer or more than 8 within a depth of 30 inches.

Slickspots. The surface of these areas is non-vegetated and tends to puddle upon wetting. Slickspots are restrictive to air and water saturated hydraulic conductivity and root growth. These areas are best suited to range. Because of the dense and massive layers, they generally are unsuited to cultivated crops, hay, and pasture. For additional information about managing these soils see "Management of Saline and Sodic Soils."

This limitation exists if "Slickspots" is included in the name of the map unit.

Slope. This limitation increases the potential for accelerated water erosion unless conservation farming practices are applied.

This limitation exists if the upper slope range of the map unit is more than 8 percent.

Soil slumping. This limitation indicates a potential for mass soil movement. These areas generally are unsuited to cultivated crops, hay, and pasture.

This limitation exists if the slope is more than 35 percent and the surface or subsoil has more than 35 percent clay; or if the slope is more than 25 percent and the subsoil contains more than 35 percent clay and bedrock is at a depth of less than 60 inches; or if "slumped" is a modifier of any named component of the map unit.

Surface crusting. This limitation restricts seedling emergence and water infiltration. It can be managed with a system of conservation tillage that leaves crop residue on the surface and by incorporating organic material into the surface layer.

This limitation exists if the surface texture is silt, silt loam, silty clay loam, or very fine sandy loam and the surface layer organic matter content is less than 3 percent; or if the surface texture is loamy very fine sand, very fine sandy loam, fine sandy loam, sandy loam, sandy clay loam, loam, clay loam, silt, silt loam, or silty clay loam and the surface layer Calcium Carbonate Equivalent ($CaCO_3$) is equal to or greater than 1; or if the surface layer or upper 10 inches has a SAR of 4 or more.

Surface rock fragments. This limitation adversely affects the use of mechanical equipment for cultivation and causes rapid wear of tillage equipment and difficult seedbed preparation. It cannot be easily overcome. These areas are generally unsuited to cultivated crops, hay, and pasture.

This limitation exists if the texture of the surface layer includes any rock fragment modifier except for gravelly or channery and "surface stones" are not already indicated as a limitation.

Surface stones. This limitation restricts normal cultivation practices. These areas are generally unsuited to cultivated crops, hay, and pasture. Economic removal of the surface stones generally is not feasible.

This limitation exists if the surface layer texture includes stony or bouldery modifiers or if “stony” or “bouldery” are included in the map unit name.

Water erosion. This limitation indicates an increased hazard of water erosion. This limitation can be managed by a system of conservation tillage that leaves crop residue on the surface, contour stripcropping, and grassed waterways in areas where runoff concentrates.

This limitation exists if the surface K factor (soil erodibility factor) multiplied by the upper slope percent is more than 2.

Wind erosion. This limitation indicates an increased hazard of wind erosion. This limitation can be managed by using a system of conservation tillage that leaves crop residue on the surface, field windbreaks, stripcropping, annual crop barriers, and a cropping sequence that includes grass-legume hay.

This limitation exists if the wind erodibility group is 1, 2, 3, 4, or 4L.

Erosion Factors

Soil erosion factors are used with other information to estimate the amount of soil lost through water and wind erosion. The procedure for predicting soil loss is useful in guiding and comparing the selection of soil and water conservation practices. The soil erodibility factors (K and Kf), the soil-loss tolerance factor (T), wind erodibility index (I), and wind erodibility groups (WEG) are described in “Physical Properties” in the “Soil Properties” section. Additional information about soil factors affecting wind and water erosion can be obtained from local offices of the Natural Resources Conservation Service or the Cooperative Extension Service.

Productivity Indexes and Crop Yield Estimates

Productivity indexes are relative ratings of the ability of a soil to produce a particular crop yield in comparison to other soils. They are useful in estimating long-term average crop yields, comparing the production capacity of soils, and in various economic analyses. Productivity indexes are shown in the “Map Unit Productivity Index and Farmland Designation” table. Productivity indexes are given for drained conditions and, where applicable, undrained conditions. The average yields per acre that can be expected of the principal crops grown in the county under a high level of management are shown in the “Yields per Acre of Crops” table.

Productivity indexes are based on soil properties important to crop production. Knowledgeable and experienced soil scientists, conservationists, and university researchers developed the indexes. They used results from field trials, demonstrations and records, and experiences of producers (Ulmer and Patterson, 1988 a, b, c). In North Dakota, productivity indexes are based on long-term average spring wheat production. Similar and contrasting map unit inclusions are considered along with the named map unit components when the productivity index is calculated. The index ranges from 0, which indicates no long-term economic production, to 100, which indicates the highest potential production. Productivity indexes are based on the best available information, but they are difficult to determine for soils with variable properties such as salinity, sodicity, and degree of drainage.

In Billings County, a productivity index of 100 was considered equal to a long-term average yield of 37 bushels per acre of spring wheat. Multiplying the productivity index by 37 and dividing the product by 100 converts the index number to a figure

representing the expected long-term average yield per acre. For example, map unit 31, Sen-Janesburg silt loam, 0 to 6 percent slopes has a productivity index of 61. This number multiplied by 37 and then divided by 100 converts to 23, which is the expected long-term average yield of spring wheat in bushels per acre for this map unit. In any given year, yields may be higher or lower than those indicated in the table because of variations in management, rainfall, and other production and climatic factors. Estimated yields reflect the production capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. Productivity of a given soil compared with that of other soils, however, is not likely to change.

Management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include nutrient management systems, moisture conservation, and conservation tillage.

Crops other than those shown in the table are grown in the survey area, but estimated yields are not listed because the acreages of such crops are small. The local office of the Natural Resources Conservation Service or the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Prime Farmland and Other Important Farmland

In this section, prime farmland and other important farmland are defined. The map units in the survey area that are considered prime farmland, farmland of statewide importance, or other land are listed on the “Map Unit Productivity Index and Farmland Designation” table. Most map units have minor areas or inclusions that do not meet the listed farmland designation. More information about the criteria for prime farmland and other important farmland can be obtained at the local office of the Natural Resources Conservation Service.

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation’s short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation’s prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forest land, or other land, but it is not urban, built-up land, or water areas. The soil qualities, growing season, and moisture supply are those needed for a well managed soil to produce sustained high yields of crops in an economic manner.

Prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. It is permeable to water and air. It is not excessively erodible or saturated with water for long periods and it is not frequently flooded during the growing season or it is protected from flooding. The slope ranges mainly from 0 to 6 percent.

Soils with a seasonal high water table may qualify as prime farmland where this limitation is overcome by drainage measures. Onsite evaluation is necessary to determine the effectiveness of corrective measures.

A recent trend in land use in some parts of the nation has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive.

About 1,250 acres, or less than 1 percent of the survey area, meets the requirements for prime farmland. The location of each map unit is shown on the detailed soil maps. The soil qualities that affect use and management are described in the sections “Detailed Map Units” and “Soil Series and Their Morphology.”

Farmland of Statewide Importance

Some areas, other than areas of prime farmland, are of statewide importance in the production of food, feed, fiber, forage, and oilseed crops. The criteria used in defining and delineating these areas are determined by appropriate state and federal agencies. Generally, additional farmland of statewide importance includes areas that nearly meet the criteria for prime farmland and that economically produce high yields of crops when treated and managed with acceptable farming methods. Some areas can produce as high a yield as areas of prime farmland if conditions are favorable.

Other Land

Lands not meeting the criteria for Prime Farmland or Farmland of Statewide Importance are placed into Other Land on the “Map Unit Productivity Index and Farmland Designation” table. This group includes Additional Farmland of Local Importance, Unique Farmland, and Other Land. These farmlands may have agricultural or nonagricultural uses.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. Soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. Criteria used in grouping the soils do not take into account extensive and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, woodland, or engineering purposes. The capability classification of each map unit is given in the “Interpretive Groupings Report” table.

In the land capability system, as described in “Land Capability Classification” (USDA-SCS, 1961), soils generally are grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. Capability classes are given for drained conditions and, where applicable, undrained conditions.

Capability classes, the broadest groups, are designated by numerals 1 through 8. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have few limitations that restrict their use.

Class 2 soils have moderate limitations that reduce the choice of plants or require moderate conservation practices.

Class 3 soils have severe limitations that reduce the choice of plants or require special conservation practices, or both.

Class 4 soils have very severe limitations that reduce the choice of plants and require very careful management, or both.

Class 5 soils are not likely to erode but have other limitations, such as wetness, that are impractical to remove and limit their use.

Class 6 soils have severe limitations that make them generally unsuitable for cultivation.

Class 7 soils have very severe limitations that make them unsuitable for cultivation.

Class 8 soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are designated by adding the letter, **e**, **w**, **s**, or **c**, to the class numeral, for example, 2e. The letter **e** shows the main hazard is the risk of erosion unless a close-growing plant cover is maintained; **w** shows that water in or on the soil interferes with plant growth or cultivation (in some soils wetness can be partly corrected by artificial drainage); **s** shows the soil is limited mainly because it is droughty, stony, or saline; and **c**, used in only some parts of the United States, shows the chief limitation is climate that is very cold or very dry.

There are no subclasses in class 1 because soils of this class have few limitations. Class 5 contains only the subclasses indicated by w, s, or c because the soils in class 5 are subject to little or no erosion. They have other limitations that restrict their use mainly to pasture, rangeland, woodland, wildlife habitat, or recreation. There are no subclasses in class 8.

Forage Suitability Groups

Pastureland is land devoted to the production of adapted introduced or native forage plants for grazing by livestock. Hayland is land primarily used for the production of hay from long-term stands of adapted forage plants. Both pastureland and hayland receive cultural treatments to enhance forage quality and yields. Because of the relatively short growing season, some producers have established cool-season tame pasture to complement the forage produced on rangeland and to extend the grazing season in the spring and fall.

Generally, large amounts of hay are needed to maintain livestock through the long, harsh winters. Hay was harvested on about 84,100 acres in Billings County in 2001 (Hartwig and Meyer, 2002).

Proper pasture or hayland management is essential for the production of high-quality forage, stand survival, and erosion control. Proper grazing management on pastureland during the growing season helps plants maintain sufficient and vigorous top and root growth for sustained production. Brush and weed control is essential in many areas. Fertilizer increases production and enhances longevity of stands. Rotation grazing and renovation also are important management practices.

Soils are assigned to forage suitability groups according to their suitability for production of forage under intensive management. Soils in each suitability group are similar enough to be suited to the same species of grasses or legumes. They also have similar management concerns, productivity levels, and limitations and hazards.

Forage suitability groups are given in the “Interpretive Groupings Report” table. They are given for drained conditions and, where applicable, undrained conditions. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information on adapted varieties and forage yields.

The following paragraphs describe the Forage Suitability Groups in Major Land Resource Areas (MLRAs) 54 and 58C which include Billings County. They specify the production potential under improved management and list representative adapted species for each group. More detailed information is available in Section II of the electronic Field Office Technical Guide (eFOTG) at www.nrcs.usda.gov/technical/efotg.

Clayey Subsoil. These soils are deep and moderately well and well drained. They are medium to fine textured soils on uplands. They have a claypan that is a moderate restriction to root growth. Otherwise, these soils have few limitations for

the management and growth of adapted plants. Production potential is moderate to high. Suitable forage species include crested wheatgrass, smooth bromegrass, Russian wildrye, intermediate and pubescent wheatgrass, western wheatgrass, green needlegrass, alfalfa, and sweetclover.

Claypan. These soils are deep and somewhat poorly to well drained. They are moderately coarse to fine textured soils on uplands. The claypan is dense with very little root penetration. Typically these soils are strongly alkaline in the claypan and below. These soils are saline below 16 inches. Production potential is low. Suitable forage species include western wheatgrass, slender wheatgrass, crested wheatgrass, alfalfa, and sweetclover.

Droughty Loam. These soils are very deep and mostly well drained. They are moderately coarse to medium textured soils on glacial outwash plains, alluvial fan remnants, terraces, and flood plains. The moderate available water capacity limits plant growth during periods of moisture deficit. Production potential is moderate. Suitable forage species include crested wheatgrass, green needlegrass, Russian wildrye, slender wheatgrass, western wheatgrass, blue grama, prairie sandreed, sand bluestem, alfalfa, and sweetclover.

Limy Upland. These soils are well drained. They are moderately fine to medium textured soils on till plains, fans, and terraces. The high lime content close to the soil surface reduces the availability of some plant nutrients. Production potential is moderate. Suitable forage species include crested wheatgrass, slender wheatgrass, western wheatgrass, blue grama, little bluestem, prairie sandreed, and sideoats grama.

Loam. These soils are mostly very deep and well drained. They are moderately coarse to moderately fine textured soils on terraces, fans, and flood plains. These soils have few limitations to the production of climatically adapted forage crops. Production potential is moderate to high. Suitable forage species include Altai wildrye, crested wheatgrass, green needlegrass, intermediate wheatgrass, Russian wildrye, big bluestem, blue grama, switchgrass, alfalfa, and purple prairieclover.

Overflow. These soils are very deep and mostly moderately well drained. They are moderately coarse to moderately fine textured soils on stream terraces, fan remnants, and flood plains and in swales and drainageways on uplands. These soils have few limitations to the production of climatically adapted forage crops. Production potential is high. Suitable species include Altai wildrye, crested wheatgrass, green needlegrass, Russian wildrye, western wheatgrass, big bluestem, sideoats grama, switchgrass, alfalfa, and sweetclover.

Sand. These soils are deep and moderately well to excessively drained. They are coarse textured soils on uplands and flood plains. Wind erosion is a severe hazard during establishment and renovation. Production potential is moderate to high. Species selection is limited for pasture and hayland. Suitable forage species include sand bluestem, switchgrass, prairie sandreed, intermediate and pubescent wheatgrass, and alfalfa.

Saline. These soils are very deep, moderately well to somewhat poorly drained, coarse to fine textured and moderately saline. The available water capacity is moderate because of salinity. Plant species are those with moderate to high salt tolerance. Severely affected areas will need to be seeded and then mulched to reduce salt concentrations during seedling establishment. Production ranges from low to moderate. Suitable forage species include western wheatgrass, slender wheatgrass, switchgrass, Newhy hybrid wheatgrass, alsike clover, and sweetclover.

Steep Loam. These soils are very deep and well drained. They are medium textured soils on moderately steep or hilly upland positions. The slope of these soils ranges from 15 to 25 percent resulting in high and very high runoff potential and the potential for water erosion. Production potential is moderate. Suitable forage species

include Altai wildrye, crested wheatgrass, intermediate wheatgrass, Russian wildrye, blue grama, little bluestem, prairie sandreed, alfalfa, and sweetclover.

Subirrigated. These soils are medium textured and somewhat poorly drained soils. They are on lake plains, surrounding shallow depressions, and on slight rises. They have a seasonal water table within 12 to 48 inches of the surface during part of the growing season. These soils have few limitations. Production potential is high. Suitable species include crested wheatgrass, slender wheatgrass, tall wheatgrass, western wheatgrass, big bluestem, little bluestem, switchgrass, alfalfa, and sweetclover.

Very Droughty Loam. These soils are moderately deep to very deep and well to excessively drained. They are on uplands, pediments, terraces, and flood plains. The moderate depth to sand and gravel results in low available water capacity and limits species selection and production potential. Production potential is moderate. Suitable species include crested wheatgrass, Siberian wheatgrass, blue grama, purple prairieclover, and white prairieclover.

Very Shallow to Gravel. These soils are deep and well to excessively drained. They are medium to moderately coarse textured soils on outwash plains and scoria topped buttes. They typically have coarse sand and gravel or shattered porcelanite at depths of less than 14 inches. These soils are very droughty. Production potential is low and species selection is severely limited. Suitable species include crested wheatgrass, western wheatgrass, thickspike wheatgrass, and slender wheatgrass. Where cultivated, returning these soils to rangeland may be a better alternative than pasture or hayland.

Wet. These soils are deep and poorly drained. They are coarse to fine textured soils on flood plains or low areas on till and lake plains. Wetness limits selection of locally adapted forage plants. Production potential is high to very high. Select plant species on the basis of flooding tolerance or inundation tolerance. Suitable species include reed canarygrass, creeping foxtail, big bluestem, switchgrass, indiangrass, western wheatgrass, intermediate and pubescent wheatgrass, smooth bromegrass, tall wheatgrass, and alsike clover.

Not Assigned. Not assigned indicates current site specific information is not adequate and a field visit is necessary for planning purposes. Included in this forage suitability group are miscellaneous land types.

Not Suited. These soils have severe limitations that make their use for forage production impractical or impossible. They are too steep, shallow, wet, or stony or possess unfavorable chemical properties for forage production. This rating would generally indicate a range seeding is recommended for planning purposes.

Management of Saline and Sodic Soils

Saline and sodic soils make up over 22 percent of Billings County. Sodic soils make up about 22 percent of the area, or about 162,000 acres; and saline-sodic soils make up less than 1 percent of the area or about 4,600 acres.

Saline soils have a high concentration of soluble salts, or salts that dissolve in water. Saline soils in Billings County are indicated by a spot symbol (+). Each of these areas are 1/4 to 3 acres in size and are scattered throughout the county.

Saline soils generally develop in areas of restricted drainage, such as those adjacent to sloughs and waterways. Where drainage is poor, salts rise with the water table and are concentrated near the surface. This salt buildup is reduced by plants and a surface cover. The plant roots use the soil water before it can reach the surface and before the salts accumulate. The surface cover prevents evaporation at the surface, the upward movement of water in the soil, and the concentration of salts at the surface (Seelig and Richardson, 1991).

Plants growing on saline soils absorb salts from the soil water. Excess amounts of certain salts may interfere with plant growth. High concentrations of some salts are toxic to certain plants. Some salts cause nutritional imbalances or deficiencies by restricting the uptake or availability of certain plant nutrients. Detecting salinity by visual observations in the field is difficult. The salts are generally not visible during much of the growing season, particularly when the soil is moist. Flecks, threads, or masses of soluble salts are usually visible when the soil is dry. Laboratory analysis or special field instruments are needed to determine the actual degree of salinity in soils.

Crop response, particularly during periods of soil moisture stress, is a useful indicator of the degree of salinity in saline soils. For instance, a small grain crop growing on saline soils tends to be stunted and has fewer tillers than small grain on nonsaline soils. Strongly saline soils are best suited to native grasses or to salt-tolerant introduced grasses. Slightly saline or moderately saline soils can produce salt-tolerant crops and forage. Barley is the most salt-tolerant of the small grains. Of the forage crops, tall wheatgrass, western wheatgrass, and alfalfa are salt tolerant once they are established. Continuous cropping is beneficial because it reduces evaporation and salt accumulation in the surface layer.

Sodic soils are characterized by a high content of exchangeable sodium which adheres to the clay particles in the soil (Seelig and Richardson, 1991). The sodic soils in Billings County are phases of the Absher, Belfield, Cedarpan, Daglum, Desart, Dogtooth, Ekalaka, Evridge, Gerda, Janesburg, Maltese, Rhoades, and Scairt series. Locally, sodic soils are known as “black alkali,” “slickspots,” “pan spots,” or “gumbo.”

Sodic soils develop in a complex pattern with a very distinct microrelief. The physical and chemical properties of these soils differ markedly within very short distances. In many areas the distance between the sodic soils and the surrounding soils that have normal physical properties is only a few feet.

Sodic soils developed in areas of saline soils that contained large quantities of sodium salts. Over a long period, usually centuries, as the water table lowers, precipitation gradually leaches the salts from the surface to lower horizons. During this leaching process, the clay in the soil becomes saturated with sodium, disperses, and moves downward with the percolating water. As the moving clay concentrates, a dense, sodic subsoil forms. The dense subsoil is hard when dry, sticky when wet, and nearly impervious to roots, water, and air. Examples are the Daglum, Dogtooth, Janesburg, and Rhoades soils.

As the leaching by soil water continues, the sodium is gradually moved lower in the soil profile and eventually is carried below rooting depth. The result is a more manageable soil, such as Belfield. If the leaching process continues and nearly all of the sodium is removed from the profile, the soil eventually changes into a nonsodic soil. This change requires a long period, usually centuries.

If plowed, sodic soils are characterized by a surface layer that is sticky when wet and hard and cloddy when dry. A crust forms easily at the surface. The chemical and physical properties of these soils are unfavorable for plant growth. The harmful effects of the properties on plants generally increase as the sodium content increases. The effects of the reduced amount of water available to plants are more harmful than the toxic effect of the sodium. The plants also are affected by the depth to the dense subsoil.

Identification of sodic soils in cultivated fields commonly is difficult because many of the physical characteristics, such as columnar structure, have been altered by tillage. Crop response, particularly during periods of soil moisture stress, is a useful indicator of the level of sodicity in a soil. Crops grown on soils with varying amounts of sodium exhibit varying heights and stages of development. If the level of sodicity is very high, the crop cannot grow. The effects of sodium on crop growth are

influenced by weather conditions, stage of crop growth, and soil moisture status. A measure of the effect of sodicity on vegetative growth is not necessarily a reliable measure of crop yields. In many areas the yields of barley and wheat are affected less than the vegetative growth of these crops.

Variability of sodic soils can cause management problems. Soils that have a dense, sodic subsoil near the surface, such as Dogtooth, Gerda, Rhoades, or Scairt are better suited to grass than to small grain and sunflower. Timely tillage is an important management need in areas of sodic soils. These areas should be tilled and seeded only when the moisture content is favorable. If worked when too wet, the soils puddle and crust. If the soils are tilled when too dry, tillage and seeding implements cannot easily penetrate the soils. Deep plowing and chemical amendments can help to reclaim sodic soils, but they may not be feasible. To be effective, deep tillage should reach below the sodic subsoil and mix several inches of the underlying material with the subsoil and topsoil. Depending on the soil, tillage to a depth of 15 to 36 inches may be needed. Any reclamation of sodic soils is a long-term endeavor. Complete reclamation may never be achieved. Onsite investigation is needed to confirm the feasibility of deep tillage in a particular area.

Saline-sodic soils develop in areas of restricted drainage where salts rise with the water table but where some downward leaching of clay and some saturation with sodium are evident and a dense, sodic subsoil has formed. An example is the Harriet or Heil soil. The management needs and crop responses on these soils are a combination of those on saline soils and those on sodic soils.

Additional information about management or reclamation of saline and sodic soils is available from the Natural Resources Conservation Service, the North Dakota Agricultural Experiment Station, and the Cooperative Extension Service (Franzen, et. al., 1994).

Soil Quality

Definition of Soil Quality

Soil quality is the ability of a soil to function within its surroundings, support plant and animal productivity, and maintain or enhance water and air quality. This is also referred to as soil health.

Functions of Soil

Soil is a living, dynamic resource. It has biological, chemical, and physical properties which are continually changing. Soil provides a physical, chemical, and biological environment for the exchange of water, air, and nutrients necessary for living organisms.

Soil controls the movement of rainfall or irrigation water on the land. Some of the water runs off the soil and directly enters surface water drainage systems. The remaining water either evaporates or infiltrates the soil. There it is stored and used for plant growth or percolates through the soil into the ground water. This control of water flow affects the movement of soluble materials, such as nitrate nitrogen and pesticides, through the environment.

Soil regulates biological activity and chemical exchanges. This affects nutrient cycling, plant growth, and decomposition of organic materials. Soil also acts as a filter to protect the quality of water and air. It provides mechanical support and a rooting environment for living organisms.

Soil quality can be viewed in two ways: In the first view, some soils are better suited than others to perform specific functions. For example, soils that are shallow to bedrock are poorly suited for supporting deep-rooted crops or trees. Soils high in sand and gravel content may have an inherently poor quality for filtering septic

system wastes. Alternatively, these same soils may have a high quality or suitability for road and street construction. This view of soil quality is useful when comparing soils and is often used to evaluate the suitability of soils for specific uses.

The second view of soil quality relates to the dynamic nature of soils. Even though a soil may have a certain ability or level of quality for a specific activity, it may be functioning at a level below its inherent capability. This may be due to past disturbance or current management systems. For example, a farming system that does not protect the surface layer from erosion may result in soil erosion and loss of organic matter, nutrients, and other beneficial properties. In most cases, the eroded soil functions at less than its original potential for production. Its condition or health is considered impaired or lower in quality. In another example, a soil in a wetland, if drained or covered with sediment from nearby uplands, may not serve as effectively as a filter as it would in its natural condition.

Importance of Soil Quality to Landowners

Soil quality has a direct affect on plant growth and productivity for crop, range, hay, and woodland production. It affects how water moves into and through the soil. Maintaining or enhancing soil quality can help reduce the negative effects of soil erosion. Increasing soil quality can reduce the movement of nitrates and other chemicals to adjacent water bodies and ground water. Maintaining a high level of soil quality will ensure the soil resource is sustained for the future.

Many soils have undergone a degradation of their inherent quality through past agricultural operations. However, improved management practices, such as conservation tillage, implementing nutrient and moisture management systems, and establishment of riparian buffers or windbreaks can improve soil quality. As a rule, management practices that maintain a vegetative cover on the soil, return the maximum practical amount of residue, and minimize soil disturbance (tillage), will result in higher levels of soil quality.

Degradation of soil quality can have negative effects on the soil resource and costly off-site impacts. Soil erosion and the consequential deposition of sediment by wind or water are examples. Other negative effects of soil degradation include: compaction and loss of granular structure of surface soil layers, reduction of infiltration rates and organic matter levels, and formation of surface crusts. Degradation of soils can also lead to nutrient loss or imbalances, pesticide carryover, and reduced biological activity.

Soil Quality Indicators

The quality of most soils can be improved over time if managed properly. Key indicators of soil quality can be observed and monitored periodically to ensure the quality of the soil is maintained or enhanced.

Soil quality indicators are soil properties or processes that can be monitored to establish changes in the soil. Indicators can be categorized into four general groups: visual (sensory), physical, chemical, and biological.

Visual indicators may be obtained from observation or photographic interpretation. Exposure of subsoils, change in soil color, ephemeral gullies, ponding, plant response, and surface crusting are a few examples. Visual evidence can be a clear indication that soil quality is changing in either a negative or a positive way. The senses of feel and smell can also be used to evaluate certain soil properties.

Physical indicators are usually obtained by observation or field and laboratory analyses. They include topsoil thickness, bulk density, porosity, aggregate stability, texture, crusting, and compaction. These indicators reflect factors affecting root growth, soil biological activity, seedling emergence, and infiltration and movement of water and air within the soil.

Chemical indicators usually require sampling and field or laboratory analyses. They include measurements of pH, salinity, organic matter, phosphorus concentrations, cation-exchange capacity, and nutrients. The chemical condition of soil affects soil-plant relationships, water quality, buffering capacities, and mobility of nutrients and contaminants.

Biological indicators may be obtained by observation or measurement. They include measurements of micro- and macro-organisms and their activities. Respiration rates to detect microbial decomposition of organic matter and populations of bacteria, fungi, earthworms, nematodes, and mites can be used as biological indicators of soil quality.

Soil quality can be monitored through observation and/or measurement of key soil quality indicators. Soil quality score cards and a test kit (USDA-Soil Quality Institute, 1998) are available to assist in the assessment process. The monitoring program should include several indicators and take into consideration the time of year that sites are monitored, stage of crop growth, and location within the field where observations are made.

Monitoring soil quality should primarily be used to detect trends that are measurable over a 1- to 10-year period. Monitoring trends determines whether the soil is improving, degrading, or remaining steady under the current management system. This allows land managers to detect problems before undesired and possibly irreversible loss of soil quality occurs.

The local office of the Natural Resources Conservation Service, Soil Conservation District, or Cooperative Extension Service can help establish a plan for monitoring soil quality.

Woodland, Windbreaks, and Environmental Plantings

Billings County has approximately 28,550 acres of native woodland (Jakes and Smith, 1982). Most of this woodland is found on north and northeast facing slopes in the badlands in the northern and central parts of the county. Primarily due to aspects that create a cooler site with reduced evapotranspiration, trees and shrubs can become established. Pioneer species on these areas consist of deciduous trees and shrubs such as green ash, chokecherry, skunkbush sumac, dogwood, buffaloberry, and snowberry. Rocky Mountain juniper apparently spread by birds, eventually takes over these sites, becoming almost pure stands. Wildfire can remove the juniper and again open the site to the deciduous pioneer species mentioned above.

Riparian forests make up most of the remaining natural woodland cover and are found in patches along the Little Missouri River, major tributaries, and at the base of major drainages. This forest cover type is very dependent upon moisture. One type of moisture change can be found in relic riparian forest zones that have died and been left high and dry as the riverbed has shifted horizontally several hundred feet. In most cases, the area of dead trees has been converted to mid grass prairie species of grasses and forbs.

Through down-cutting of the Little Missouri River, most of the flood plain where the cottonwoods, elms, and green ash are located, is no longer subject to flooding. Many of the mature trees are dead or dying in these areas. In fact, many of these areas have water tables that are no closer to the surface than 5 to 15 feet. This reduction in accessible water is causing the forest cover to switch to buffaloberry, Rocky Mountain juniper, common juniper, spreading juniper, and prairie grasses such as prairie sandreed, needleandthread, and blue grama. Natural regeneration of riparian species such as cottonwood and willow exists only within the narrow confines of the active stream channel.

Native forests at the base of major drainages are just as susceptible to changes in hydrology as those located along the river. Moisture plentiful enough to initiate forest establishment can be rerouted as a result of debris jams washing out of the coulees. Rerouting of runoff moisture just a few hundred feet can result in the decline of the established forest and perhaps the initiation of a new forest at a different location with more plentiful moisture.

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens and furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow tree/shrub rows interspersed with cropland at specified intervals. Field windbreaks oriented perpendicular to the prevailing winds are the most efficient. Intervals depend on the erodibility of the soil. Field windbreaks protect cropland and crops from wind, help to keep snow on fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To ensure plant survival, a healthy planting stock of suitable species should be properly planted on a well prepared site and maintained in good condition.

The following items should be considered before a planting is made: purpose of the planting, suitability of various species of trees and shrubs to the soils and climate, location and design of the windbreak, and selection of hardy seedlings. Planting stock should be from parent material originally from the Northern Great Plains or southern Canadian Prairie provinces. If these items are not considered, a poor, unsuccessful windbreak may result.

Establishment of a windbreak or an environmental planting and growth of trees and shrubs also depend on suitable site preparation and adequate maintenance after the trees and shrubs are planted. Grasses and weeds should be eliminated before the trees and shrubs are planted and competing ground cover should be controlled for the life of the windbreak. Competition from sod-forming grasses will greatly harm and sometimes kill tree and shrub plantings. Some replanting may be necessary during the first two years after the trees and shrubs are planted.

Windbreaks are often planted on land that did not originally support trees. Knowledge of how trees perform on such land can be gained only by observing and recording the performance of trees that have been planted and survived. Many popular windbreak species are not indigenous to the areas in which they are planted.

Each tree or shrub species has certain climatic and physiographic limits. Within these parameters, a tree or shrub may grow well or grow poorly, depending on the characteristics of the soil.

Windbreak suitability groups consist of soils in which the kinds and degrees of hazards and limitations that affect the survival and growth of trees and shrubs in windbreaks are similar. They are a guide for selecting species best suited for different kinds of soils. Windbreak suitability groups are shown for each soil in the "Interpretive Groupings Report" table. They are given for drained conditions and, where applicable, undrained conditions.

Windbreak Suitability Groups

The following paragraphs describe the windbreak suitability groups:

Group 1. These are very deep, well to somewhat poorly drained soils that receive beneficial moisture from favorable landscape positions, flooding, or runoff from adjacent land. They may also have a beneficial seasonally high water table during the spring. Competition from grass and weeds is the principal concern in establishing and managing trees and shrubs. Occasionally, somewhat poorly drained soils may have excessive water for some species

Group 1K. These are very deep, calcareous, well to somewhat poorly drained soils on low rises near wetlands that receive beneficial moisture from favorable landscape positions or have a beneficial seasonally high water table during the spring. High calcium carbonate content will have an effect on the selection of species on soils in this group. Competition from grass and weeds is the principal concern in establishing and managing trees and shrubs. Occasionally, somewhat poorly drained soils may have excessive water for some species. Wind erosion is a concern on these soils.

Group 2. Soils in this group are very deep, poorly or very poorly drained, and excessively wet or ponded during the spring or overflow periods. Wetness and drainage will have an affect on the selection of tree and shrub species for soils in this group. Competition from grass and weeds is the principal concern in establishing and managing trees and shrubs. Spring planting may be delayed because of wet conditions. Wind erosion is a concern on the sandy and organic soils in this group.

Group 2H. Soils in this group are very deep, have an organic mat about 24 inches thick, are poorly or very poorly drained, and are excessively wet or ponded during the spring or overflow periods. Wetness and drainage will have an affect on the selection of tree and shrub species for soils in this group. Competition from grass and weeds is the principal concern in establishing and managing trees and shrubs. Spring planting may be delayed because of wet conditions. Wind erosion is a concern on these soils.

Group 2K. Soils in this group are very deep, calcareous, poorly or very poorly drained, and are on rims of potholes and broad flats that are excessively wet or ponded during the spring or overflow periods. Wetness, high calcium carbonate content, and drainage will have an affect on the selection of tree and shrub species for soils in this group. Competition from grass and weeds is the principal concern in establishing and managing trees and shrubs. Spring planting may be delayed because of wet conditions. Wind erosion is a concern on these soils.

Group 3. Soils in this group are very deep, well drained, loamy textured soils with moderate and moderately slow saturated hydraulic conductivity on uplands. Competition from grass and weeds is the principal concern in establishing and managing trees and shrubs on these soils. Water erosion is a concern on the gently sloping to moderately steep areas.

Group 4. Soils in this group are moderately deep to very deep, have loamy surface textures with clayey subsoils, have slow or very slow saturated hydraulic conductivity and occur on uplands. High clay content has an affect on the selection of tree and shrub species for these soils. Competition from grass and weeds is the principal concern in establishing and managing trees and shrubs on these soils. Water erosion is a concern on the gently sloping to moderately steep areas.

Group 4C. Soils in this group are moderately deep to very deep, are clayey throughout, have slow or very slow saturated hydraulic conductivity, and occur on uplands. High clay content has an affect on the selection of tree and shrub species for these soils. Competition from grass and weeds is the principal concern in establishing and managing trees and shrubs on these soils. Wind erosion is a concern on these soils and water erosion is a concern on the gently sloping to moderately steep areas.

Group 5. Soils in this group are very deep with loamy and sandy textures. This group typically includes soils that normally have adequate soil moisture. Competition from grass and weeds and abrasion from wind erosion are the principal concerns in establishing and managing trees and shrubs on these soils.

Group 6D. Soils in this group are well drained, mostly loamy textured, and moderately deep over bedrock and other cemented layers that can severely restrict root growth. They have low or moderate available water capacity. Droughtiness will have an affect on the selection of tree and shrub species for use on these soils.

Competition from grass and weeds is the principal concern in establishing and managing trees and shrubs on these soils. Water erosion is a concern on the gently sloping to moderately steep areas. Supplemental watering may be needed for establishment.

Group 6G. Soils in this group are well drained, mostly loamy textured, and moderately deep over sand and gravel. The sand and gravel can restrict root growth and reduce available water capacity. Droughtiness will have an affect on the selection of tree and shrub species for use on these soils. Competition from grass and weeds is the principal concern in establishing and managing trees and shrubs on these soils. Water erosion is a concern on the gently sloping to moderately steep areas. Supplemental watering may be needed for establishment.

Group 7. Soils in this group are very deep, excessively to moderately well drained, and sandy textured. They typically have low to very low available water capacity and do not normally have adequate moisture. Drought conditions and abrasion from wind erosion are the principal concerns in establishing and managing trees and shrubs on these soils. Specialized site preparation and planting methods (vegetation between the rows is normally left undisturbed) are needed to establish trees and shrubs. Supplemental water may be essential for successful establishment.

Group 8. Soils in this group are calcareous at or near the surface. They do not receive beneficial moisture from run-on, flooding, or seasonal high water tables. High calcium carbonate content and competition from grass and weeds are the principal concerns in establishing and managing trees and shrubs on these soils. Wind erosion is a concern on these soils. Water erosion is a concern on gently sloping to moderately steep areas.

Group 9C. Soils in this group are clayey and affected by salinity and/or sodicity. These soils do not have a seasonal high water table. Concentrations of salt will severely affect the establishment, vigor, and growth of trees and shrubs on these soils.

Group 9W. Soils in this group are affected by salinity and/or sodicity and have a high water table. Concentrations of salt will severely affect the establishment, vigor, and growth of trees and shrubs on these soils.

Group 10. Soils in this group have one or more characteristics such as soil depth, texture, drainage, channeled phases, available water capacity, slope, or salt toxicity which severely limit planting, survival, or growth of trees and shrubs. Soils in this group are usually not recommended for farmstead and feedlot windbreaks, field windbreaks, and plantings for recreation and wildlife. However, onsite investigations may reveal tree and shrub plantings can be made with special treatments (hand planting, no till planting, scalp planting, specialized site preparation, drainage, or other specialized treatments). Selection of species must be tailored to soil conditions existing at each site.

All soils on moderately steep, steep, or very steep slopes (generally 15 percent or greater) and soils that are generally too wet, too shallow, or have other severely restrictive conditions fall into group 10. When an onsite investigation reveals a planting can be made on a soil in group 10, species should be selected from the most comparable windbreak suitability group. For example, for a shallow soil over bedrock, trees or shrubs would be selected from group 6D; an excessively wet soil would most closely match group 2.

More detailed information is available in Section II of the electronic Field Office Technical Guide (eFOTG) at www.nrcs.usda.gov/technical/efotg.

Potential Cropland Limitations and Hazards

(See text for a description and criteria of the limitations and hazards listed in this table.)

Map symbol and component name	Cropland limitations and hazards
3:	
Peta	Excessive saturated hydraulic conductivity High water table Pesticide and nutrient leaching
5:	
Savage	Poor tilth and compaction Restricted saturated hydraulic conductivity
5B:	
Savage	Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity
6:	
Regan	Alkalinity High water table Lime content Pesticide and nutrient leaching Pesticide and nutrient runoff Surface crusting Wind erosion
7:	
Arnegard	None
9F:	
Cabba	Alkalinity Depth to rock Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Surface crusting Water erosion Wind erosion
Sen	Depth to rock Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Water erosion
Chama	Alkalinity Depth to rock Lime content Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Surface crusting Water erosion Wind erosion

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
12B:	
Rhoades	Alkalinity High sodium content Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Surface crusting
Daglum	High sodium content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Surface crusting
13B:	
Dogtooth	Alkalinity Depth to rock High sodium content Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Surface crusting
Janesburg	Depth to rock High sodium content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Surface crusting
13D:	
Dogtooth	Alkalinity Depth to rock High sodium content Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Slope Surface crusting Water erosion

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
13D:(cont.)	
Janesburg	Depth to rock High sodium content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Slope Surface crusting Water erosion
14E:	
Amor	Depth to rock Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Water erosion
Brandenburg	Depth to sand and gravel Excessive saturated hydraulic conductivity Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Slope Surface crusting Water erosion
15B:	
Daglum	High sodium content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Surface crusting
Rhoades	Alkalinity High sodium content Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Surface crusting
17:	
Amor	Depth to rock Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity
Arnegard	Pesticide and nutrient runoff

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
17B:	
Amor	Depth to rock Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity
Shambo	Pesticide and nutrient runoff
17C:	
Amor	Depth to rock Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Water erosion
Cabba	Alkalinity Depth to rock Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Surface crusting Water erosion Wind erosion
17D:	
Amor	Depth to rock Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Water erosion
Cabba	Alkalinity Depth to rock Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Surface crusting Water erosion Wind erosion
18E:	
Manning	Depth to sand and gravel Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Slope Water erosion Wind erosion

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
18E:(cont.)	
Schaller	Excessive saturated hydraulic conductivity Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Slope Water erosion Wind erosion
Wabek	Alkalinity Depth to sand and gravel Excessive saturated hydraulic conductivity Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Slope Surface crusting Water erosion
19:	
Sen	Depth to rock Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity
Golva	Pesticide and nutrient runoff
19B:	
Chama	Alkalinity Depth to rock Lime content Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Surface crusting Wind erosion
Sen	Depth to rock Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity
Cabba	Alkalinity Depth to rock Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Surface crusting Wind erosion
19C:	
Chama	Alkalinity Depth to rock Lime content Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Surface crusting Water erosion Wind erosion

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
19C:(cont.)	
Cabba	Alkalinity Depth to rock Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Surface crusting Water erosion Wind erosion
Sen	Depth to rock Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Water erosion
19D:	
Cabba	Alkalinity Depth to rock Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Surface crusting Water erosion Wind erosion
Chama	Alkalinity Depth to rock Lime content Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Surface crusting Water erosion Wind erosion
Sen	Depth to rock Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Water erosion
21B:	
Parshall	Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Wind erosion
22B:	
Regent	Depth to rock Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
22B:(cont.)	
Savage	Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity
24B:	
Janesburg	Depth to rock Excessive saturated hydraulic conductivity High sodium content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Surface crusting Wind erosion
25B:	
Lefor	Depth to rock Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Wind erosion
27F:	
Badland, outcrop	Alkalinity Depth to rock High sodium content Lime content Limited organic matter Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Slope Soil slumping Water erosion Wind erosion
Lambert	Alkalinity Lime content Pesticide and nutrient runoff Slope Surface crusting Water erosion Wind erosion
Cabba	Alkalinity Depth to rock Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Surface crusting Water erosion Wind erosion

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
28F:	
Flasher	Alkalinity Depth to rock Excessive saturated hydraulic conductivity Lime content Limited available water capacity Limited organic matter Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Areas of rock outcrop Slope Water erosion Wind erosion
Rock outcrop	Onsite required
Vebar	Depth to rock Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Areas of rock outcrop Slope Water erosion Wind erosion
29F:	
Arikara	Excessive saturated hydraulic conductivity Pesticide and nutrient leaching Pesticide and nutrient runoff Slope Water erosion
Shambo	Pesticide and nutrient runoff Slope Water erosion
Cabba	Alkalinity Depth to rock Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Surface crusting Water erosion Wind erosion
30F:	
Vebar, extremely stony	Depth to rock Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Surface stones Water erosion

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
30F:(cont.)	
Amor, extremely stony	Depth to rock Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Surface stones Water erosion
31B:	
Sen	Depth to rock Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity
Janesburg	Depth to rock High sodium content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Surface crusting
31C:	
Sen	Depth to rock Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Water erosion
Janesburg	Depth to rock High sodium content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Slope Surface crusting Water erosion
35F:	
Flasher	Alkalinity Depth to rock Excessive saturated hydraulic conductivity Lime content Limited available water capacity Limited organic matter Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Water erosion Wind erosion

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
35F:(cont.)	
Vebar	Depth to rock Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Water erosion Wind erosion
Parshall	Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Slope Water erosion Wind erosion
36B:	
Ekalaka	Excessive saturated hydraulic conductivity High sodium content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Salt content Wind erosion
Parshall	Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Wind erosion
Desart	Excessive saturated hydraulic conductivity High sodium content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Wind erosion
37B:	
Farfeld	Dense layer Limited available water capacity Pesticide and nutrient runoff Restricted saturated hydraulic conductivity
Cedarpan	Dense layer High sodium content Limited available water capacity Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Surface crusting

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
37F:	
Cedarpan	Dense layer High sodium content Limited available water capacity Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Slope Surface crusting Water erosion
Slickspots	Alkalinity High sodium content Lime content Limited available water capacity Limited organic matter Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Slope Surface crusting Surface stones Water erosion Wind erosion
Farfeld	Dense layer Limited available water capacity Pesticide and nutrient runoff Restricted saturated hydraulic conductivity
41C:	
Wayden	Alkalinity Depth to rock Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Slope Water erosion Wind erosion
Moreau	Alkalinity Depth to rock Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Slope Water erosion Wind erosion

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
42B:	
Searing	Depth to sand and gravel Excessive saturated hydraulic conductivity Pesticide and nutrient leaching Pesticide and nutrient runoff
Ringling	Depth to sand and gravel Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching
43:	
Belfield	High sodium content Pesticide and nutrient leaching Restricted saturated hydraulic conductivity Salt content
Grail	Pesticide and nutrient leaching Poor tilth and compaction Restricted saturated hydraulic conductivity
44:	
Shambo	None
44B:	
Shambo	Pesticide and nutrient runoff
47:	
Stady	Depth to sand and gravel Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff
48B:	
Manning	Depth to sand and gravel Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Wind erosion
49B:	
Lihen	Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Wind erosion
Parshall	Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Wind erosion
51B:	
Janesburg	Depth to rock High sodium content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Surface crusting

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
51B:(cont.)	
Dogtooth	Alkalinity Depth to rock High sodium content Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Surface crusting
52:	
Heil	High sodium content High water table Pesticide and nutrient leaching Pesticide and nutrient runoff Ponding Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Surface crusting
53B:	
Savage	Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity
Daglum	High sodium content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Surface crusting
54:	
Channel	Onsite required
Straw	Channels Flooding Pesticide and nutrient leaching Pesticide and nutrient runoff
55:	
Pits, gravel and sand	Alkalinity Depth to sand and gravel Excessive saturated hydraulic conductivity Lime content Limited available water capacity Limited organic matter Pesticide and nutrient leaching Pesticide and nutrient runoff Slope Surface rock fragments Water erosion

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
57:	
Straw	None
Rhoades	Alkalinity High sodium content Lime content Limited available water capacity Pesticide and nutrient leaching Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Surface crusting
Daglum	High sodium content Limited available water capacity Pesticide and nutrient leaching Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Surface crusting
58:	
Straw	None
60:	
Korell	None
62F:	
Dogtooth	Alkalinity Depth to rock High sodium content Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Slope Surface crusting Water erosion
Janesburg	Depth to rock High sodium content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Slope Surface crusting Water erosion
Brandenburg	Depth to sand and gravel Excessive saturated hydraulic conductivity Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Slope Surface crusting Water erosion

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
63F:	
Dogtooth	Alkalinity Depth to rock High sodium content Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Slope Surface crusting Water erosion
Janesburg	Depth to rock High sodium content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Slope Surface crusting Water erosion
Cabba	Alkalinity Depth to rock Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Surface crusting Water erosion Wind erosion
65:	
Channel	Onsite required
Banks	Channels Excessive saturated hydraulic conductivity Flooding Limited available water capacity Limited organic matter Pesticide and nutrient leaching Pesticide and nutrient runoff Surface crusting Wind erosion
Trembles	Alkalinity Channels Excessive saturated hydraulic conductivity Flooding Lime content Pesticide and nutrient leaching Pesticide and nutrient runoff Surface crusting Wind erosion

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
66B:	
Stady	Depth to sand and gravel Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff
67B:	
Evridge	Depth to rock Excessive saturated hydraulic conductivity High sodium content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Salt content Wind erosion
Desart	Excessive saturated hydraulic conductivity High sodium content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Wind erosion
Telfer	Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Surface crusting Wind erosion
68F:	
Cabbart	Alkalinity Depth to rock Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Surface crusting Water erosion Wind erosion
Badland, outcrop	Alkalinity Depth to rock High sodium content Lime content Limited organic matter Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Slope Soil slumping Water erosion Wind erosion

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
69F:	
Patent	Alkalinity Lime content Pesticide and nutrient runoff Slope Surface crusting Water erosion Wind erosion
Badland, outcrop	Alkalinity Depth to rock High sodium content Lime content Limited organic matter Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Slope Soil slumping Water erosion Wind erosion
Cabbart	Alkalinity Depth to rock Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Surface crusting Water erosion Wind erosion
70B:	
Maltese	Excessive saturated hydraulic conductivity High sodium content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Surface crusting
Gerda	Alkalinity Excessive saturated hydraulic conductivity High sodium content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Surface crusting
71B:	
Chinook	Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Wind erosion

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
71B:(cont.)	
Rhame	Depth to rock Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Wind erosion
71D:	
Rhame	Depth to rock Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Water erosion Wind erosion
Chinook	Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Slope Water erosion Wind erosion
72F:	
Rhame	Depth to rock Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Water erosion Wind erosion
Fleak	Depth to rock Excessive saturated hydraulic conductivity Lime content Limited available water capacity Limited organic matter Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Water erosion Wind erosion
73D:	
Gerda	Alkalinity Excessive saturated hydraulic conductivity High sodium content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Slope Surface crusting Water erosion

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
73D:(cont.)	
Kirby	Alkalinity Dense layer Depth to sand and gravel Excessive saturated hydraulic conductivity Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Slope Surface crusting Surface rock fragments
74:	
Channel	Onsite required
Glendive	Alkalinity Channels Excessive saturated hydraulic conductivity Lime content Limited available water capacity Limited organic matter Pesticide and nutrient leaching Pesticide and nutrient runoff Surface crusting Wind erosion
Havre	Alkalinity Channels Lime content Limited organic matter Pesticide and nutrient runoff Surface crusting Wind erosion
75:	
Havre	Alkalinity Lime content Limited organic matter Pesticide and nutrient runoff Surface crusting Wind erosion
76B:	
Lonna	Alkalinity Lime content Pesticide and nutrient runoff Surface crusting Water erosion Wind erosion
76C:	
Lonna	Alkalinity Lime content Pesticide and nutrient runoff Slope Surface crusting Water erosion Wind erosion

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
77:	
Glendive	Alkalinity Excessive saturated hydraulic conductivity Lime content Limited available water capacity Limited organic matter Pesticide and nutrient leaching Pesticide and nutrient runoff Surface crusting Wind erosion
78B:	
Hanly	Alkalinity Excessive saturated hydraulic conductivity Limited available water capacity Limited organic matter Pesticide and nutrient leaching Pesticide and nutrient runoff Wind erosion
79C:	
Zeona	Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Slope Wind erosion
80:	
Ethridge	Lime content Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity
81B:	
Vebar	Depth to rock Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Wind erosion
Parshall	Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Wind erosion
81C:	
Vebar	Depth to rock Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Wind erosion
Tally	Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Slope Wind erosion

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
81D:	
Vebar	Depth to rock Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Water erosion Wind erosion
Flasher	Alkalinity Depth to rock Excessive saturated hydraulic conductivity Lime content Limited available water capacity Limited organic matter Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Water erosion Wind erosion
Tally	Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Slope Water erosion Wind erosion
82E:	
Badland, outcrop	Alkalinity Depth to rock High sodium content Lime content Limited organic matter Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Slope Soil slumping Water erosion Wind erosion
Patent	Alkalinity High sodium content Lime content Pesticide and nutrient runoff Slope Surface crusting Water erosion Wind erosion

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
83:	
Badland	Alkalinity Depth to rock High sodium content Lime content Limited organic matter Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Slope Soil slumping Water erosion Wind erosion
85F:	
Lonna	Alkalinity Lime content Pesticide and nutrient runoff Slope Surface crusting Water erosion Wind erosion
Cabbart	Alkalinity Depth to rock Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Surface crusting Water erosion Wind erosion
86F:	
Kirby	Alkalinity Dense layer Depth to sand and gravel Excessive saturated hydraulic conductivity Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Slope Surface crusting Surface rock fragments Water erosion
Badland, outcrop	Alkalinity Depth to rock High sodium content Lime content Limited organic matter Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Slope Soil slumping Water erosion Wind erosion

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
86F:(cont.)	
Patent	Alkalinity Lime content Pesticide and nutrient runoff Slope Surface crusting Water erosion Wind erosion
88:	
Littlemo	Depth to sand and gravel Excessive saturated hydraulic conductivity Pesticide and nutrient leaching Pesticide and nutrient runoff
Chanta	Depth to sand and gravel Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff
89B:	
Patent	Alkalinity Lime content Pesticide and nutrient runoff Surface crusting Wind erosion
91F:	
Lonna	Alkalinity Lime content Pesticide and nutrient runoff Slope Surface crusting Water erosion Wind erosion
Kirby	Alkalinity Dense layer Depth to sand and gravel Excessive saturated hydraulic conductivity Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Slope Surface crusting Surface rock fragments Water erosion
Cabbart	Alkalinity Depth to rock Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Surface crusting Water erosion Wind erosion
92B:	
Kremlin	Pesticide and nutrient runoff Water erosion

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
92B:(cont.)	
Ethridge	Lime content Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Water erosion
Gerda	Alkalinity Excessive saturated hydraulic conductivity High sodium content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Surface crusting
94F:	
Kirby	Alkalinity Dense layer Depth to sand and gravel Excessive saturated hydraulic conductivity Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Slope Surface crusting Surface rock fragments Water erosion
Arikara	Excessive saturated hydraulic conductivity Pesticide and nutrient leaching Pesticide and nutrient runoff Slope Water erosion
Badland, outcrop	Alkalinity Depth to rock High sodium content Lime content Limited organic matter Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Slope Soil slumping Water erosion Wind erosion
95F:	
Tinsley	Depth to sand and gravel Excessive saturated hydraulic conductivity Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Slope Surface crusting Surface rock fragments Water erosion Wind erosion

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
95F:(cont.)	
Chanta	Depth to sand and gravel Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Slope Water erosion
97:	
Kremlin	Pesticide and nutrient runoff
98:	
Wolf Point	Lime content Limited organic matter Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Surface crusting
99F:	
Badland, outcrop	Alkalinity Depth to rock High sodium content Lime content Limited organic matter Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Slope Soil slumping Water erosion Wind erosion
Cabbart	Alkalinity Depth to rock Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Surface crusting Water erosion Wind erosion
100C:	
Patent	Alkalinity Gullies Lime content Pesticide and nutrient runoff Slope Surface crusting Water erosion Wind erosion

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
100C:(cont.)	
Gullied land	Alkalinity Depth to rock Excessive saturated hydraulic conductivity Gullies High sodium content Lime content Limited available water capacity Limited organic matter Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Salt content Slope Soil slumping Water erosion Wind erosion
Glendive	Alkalinity Excessive saturated hydraulic conductivity Gullies Lime content Limited available water capacity Limited organic matter Pesticide and nutrient leaching Pesticide and nutrient runoff Surface crusting Wind erosion
101F:	
Boxwell	Depth to rock Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Water erosion
Cabbart	Alkalinity Depth to rock Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Surface crusting Water erosion Wind erosion
Arikara	Excessive saturated hydraulic conductivity Pesticide and nutrient leaching Pesticide and nutrient runoff Slope Water erosion
102B:	
Boxwell	Depth to rock Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Water erosion
Kremlin	Pesticide and nutrient runoff Water erosion

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
102D:	
Boxwell	Depth to rock Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Water erosion
Kremlin	Pesticide and nutrient runoff Slope Water erosion
103F:	
Badland, outcrop	Alkalinity Depth to rock High sodium content Lime content Limited organic matter Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Slope Soil slumping Water erosion Wind erosion
Arikara	Excessive saturated hydraulic conductivity Pesticide and nutrient leaching Pesticide and nutrient runoff Slope Water erosion
Cabbart	Alkalinity Depth to rock Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Surface crusting Water erosion Wind erosion
105:	
Harriet	Alkalinity High sodium content High water table Lime content Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Surface crusting

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
106:	
Riverwash	Excessive saturated hydraulic conductivity Flooding High water table Limited organic matter Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Wind erosion
107D:	
Rhame	Depth to rock Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Water erosion Wind erosion
Kremlin	Pesticide and nutrient runoff Slope Water erosion
Maltese	Excessive saturated hydraulic conductivity High sodium content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Slope Surface crusting Water erosion
108D:	
Boxwell	Depth to rock Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Water erosion
Scairt	Alkalinity Depth to rock High sodium content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Slope Surface crusting Water erosion

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
108D:(cont.)	
Maltese	Excessive saturated hydraulic conductivity High sodium content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Slope Surface crusting Water erosion
109F:	
Rhame	Depth to rock Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Water erosion Wind erosion
Arikara	Excessive saturated hydraulic conductivity Pesticide and nutrient leaching Pesticide and nutrient runoff Slope Water erosion
Fleak	Depth to rock Excessive saturated hydraulic conductivity Lime content Limited available water capacity Limited organic matter Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Water erosion Wind erosion
110C:	
Patent	Alkalinity Lime content Pesticide and nutrient runoff Slope Surface crusting Water erosion Wind erosion
Gerda	Alkalinity Excessive saturated hydraulic conductivity High sodium content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Slope Surface crusting Water erosion

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
110C:(cont.)	
Slickspots	Alkalinity High sodium content High water table Lime content Limited available water capacity Limited organic matter Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Surface crusting Wind erosion
111F:	
Lonna	Alkalinity Lime content Pesticide and nutrient runoff Slope Surface crusting Water erosion Wind erosion
Arikara	Excessive saturated hydraulic conductivity Pesticide and nutrient leaching Pesticide and nutrient runoff Slope Water erosion
Cabbart	Alkalinity Depth to rock Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Surface crusting Water erosion Wind erosion
112:	
Wolf Point	Lime content Limited organic matter Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Surface crusting
113:	
Havre	Alkalinity Lime content Limited organic matter Pesticide and nutrient runoff Surface crusting Wind erosion
114B:	
Haplustolls	Depth to sand and gravel Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Surface crusting

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
114B:(cont.)	
Ustorthents	Alkalinity Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Surface crusting Wind erosion
115B:	
Cozberg	Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff
Chanta	Depth to sand and gravel Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff
116F:	
Kremlin	Pesticide and nutrient runoff Slope Surface stones Water erosion
Shibah	Dense layer Depth to sand and gravel Excessive saturated hydraulic conductivity Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Slope Surface crusting Surface rock fragments Surface stones Water erosion
117B:	
Kremlin	Pesticide and nutrient runoff Water erosion
Chanta	Depth to sand and gravel Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff
118F:	
Shibah	Dense layer Depth to sand and gravel Excessive saturated hydraulic conductivity Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Slope Surface crusting Surface rock fragments Water erosion

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
118F:(cont.)	
Rubbleland	Onsite required
Arikara	Excessive saturated hydraulic conductivity Pesticide and nutrient leaching Pesticide and nutrient runoff Slope Water erosion
119:	
Glendive, wooded	Alkalinity Excessive saturated hydraulic conductivity Lime content Limited available water capacity Limited organic matter Pesticide and nutrient leaching Pesticide and nutrient runoff Surface crusting Wind erosion
120B:	
Hanly, wooded	Alkalinity Excessive saturated hydraulic conductivity Limited available water capacity Limited organic matter Pesticide and nutrient leaching Pesticide and nutrient runoff Wind erosion
121F:	
Maltese	Excessive saturated hydraulic conductivity High sodium content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Slope Surface crusting Water erosion
Lonna	Alkalinity Lime content Pesticide and nutrient runoff Slope Surface crusting Water erosion Wind erosion
Arikara	Excessive saturated hydraulic conductivity Pesticide and nutrient leaching Pesticide and nutrient runoff Slope Water erosion
122C:	
Bulltop	Dense layer Depth to sand and gravel Excessive saturated hydraulic conductivity Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Surface crusting

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
122C:(cont.)	
Shibah	Dense layer Depth to sand and gravel Excessive saturated hydraulic conductivity Lime content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Slope Surface crusting Surface rock fragments Water erosion
123E:	
Scairt	Alkalinity Depth to rock High sodium content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Slope Surface crusting Water erosion
Maltese	Excessive saturated hydraulic conductivity High sodium content Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Slope Surface crusting Water erosion
Boxwell	Depth to rock Limited available water capacity Pesticide and nutrient leaching Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Slope Water erosion
152:	
Heil	High sodium content High water table Pesticide and nutrient leaching Pesticide and nutrient runoff Ponding Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Surface crusting

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
155:	
Dumps and pits, mine	Alkalinity Dense layer High sodium content Lime content Limited available water capacity Limited organic matter Pesticide and nutrient runoff Restricted saturated hydraulic conductivity Salt content Slope Surface crusting Water erosion Wind erosion
159:	
Channel	Onsite required
Straw	Flooding Pesticide and nutrient leaching Pesticide and nutrient runoff
Daglum	High sodium content Limited available water capacity Pesticide and nutrient leaching Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Surface crusting
175:	
Havre	Alkalinity Lime content Limited organic matter Pesticide and nutrient runoff Surface crusting Wind erosion
177:	
Glendive	Alkalinity Excessive saturated hydraulic conductivity Lime content Limited available water capacity Limited organic matter Pesticide and nutrient leaching Pesticide and nutrient runoff Surface crusting Wind erosion
183:	
Badland, high precipitation	Alkalinity Depth to rock High sodium content Lime content Limited organic matter Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Slope Soil slumping Water erosion Wind erosion

Potential Cropland Limitations and Hazards--Continued

Map symbol and component name	Cropland limitations and hazards
205:	
Harriet, low precipitation	Alkalinity Flooding High sodium content High water table Lime content Pesticide and nutrient leaching Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Surface crusting
210C:	
Lambert	Alkalinity Lime content Pesticide and nutrient runoff Slope Surface crusting Water erosion Wind erosion
Slickspots	Alkalinity High sodium content Lime content Limited available water capacity Limited organic matter Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Surface crusting
Rhoades	Alkalinity High sodium content Lime content Limited available water capacity Pesticide and nutrient runoff Poor tilth and compaction Restricted saturated hydraulic conductivity Salt content Surface crusting
255:	
Pits, gravel and sand, low precipitation	Alkalinity Depth to sand and gravel Excessive saturated hydraulic conductivity Lime content Limited available water capacity Limited organic matter Pesticide and nutrient leaching Pesticide and nutrient runoff Slope Surface rock fragments Water erosion
M-W:	
Miscellaneous water	Onsite required
W:	
Water	Onsite required

Map Unit Productivity Index and Farmland Designation

Map symbol	Spring wheat productivity index	Farmland designation
3	90	Prime farmland
5	89	Farmland of statewide importance
5B	84	Farmland of statewide importance
6	35	Other land
7	94	Prime farmland
9F	25	Other land
12B	38	Other land
13B	32	Other land
13D	26	Other land
14E	43	Other land
15B	49	Other land
17	81	Farmland of statewide importance
17B	76	Farmland of statewide importance
17C	53	Other land
17D	41	Other land
18E	30	Other land
19	77	Farmland of statewide importance
19B	66	Farmland of statewide importance
19C	49	Other land
19D	37	Other land
21B	67	Farmland of statewide importance
22B	77	Farmland of statewide importance
24B	44	Other land
25B	58	Farmland of statewide importance
27F	18	Other land
28F	13	Other land
29F	25	Other land
30F	15	Other land
31B	61	Other land
31C	48	Other land
35F	20	Other land
36B	52	Other land

Map Unit Productivity Index and Farmland Designation--Continued

Map symbol	Spring wheat productivity index	Farmland designation
37B	52	Other land
37F	27	Other land
41C	35	Other land
42B	59	Farmland of statewide importance
43	83	Farmland of statewide importance
44	84	Farmland of statewide importance
44B	82	Farmland of statewide importance
47	64	Farmland of statewide importance
48B	46	Other land
49B	50	Farmland of statewide importance
51B	43	Other land
52	36	Other land
53B	70	Other land
54	45	Other land
55	9	Other land
57	61	Other land
58	87	Prime farmland
60	84	Farmland of statewide importance
62F	22	Other land
63F	21	Other land
65	30	Other land
66B	55	Farmland of statewide importance
67B	43	Other land
68F	17	Other land
69F	22	Other land
70B	46	Other land
71B	65	Farmland of statewide importance
71D	43	Other land
72F	19	Other land
73D	32	Other land
74	36	Other land
75	80	Farmland of statewide importance
76B	72	Farmland of statewide importance

Map Unit Productivity Index and Farmland Designation--Continued

Map symbol	Spring wheat productivity index	Farmland designation
76C	58	Farmland of statewide importance
77	61	Farmland of statewide importance
78B	47	Other land
79C	38	Other land
80	85	Farmland of statewide importance
81B	62	Farmland of statewide importance
81C	52	Other land
81D	33	Other land
82E	14	Other land
83	5	Other land
85F	36	Other land
86F	13	Other land
88	71	Farmland of statewide importance
89B	49	Other land
91F	28	Other land
92B	65	Other land
94F	13	Other land
95F	22	Other land
97	81	Farmland of statewide importance
98	81	Farmland of statewide importance
99F	8	Other land
100C	44	Other land
101F	24	Other land
102B	77	Farmland of statewide importance
102D	54	Other land
103F	17	Other land
105	26	Other land
106	8	Other land
107D	50	Other land
108D	41	Other land
109F	20	Other land
110C	39	Other land
111F	24	Other land

Map Unit Productivity Index and Farmland Designation--Continued

Map symbol	Spring wheat productivity index	Farmland designation
112	80	Farmland of statewide importance
113	79	Farmland of statewide importance
114B	38	Other land
115B	56	Other land
116F	18	Other land
117B	70	Farmland of statewide importance
118F	11	Other land
119	61	Farmland of statewide importance
120B	47	Other land
121F	28	Other land
122C	52	Other land
123E	29	Other land
152	36	Other land
155	7	Other land
159	39	Other land
175	79	Farmland of statewide importance
177	61	Farmland of statewide importance
183	3	Other land
205	24	Other land
210C	37	Other land
255	9	Other land
M-W	0	Other land
W	0	Other land

Yields per Acre of Crops

(Yields are those that can be expected under a high level of management. They are for nonirrigated areas. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil. Entries in () are for undrained conditions.)

Map symbol and soil name	Spring wheat	Oats	Barley	Sunflowers	Grass-legume hay
	Bu	Bu	Bu	Lbs	Tons
3: Peta	33	71	54	1,650	1.8
5: Savage	33	70	54	1,650	1.6
5B: Savage	31	66	51	1,550	1.6
6: Regan	13	28	21	650	2.1
7: Arnegard	35	74	57	1,750	1.8
9F: Cabba Sen Chama	9	20	15	450	0.3
12B: Rhoades Daglum	14	30	23	700	0.9
13B: Dogtooth Janesburg	12	25	19	600	0.9
13D: Dogtooth Janesburg	10	20	16	500	0.6
14E: Amor Brandenburg	16	34	26	800	0.9
15B: Daglum Rhoades	18	39	29	900	0.9
17: Amor Arnegard	30	64	49	1,500	1.6
17B: Amor Shambo	28	60	46	1,400	1.8
17C: Amor Cabba	20.0	42	32	1,000	1.0
17D: Amor Cabba	15.0	32	25	750	0.8

Yields per Acre of Crops--Continued

Map symbol and soil name	Spring wheat	Oats	Barley	Sunflowers	Grass-legume hay
	Bu	Bu	Bu	Lbs	Tons
18E: Manning, Schaller, Wabek	11.0	24	18	550	0.7
19: Sen, Golva	28.0	61	46	1,450	1.6
19B: Chama, Sen, Cabba	24	52	40	1,200	1.2
19C: Chama, Cabba, Sen	18	39	29	900	1.1
19D: Cabba, Chama, Sen	14	29	22	700	0.7
21B: Parshall	25	53	40	1,250	1.4
22B: Regent, Savage	28	61	46	1,450	1.5
24B: Janesburg	16	35	26	800	1.1
25B: Lefor	21	46	35	1,050	1.3
27F: Badland, outcrop, Lambert, Cabba	7	14	11	350	0.4
28F: Flasher, Rock outcrop, Vebar	5	10	8	250	0.1
29F: Arikara, Shambo, Cabba	9	20	15	450	0.4
30F: Vebar, extremely stony, Amor, extremely stony	6	12	9	300	0.1
31B: Sen, Janesburg	23	48	37	1,150	1.3

Yields per Acre of Crops--Continued

Map symbol and soil name	Spring wheat	Oats	Barley	Sunflowers	Grass-legume hay
	Bu	Bu	Bu	Lbs	Tons
31C: Sen Janesburg	18	38	29	900	1.3
35F: Flasher Vebar Parshall	7	16	12	350	0.4
36B: Ekalaka Parshall Desart	20	42	32	1,000	1.2
37B: Farfeld Cedarpan	19	41	31	950	1.3
37F: Cedarpan Slickspots, stony Farfeld	10	21	16	500	0.6
41C: Wayden Moreau	13	28	21	650	0.9
42B: Searing Ringling	22	46	35	1,100	1.4
43: Belfield Grail	31	65	50	1,550	1.7
44: Shambo	31	66	51	1,550	1.8
44B: Shambo	30	64	49	1,500	1.8
47: Stady	24	50	38	1,200	1.8
48B: Manning	17	36	28	850	1.4
49B: Lihen Parshall	19	39	30	950	1.4
51B: Janesburg Dogtooth	16	34	26	800	0.9
52: Heil	13	28	22	650	1.1
53B: Savage Daglum	26	56	43	1,300	1.4

Yields per Acre of Crops--Continued

Map symbol and soil name	Spring wheat	Oats	Barley	Sunflowers	Grass-legume hay
	Bu	Bu	Bu	Lbs	Tons
54: Channel Straw	16	35	26	800	2.4
55: Pits, gravel and sand	3	7	5	150	0.0
57: Straw Rhoades Daglum	23	48	37	1,150	1.3
58: Straw	32	68	52	1,600	1.8
60: Korell	31	66	51	1,550	1.8
62F: Dogtooth Janesburg Brandenburg	8	17	13	400	0.4
63F: Dogtooth Janesburg Cabba	8	17	13	400	0.4
65: Channel Banks Trembles	11	24	18	550	1.7
66B: Stady	20	43	33	1,000	1.8
67B: Evridge Desart Telfer	16	34	26	800	1.2
68F: Cabbart Badland, outcrop	6	13	10	300	0.1
69F: Patent Badland, outcrop Cabbart	8	17	13	400	0.6
70B: Maltese Gerda	17	36	28	850	0.8
71B: Chinook Rhame	24	51	39	1,200	1.0
71D: Rhame Chinook	16	34	26	800	0.7

Yields per Acre of Crops--Continued

Map symbol and soil name	Spring wheat	Oats	Barley	Sunflowers	Grass-legume hay
	Bu	Bu	Bu	Lbs	Tons
72F:	7	15	11	350	0.2
Rhame					
Fleak					
73D:	12	25	19	600	0.6
Gerda					
Kirby					
74:	13	28	21	650	1.3
Channel					
Glendive					
Havre					
75:	30	63	48	1,500	1.4
Havre					
76B:	27	57	43	1,350	1.4
Lonna					
76C:	21	46	35	1,050	1.4
Lonna					
77:	23	48	37	1,150	1.1
Glendive					
78B:	17	37	28	850	1.3
Hanly					
79C:	14	30	23	700	1.3
Zeona					
80:	31	67	51	1,550	1.5
Ethridge					
81B:	23	49	37	1,150	1.3
Vebar					
Parshall					
81C:	19	41	31	950	1.3
Vebar					
Tally					
81D:	12	26	20	600	0.8
Vebar					
Flasher					
Tally					
82E:	5	11	8	250	0.4
Badland, outcrop					
Patent					
83:	2	4	3	100	0.0
Badland					
85F:	13	28	22	650	0.5
Lonna					
Cabbart					
86F:	5	10	8	250	0.2
Kirby					
Badland, outcrop					
Patent					

Yields per Acre of Crops--Continued

Map symbol and soil name	Spring wheat	Oats	Barley	Sunflowers	Grass-legume hay
	Bu	Bu	Bu	Lbs	Tons
88: Littlemo Chanta	26	56	43	1,300	1.4
89B: Patent	18	39	29	900	1.4
91F: Lonna Kirby Cabbart	10	21	16	500	0.6
92B: Kremlin Ethridge Gerda	24	51	39	1,200	1.3
94F: Kirby Arikara Badland, outcrop	5	10	8	250	0.2
95F: Tinsley Chanta	8	17	13	400	0.6
97: Kremlin	30	64	49	1,500	1.4
98: Wolf Point	30	64	49	1,500	1.5
99F: Badland, outcrop Cabbart	3	6	5	150	0.1
100C: Patent Gullied land Glendive	16	35	26	800	0.8
101F: Boxwell Cabbart Arikara	9	19	14	450	0.3
102B: Boxwell Kremlin	28	61	46	1,450	1.5
102D: Boxwell Kremlin	20	42	32	1,000	1.0
103F: Badland, outcrop Arikara Cabbart	6	13	10	300	0.1
105: Harriet	10	20	16	500	1.1

Yields per Acre of Crops--Continued

Map symbol and soil name	Spring wheat	Oats	Barley	Sunflowers	Grass-legume hay
	Bu	Bu	Bu	Lbs	Tons
106: Riverwash	3	6	5	150	0.0
107D: Rhame, Kremlin, Maltese	19	39	30	950	1.1
108D: Boxwell, Scairt, Maltese	15	32	25	750	0.8
109F: Rhame, Arikara, Fleak	7	16	12	350	0.2
110C: Patent, Gerda, Slickspots	14	31	23	700	0.9
111F: Lonna, Arikara, Cabbart	8	17	13	400	0.5
112: Wolf Point, wooded	30	63	48	1,500	1.5
113: Havre, wooded	29	62	47	1,450	1.4
114B: Haplustolls, Ustorthents	14	30	23	700	1.5
115B: Cozberg, Chanta	21	44	34	1,050	1.3
116F: Kremlin, Shibah	7	14	11	350	0.2
117B: Kremlin, Chanta	26	55	42	1,300	1.4
118F: Shibah, Rubbleland, Arikara	4	9	7	200	0.2
119: Glendive, wooded	23	48	37	1,150	1.1
120B: Hanly, wooded	17	37	28	850	1.3

Yields per Acre of Crops--Continued

Map symbol and soil name	Spring wheat	Oats	Barley	Sunflowers	Grass-legume hay
	Bu	Bu	Bu	Lbs	Tons
121F: Maltese Lonna Arikara	10	22	17	500	1.0
122C: Bulltop Shibah	19	41	31	950	1.1
123E: Scairt Maltese Boxwell, low precipitation	11	23	17	550	0.7
152: Heil	13	28	22	650	1.0
155: Dumps and Pits, mine	3	6	4	150	0.0
159: Channel Straw Daglum	14	29	23	700	1.9
175: Havre, rarely flooded	29	62	47	1,450	1.4
177: Glendive, rarely flooded	23	48	37	1,150	1.1
183: Badland, high precipitation	1	2	2	50	0.0
205: Harriet, low precipitation	9	19	14	450	1.0
210C: Lambert Slickspots Rhoades	14	29	22	700	1.0
255: Pits, gravel and sand, low precipitation	3	7	5	150	0.0
M-W: Miscellaneous water	--	-	-	-	-
W: Water	--	-	-	-	-

Interpretive Groupings Report

(Dashes (--) indicate an interpretive group is not assigned. Entries in ( ) are for undrained conditions.)

Map symbol and soil name	Forage suitability group	Land capability class	Windbreak suitability group
3:			
Peta	Subirrigated	2c	1
5:			
Savage	Clayey Subsoil	2s	4
5B:			
Savage	Clayey Subsoil	2e	4
6:			
Regan	Wet	4w	2k
7:			
Arnegard	Loam	2c	1
9F:			
Cabba	Not suited	7e	10
Sen	Not suited	6e	10
Chama	Not suited	7e	10
12B:			
Rhoades	Not suited	6s	10
Daglum	Claypan	4s	9c
13B:			
Dogtooth	Not suited	6s	10
Janesburg	Claypan	4s	9c
13D:			
Dogtooth	Not suited	6s	10
Janesburg	Claypan	6s	9c
14E:			
Amor	Droughty Loam	4e	6d
Brandenburg	Not suited	6s	10
15B:			
Daglum	Claypan	4s	9c
Rhoades	Not suited	6s	10
17:			
Amor	Droughty Loam	2s	6d
Arnegard	Overflow	2c	1
17B:			
Amor	Droughty Loam	2e	6d
Shambo	Loam	2e	3

Interpretive Groupings Report--Continued

Map symbol and soil name	Forage suitability group	Land capability class	Windbreak suitability group
17C:			
Amor	Droughty Loam	3e	6d
Cabba	Not suited	6e	10
17D:			
Amor	Droughty Loam	4e	6d
Cabba	Not suited	6e	10
18E:			
Manning	Very Droughty Loam	6e	6g
Schaller	Not suited	7e	10
Wabek	Not suited	7s	10
19:			
Sen	Droughty Loam	2s	6d
Golva	Loam	2c	3
19B:			
Chama	Limy Upland	3e	8
Sen	Droughty Loam	2e	6d
Cabba	Not suited	6s	10
19C:			
Chama	Limy Upland	4e	8
Cabba	Not suited	6e	10
Sen	Droughty Loam	3e	6d
19D:			
Cabba	Not suited	6e	10
Chama	Limy Upland	6e	10
Sen	Droughty Loam	4e	6d
21B:			
Parshall	Loam	3e	1
22B:			
Regent	Clayey Subsoil	2e	4
Savage	Clayey Subsoil	2e	4
24B:			
Janesburg	Claypan	4s	9c
25B:			
Lefor	Droughty Loam	3e	6d
27F:			
Badland, outcrop	Not suited	8e	10
Lambert	Limy Upland	6e	10
Cabba	Not suited	7e	10

Interpretive Groupings Report--Continued

Map symbol and soil name	Forage suitability group	Land capability class	Windbreak suitability group
28F:			
Flasher	Not suited	7e	10
Rock outcrop	Not suited	8s	10
Vebar	Not suited	7e	10
29F:			
Arikara	Not suited	7e	10
Shambo	Not suited	7e	10
Cabba	Not suited	7e	10
30F:			
Vebar, extremely stony	Not suited	7s	10
Amor, extremely stony	Not suited	7s	10
31B:			
Sen	Droughty Loam	2e	6d
Janesburg	Claypan	4s	9c
31C:			
Sen	Droughty Loam	3e	6d
Janesburg	Claypan	6s	9c
35F:			
Flasher	Not suited	7e	10
Vebar	Not suited	7e	10
Parshall	Loam	6e	5
36B:			
Ekalaka	Claypan	4s	9l
Parshall	Loam	3e	1
Desart	Very Droughty Loam	4s	9l
37B:			
Farfeld	Droughty Loam	6s	10
Cedarpan	Claypan	6s	10
37F:			
Cedarpan	Not suited	6s	10
Slickspots, stony	Not suited	8s	10
Farfeld	Droughty Loam	6s	10
41C:			
Wayden	Not suited	6e	10
Moreau	Clayey Subsoil	3e	4c

Interpretive Groupings Report--Continued

Map symbol and soil name	Forage suitability group	Land capability class	Windbreak suitability group
42B:			
Searing---------	Droughty Loam	3e	6g
Ringling--------	Not suited	6s	10
43:			
Belfield--------	Clayey Subsoil	2s	4
Grail----------	Clayey Subsoil	2c	1
44:			
Shambo----------	Loam	2c	3
44B:			
Shambo----------	Loam	2e	3
47:			
Stady----------	Droughty Loam	2e	6g
48B:			
Manning---------	Very Droughty Loam	3e	6g
49B:			
Lihen----------	Sand	4e	7
Parshall--------	Loam	3e	1
51B:			
Janesburg-------	Claypan	4s	9c
Dogtooth--------	Not suited	6s	10
52:			
Heil----------	Not suited	6s	10
53B:			
Savage----------	Clayey Subsoil	2e	4
Daglum----------	Claypan	4s	9c
54:			
Channel---------	---	---	10
Straw----------	Overflow	6w	10
55:			
Pits, gravel and sand	---	8s	10
57:			
Straw----------	Loam	2c	1
Rhoades---------	Not suited	6s	10
Daglum----------	Claypan	4s	9c
58:			
Straw----------	Loam	2c	1
60:			
Korell----------	Loam	2c	1

Interpretive Groupings Report--Continued

Map symbol and soil name	Forage suitability group	Land capability class	Windbreak suitability group
62F:			
Dogtooth--------	Not suited	7s	10
Janesburg-------	Claypan	6s	10
Brandenburg-----	Not suited	7s	10
63F:			
Dogtooth--------	Not suited	7s	10
Janesburg-------	Claypan	6s	10
Cabba----------	Not suited	7e	10
65:			
Channel---------	Not suited	---	10
Banks----------	Very Droughty Loam	6w	10
Trembles--------	Overflow	6w	10
66B:			
Stady----------	Droughty Loam	3e	6g
67B:			
Evridge---------	Claypan	4s	9l
Desart----------	Very Droughty Loam	4s	9l
Telfer----------	Sand	4e	7
68F:			
Cabbart---------	Not suited	7e	10
Badland, outcrop	---	8e	10
69F:			
Patent----------	Limy Upland	6e	10
Badland, outcrop	Not suited	8e	10
Cabbart---------	Not suited	7e	10
70B:			
Maltese---------	Claypan	4s	9c
Gerda----------	Not suited	6s	10
71B:			
Chinook---------	Droughty Loam	3e	5
Rhame----------	Very Droughty Loam	3e	6d
71D:			
Rhame----------	Not suited	6e	6d
Chinook---------	Droughty Loam	6e	5
72F:			
Rhame----------	Not suited	7e	10
Fleak----------	Not suited	7e	10

Interpretive Groupings Report--Continued

Map symbol and soil name	Forage suitability group	Land capability class	Windbreak suitability group
73D:			
Gerda	Not suited	6s	10
Kirby	Not suited	6s	10
74:			
Channel	---	---	10
Glendive	Overflow	6w	10
Havre	Overflow	6w	10
75:			
Havre	Loam	2e	1k
76B:			
Lonna	Limy Upland	2e	8
76C:			
Lonna	Limy Upland	3e	8
77:			
Glendive	Droughty Loam	3e	5
78B:			
Hanly	Very Droughty Loam	4e	7
79C:			
Zeona	Not suited	4e	10
80:			
Ethridge	Clayey Subsoil	2s	3
81B:			
Vebar	Very Droughty Loam	3e	6d
Parshall	Loam	3e	1
81C:			
Vebar	Very Droughty Loam	4e	6d
Tally	Droughty Loam	4e	5
81D:			
Vebar	Not suited	6e	6d
Flasher	Not suited	6e	10
Tally	Droughty Loam	6e	5
82E:			
Badland, outcrop	---	8e	10
Patent	Limy Upland	7e	10
83:			
Badland	---	8e	10
85F:			
Lonna	Limy Upland	4e	10
Cabbart	Not suited	7e	10

Interpretive Groupings Report--Continued

Map symbol and soil name	Forage suitability group	Land capability class	Windbreak suitability group
86F:			
Kirby----------	Not suited	7s	10
Badland, outcrop	---	8e	10
Patent----------	Limy Upland	7e	10
88:			
Littlemo--------	Loam	2c	3
Chanta----------	Droughty Loam	2s	6g
89B:			
Patent----------	Limy Upland	4e	8
91F:			
Lonna----------	Limy Upland	6e	10
Kirby----------	Not suited	7s	10
Cabbart---------	Not suited	7e	10
92B:			
Kremlin---------	Loam	2e	3
Ethridge--------	Clayey Subsoil	2e	4
Gerda----------	Not suited	6s	10
94F:			
Kirby----------	Not suited	7s	10
Arikara---------	Not suited	7e	10
Badland, outcrop	---	8e	10
95F:			
Tinsley---------	Not suited	7s	10
Chanta----------	Droughty Loam	6e	6g
97:			
Kremlin---------	Loam	2c	3
98:			
Wolf Point------	Clayey Subsoil	2s	4c
99F:			
Badland, outcrop	---	8e	10
Cabbart---------	Not suited	7e	10
100C:			
Patent----------	Limy Upland	4e	8
Gullied land----	Not suited	8e	10
Glendive--------	Droughty Loam	3e	5

Interpretive Groupings Report--Continued

Map symbol and soil name	Forage suitability group	Land capability class	Windbreak suitability group
101F:			
Boxwell---------	Not suited	7e	10
Cabbart---------	Not suited	7e	10
Arikara---------	Not suited	7e	10
102B:			
Boxwell---------	Droughty Loam	2e	6d
Kremlin---------	Loam	2e	3
102D:			
Boxwell---------	Droughty Loam	4e	6d
Kremlin---------	Loam	4e	3
103F:			
Badland, outcrop	Not suited	8e	10
Arikara---------	Not suited	7e	10
Cabbart---------	Not suited	7e	10
105:			
Harriet---------	Not suited	6s	10
106:			
Riverwash-------	Not suited	8w	10
107D:			
Rhame----------	Not suited	6e	6d
Kremlin---------	Loam	3e	3
Maltese---------	Claypan	4s	9c
108D:			
Boxwell---------	Droughty Loam	4e	6d
Scairt----------	Not suited	6s	10
Maltese---------	Claypan	6s	9c
109F:			
Rhame----------	Not suited	7e	10
Arikara---------	Not suited	7e	10
Fleak----------	Not suited	7e	10
110C:			
Patent----------	Limy Upland	4e	8
Gerda----------	Not suited	6s	10
Slickspots------	Not suited	8s	10

Interpretive Groupings Report--Continued

Map symbol and soil name	Forage suitability group	Land capability class	Windbreak suitability group
111F:			
Lonna	Limy Upland	6e	10
Arikara	Not suited	7e	10
Cabbart	Not suited	7e	10
112:			
Wolf Point, wooded	Not suited	2s	4c
113:			
Havre, wooded	Not suited	2e	1k
114B:			
Haplustolls	Not suited	2e	3
Ustorthents	Not suited	4e	8
115B:			
Cozberg	Droughty Loam	3e	5
Chanta	Droughty Loam	3e	6g
116F:			
Kremlin	Steep Loam	6e	10
Shibah	Not suited	7s	10
117B:			
Kremlin	Loam	2e	3
Chanta	Droughty Loam	3e	6g
118F:			
Shibah	Not suited	7s	10
Rubbleland	---	8s	10
Arikara	Not suited	7e	10
119:			
Glendive, wooded	Not suited	3e	5
120B:			
Hanly, wooded	Not suited	4e	7
121F:			
Maltese	Claypan	6s	9c
Lonna	Steep Loam	6e	10
Arikara	Not suited	7e	10
122C:			
Bulltop	Loam	3e	6g
Shibah	Droughty Loam	6s	10

Interpretive Groupings Report--Continued

Map symbol and soil name	Forage suitability group	Land capability class	Windbreak suitability group
123E:			
Scairt----------	Not suited	6s	10
Maltese---------	Claypan	6s	9c
Boxwell---------	Droughty Loam	4e	6d
152:			
Heil----------	Not suited	6s	10
155:			
Dumps and pits, mine----------	---	8s	10
159:			
Straw----------	Overflow	6w	10
Daglum----------	Claypan	6w	10
175:			
Havre, rarely flooded--------	Loam	2e	1k
177:			
Glendive, rarely flooded--------	Droughty Loam	3e	5
183:			
Badland, high precipitation--	---	8e	10
205:			
Harriet, low percipitation--	Not suited	6s	10
210C:			
Lambert---------	Limy Upland	4e	8
Slickspots------	---	8s	10
Rhoades---------	Not suited	6s	10
255:			
Pits, gravel and sand, low precipitation--	Not suited	8s	10
M-W:			
Miscellaneous water----------	---	---	10
W:			
Water----------	---	---	10

Rangeland

Rangeland makes up about 523,250 acres or 71 percent of the land in Billings County. The majority of rangeland is on rolling to steep dissected uplands. The soils are generally unsuited to poorly suited for cultivated crops. Rangeland is used primarily for grazing by domestic livestock; however, it also provides wildlife habitat, watershed protection, recreational areas, and aesthetic value.

Rangeland is defined as land on which the native vegetation (historic climax or natural potential plant community) is predominantly grasses, grasslike plants, forbs, and shrubs. Rangeland includes natural grasslands. Cultural treatments, such as fertilization and cultivation, generally are not used or needed to maintain productivity of rangeland. The composition and production of the plant community are largely determined by soil, climate, topography, and grazing influences.

Ecological Sites

In areas that have similar climate and topography, differences in the kind and amount of vegetation produced on rangeland are closely related to the kind of soil. Soils vary in their capacity to produce grasses and other native plants. Soils that produce similar kinds, proportions, and amounts of vegetation are grouped into an ecological site.

Ecological site is a distinctive kind of rangeland that produces a characteristic natural plant community that differs from natural plant communities on other ecological sites in kind, amount, and proportion of range plants. Over time, the combination of plants best suited to a particular soil and climate has become established. In the absence of excessive disturbances, this group of plants is the natural plant community or climax community for the site. Natural plant communities are not static but vary slightly from year to year and place to place. The natural potential plant community is generally, but not always, the most productive and diverse combination of plants that may occur on a site.

The relationship between soils and vegetation was determined during this survey. In most cases, ecological sites can be determined directly from the soil map. Soil properties that affect moisture supply and plant nutrients have the greatest influence on the productivity of ecological sites. Soil reaction, salt content, and a seasonal high water table are also important. Many different ecological sites occur in the survey area. Ecological sites for each map unit component under undrained conditions are given in the table, “Ecological Site Report." For a detailed description of the ecological sites in Billings County, see www.nrcs.usda.gov/technical/efotg.

Ecological Site Plant Community, Composition, and Production

The characteristic vegetation consists of grasses, grasslikes, forbs, shrubs, and trees that dominate the natural potential plant community on each ecological site. The plant species within these groups are listed by common name. Under composition by weight, the expected percentage of the total annual production is

given for each major species and groups of minor species making up the characteristic vegetation.

The ecological site description helps interpret the ecological and utilitarian values of a given site, including grazing, wildlife habitat, watershed protection, recreation, and others.

Total annual production is the amount of vegetation that can be expected to grow annually on well managed rangeland, supporting the potential natural plant community. It includes all vegetation, whether or not palatable to grazing animals. It includes the current year's herbaceous growth, as well as growth of leaves, twigs, and fruit of woody plants. It does not include the increase in stem diameter of trees and shrubs. Potential production depends on the kind of ecological site. Current production depends on the rangeland similarity index and the amount of moisture available to the plants during the growing season. Production is expressed in pounds per acre of air-dry herbage for favorable, average, and unfavorable years, as determined by the amount and distribution of precipitation and the temperatures favorable to growing conditions.

Rangeland Similarity Index

Rangeland similarity index indicates the present composition of the plant community on an ecological site in relation to the historic climax plant community. Similarity index is determined by comparing the present plant community with the historic climax plant community or the desired plant community which meets the manager’s goals and objectives while protecting the natural resources on a particular ecological site. The more closely the existing community resembles the historic climax plant community, the higher the similarity index.

In some cases the plant community found on a site may not look similar to the historic climax plant community described in the ecological site description. This is usually due to a lower similarity index, reflecting past disturbances, or in some cases long-term exclusion from grazing or fire. Abnormal disturbances that change the historic climax plant community include prolonged overgrazing or season-long grazing, excessive or untimely burning, erosion, and plowing. Under these circumstances, some of the climax plants decrease in proportion while others increase. Also, plants which were not part of the original native plant community may invade the site.

A very severe disturbance, such as plowing, can completely destroy the native plant community, resulting in dominance of annuals or weedy perennials of a lower plant successional status. If the plant community has not deteriorated significantly, it eventually can return to a higher similarity rating under proper range management.

The following paragraphs briefly describe soil and landscape features and limitations associated with ecological sites in Major Land Resource Areas (MLRAs) 54 and 58C. Some of the ecological sites described may not occur in Billings County.

Clayey ecological site. These are moderately deep to very deep, moderately well and well drained, moderately fine and fine textured soils. Saturated hydraulic conductivity is slow or very slow and available water capacity is moderate to high. Salinity is none to very slight and sodicity is none to high at depths greater than 16 inches. This site is on nearly level to hilly alluvial plains, lake plains, residual uplands, till plains, and terraces of large streams. Slope ranges from 1 to 25 percent.

Claypan ecological site. These are moderately deep to very deep, moderately well and well drained soils. Saturated hydraulic conductivity is moderately slow to very slow and available water capacity is moderate. They have moderately coarse to moderately fine textured surface layers underlain by a sodium affected subsoil. The subsoils are moderately fine to fine textured and are high in sodium. These dense sodium affected subsoils restrict root growth. Salinity is moderate to strong at depths

greater than 16 inches. This site is on nearly level to hilly alluvial plains, lake plains, residual uplands, and till plains. Slope ranges from 0 to 25 percent.

Closed Depression ecological site. These are very deep, poorly and very poorly drained, fine textured soils. Saturated hydraulic conductivity is slow to very slow. Salinity and sodicity are slight to strong. This site is on enclosed depressions on residual uplands and till plains. Slope ranges from 0 to 1 percent.

Limy Sands ecological site. These are moderately deep, well to somewhat excessively drained, moderately coarse to coarse textured soils. Typically these soils are calcareous throughout, but in some pedons the A horizon is noncalcareous. Saturated hydraulic conductivity is moderately rapid to moderate and available water capacity is low. Salinity is none to very slight and sodicity is none. Soils on this site are moderately to highly susceptible to wind erosion. In severely disturbed areas, blowouts are common. This site is on nearly level to very steep residual uplands. Slope ranges from 1 to 50 percent.

Limy Subirrigated ecological site. These are very deep, somewhat poorly drained, coarse to medium textured soils. These soils have a calcareous subsoil. Saturated hydraulic conductivity is moderately rapid to moderately slow and available water capacity is low to high. Salinity is none to very slight. Soils on this site are moderately to highly susceptible to wind erosion. This site is on flats and swales on lake plains, outwash plains, and till plains. Slope ranges from 0 to 6 percent.

Loamy ecological site. These are moderately deep to very deep, moderately well to well drained, medium and moderately fine textured soils. Saturated hydraulic conductivity is moderate and available water capacity is moderate to high. Salinity is none to very slight and sodicity is none. This site occurs on nearly level to hilly alluvial fans, flood plains, lake plains, residual uplands, and till plains. Slope ranges from 1 to 20 percent.

Loamy Overflow ecological site. These are deep and very deep, moderately well and well drained, moderately coarse to fine textured soils. Saturated hydraulic conductivity is moderate to slow and available water capacity is moderate to high. Salinity is none to very slight and sodicity is none. This site is in swale positions that regularly receive additional run-on from surrounding uplands or flooding. These soils occur on swales, depressions, and footslopes on the lake plains, residual uplands, till plains, and frequently flooded stream terraces and flood plains. Slope ranges from 0 to 6 percent.

Loamy Terrace ecological site. These are moderately deep to very deep, well drained, medium and moderately fine textured soils. Saturated hydraulic conductivity is moderate to moderately slow and available water capacity is moderate to high. Salinity is none to very slight and sodicity is none. This site is on level to gently sloping flood plains and terraces. Flooding frequency ranges from none to occasional. Slope ranges from 0 to 6 percent.

Not Assigned ecological site. These sites indicate current site specific information is not adequate and a field visit is necessary for planning purposes. Includes all miscellaneous land types.

Saline Lowland ecological site. These are moderately deep to very deep, poorly to moderately well drained, coarse to fine textured soils. Saturated hydraulic conductivity is moderately rapid to very slow and available water capacity is low to high. Salinity is moderate, especially in surface layers and sodicity is none to high. Natraquolls are included in this site. This ecological site receives additional moisture from ground water seepage and/or run-on. This site occurs on depressed areas on alluvial fans, flood plains, lake plains, residual uplands, and till plains. Slope ranges from 0 to 6 percent.

Sands ecological site. These are deep to very deep, well to excessively drained, coarse textured soils. Saturated hydraulic conductivity is very rapid to moderately

rapid and available water capacity is moderate to very low. Salinity and sodicity are none. Soils on this site are highly susceptible to wind erosion. This site is on nearly level to steep flood plains, lake plains, outwash plains, residual uplands, terraces, and till plains. Slope ranges from 0 to 45 percent.

Sands Subirrigated ecological site. These are deep to very deep, moderately well drained, coarse textured soils. Saturated hydraulic conductivity is very rapid to moderately rapid and available water capacity is moderate to very low. Salinity and sodicity are none. Soils on this site are highly susceptible to wind erosion. A seasonal water tables ranges from 3 feet to 5 feet below the surface. This site is on level to undulating flood plains, lake plains, outwash plains, and terraces. Slopes range from 0 to 6 percent.

Sandy ecological site. These are moderately deep to very deep and well to somewhat excessively drained soils. Soil textures include moderately coarse and moderately coarse over moderately fine and moderately coarse over sandy or sandy skeletal (24 to 40 inches to sand or sand and gravel). Saturated hydraulic conductivity is moderately rapid to moderate and available water capacity is low to moderate. These soils are friable and susceptible to wind erosion. This site is on nearly level to very steep lake plains, outwash plains, residual uplands, and till plains. Slope ranges from 1 to 60 percent.

Sandy Claypan ecological site. These are moderately deep to very deep, moderately well and well drained soils. They have moderately coarse to medium textured surface layers underlain by a sodium affected subsoil. The subsoils are moderately coarse to medium textured and are high in sodium. Saturated hydraulic conductivity is moderate to slow and available water capacity is moderate. Salinity is none to slight and sodicity is high. This site is on nearly level to moderately steep alluvial flats, lake plains, residual uplands, and till plains. Slope ranges from 0 to 25 percent.

Sandy Terrace ecological site. These are moderately deep to very deep, well to somewhat excessively drained, moderately coarse to medium textured soils. Saturated hydraulic conductivity is moderately rapid to moderately slow and available water capacity is moderately low to high. Salinity is none to very slight and sodicity is none. These soils are friable and susceptible to wind erosion. This site is on level to gently sloping flood plains and terraces. Flooding frequency ranges from none to occasional. Slope ranges from 0 to 6 percent.

Shallow Clayey ecological site. These are shallow, well drained, fine textured soils overlying weathered shale at less than 20 inches. Saturated hydraulic conductivity is slow to very slow and available water capacity is low to very low. Salinity and sodicity are none. This site occurs on knolls and ridges on nearly level to very steep residual uplands. Slope ranges from 0 to 70 percent.

Shallow Gravel ecological site. These soils are very deep and somewhat excessively drained. Soil textures include moderately coarse and medium textured soils over sand or sand and gravel between the depths of 14 to 25 inches. Saturated hydraulic conductivity is moderately rapid to moderate in the upper part and very rapid in the lower part. Available water capacity is moderate in the upper part and low to very low in the lower part. Salinity and sodicity are none. This site occurs on flats, rises, and side slopes on outwash plains and terraces. Slope ranges from 0 to 15 percent.

Shallow Loamy ecological site. These are shallow, well drained, medium and moderately fine textured soils overlying weathered mudstone or siltstone at less than 20 inches. Saturated hydraulic conductivity is moderate or moderately slow and available water capacity is low or very low. Salinity and sodicity are none. This site occurs on knolls and ridges on nearly level to very steep residual uplands. Slope ranges from 0 to 60 percent.

Shallow Sandy ecological site. These are shallow, coarse and moderately coarse textured, well drained soils overlying sandstone at less than 20 inches. Saturated hydraulic conductivity is moderately rapid to moderate and available water capacity is low to very low. Salinity and sodicity are none. Wind erosion is a hazard on denuded areas. This site occurs on knolls and ridges on nearly level to very steep residual uplands. Slope ranges from 0 to 60 percent.

Subirrigated ecological site. These are very deep, somewhat poorly drained, coarse to moderately fine textured soils. Saturated hydraulic conductivity is moderate to moderately slow and available water capacity is low to high. Salinity is none to very slight and sodicity is none. These soils have a high water table (1.5 to 3.5 feet from the surface) which keeps the rooting zone moist for most of the growing season. This site is on flats and swales on alluvial plains, lake plains, outwash plains, and till plains. Slope ranges from 0 to 6 percent.

Thin Claypan ecological site. These are moderately deep to very deep, moderately well and well drained, moderately coarse to fine textured soils. The thin surface layer is underlain by a dense sodium affected subsoil. Saturated hydraulic conductivity is moderate to very slow and available water capacity is low to moderate. Salinity is moderate to strong at depths of less than 16 inches and sodicity is high. This site is on nearly level to strongly sloping flats and side slopes on alluvial plains, lake plains, residual uplands, and till plains. Slope ranges from 0 to 15 percent.

Thin Loamy ecological site. These are moderately deep to very deep, moderately well and well drained, moderately coarse to moderately fine textured soils. These soils have a strongly calcareous subsoil or are calcareous to the surface. Saturated hydraulic conductivity is moderate to moderately slow and available water capacity is high. Salinity is none to very slight and sodicity is none. This site is on side slopes or ridges on nearly level to very steep lake plains, residual uplands, and till plains. Slope ranges from 0 to 60 percent.

Thin Sands ecological site. These are deep and very deep, somewhat excessive and excessively drained, coarse textured soils that have a thin surface horizon. Saturated hydraulic conductivity is moderately rapid to very rapid and available water capacity is moderate to very low. Salinity and sodicity are none. These soils are highly susceptible to wind erosion. This site is on rises and ridges on nearly level to very steep flood plains, lake plains, outwash plains, residual uplands, and terraces. Slope ranges from 0 to 45 percent.

Very Shallow ecological site. These are very deep, excessively drained, moderately coarse and medium textured soils that are very shallow to porcelanite or sand and/or sand and gravel. Saturated hydraulic conductivity is very rapid and available water capacity is low and very low. Salinity and sodicity are none. This site is on flats, rises, and ridges on outwash plains, residual uplands, and terraces. Slope ranges from 1 to 60 percent.

Wet Land ecological site. These are very deep, very poorly drained, coarse to fine textured soils. Salinity and sodicity are none to slight. Water tables on this site range from 1 1/2 feet above to 1/2 foot below the surface during most of the growing season. This site is in deep depressions on flood plains, lake plains, residual uplands, and till plains. Slope ranges from 0 to 3 percent.

Wet Meadow ecological site. These are very deep, poorly drained, coarse to fine textured soils. Saturated hydraulic conductivity is very rapid to slow and available water capacity is low to high. Salinity and sodicity are none to slight. Water tables on this site range from 1/2 foot above to 1 1/2 feet below the surface several weeks during the growing season. The site normally receives additional water from surface runoff and/or underground seepage. This site occurs in flats and depressions on flood plains, lake plains, residual uplands, and till plains. Slope ranges from 0 to 3 percent.

Range Management

Range management requires knowledge of the kinds of soils and of the historic climax plant community. It also requires an evaluation of the present rangeland similarity index, trend, and health. The primary objective in range management is to manipulate grazing in such a manner that the plants growing on a site are similar in kind and amount to the historic climax or desired plant community for that site. Such management generally results in the optimum production and diversity of vegetation, suppression of undesirable brush and weeds, conservation of water, and control of erosion. Sometimes, however, a rangeland similarity index somewhat below the potential meets forage needs, provides wildlife habitat, and protects soil and water resources.

Ecologically sound range management ensures that the water, nutrient, and energy cycles are properly functioning. Water is conserved, yields are optimized, and soils are protected. An important management concern is recognizing the changes in the plant community that take place gradually and that can be misinterpreted or overlooked. Growth encouraged by heavy rainfall, for example, may lead to the conclusion that the range is in good health when actually the plant cover is weedy and the long-term trend is toward lower production. On the other hand, some rangeland that has been grazed closely for a short period may have a degraded appearance that temporarily obscures its quality and ability to recover rapidly.

Rangeland can recover from prolonged overgrazing or other disturbance if the climax species have not been completely eliminated from the plant community. Generally an adequate population of climax plants remains to restore the rangeland to a high similarity index through sound grazing management. In areas where the climax plant community has been severely disturbed or destroyed, range seeding can accelerate improvement. Seeding the proper climax species also can restore productive rangeland on areas of depleted or low quality cropland or pastureland. Brush suppression, water developments, fencing, and other mechanical practices may be needed to facilitate proper grazing management for range improvement on some rangeland. Proper grazing management is the key to maintaining or improving the productivity and diversity of rangeland.

For additional information about rangeland management, contact the local Natural Resources Conservation Service or Cooperative Extension Service office.

Ecological Site Report

(Dashes (--) indicate an ecological site is not assigned. Ecological sites are for undrained conditions Minor components are also listed on this table only.)

Map symbol and soil name	Ecological site
3:	
Peta	Subirrigated
Parshall, moderately well drained	Loamy Overflow
Peta, fine sandy loam	Subirrigated
Daglum	Claypan
Heil	Closed Depression
5:	
Savage	Clayey
Grail	Loamy Overflow
Belfield	Clayey
Farnuf	Loamy
Regent	Clayey
Lawther	Clayey
Daglum	Claypan
Parshall	Loamy Overflow
5B:	
Savage	Clayey
Grail	Loamy Overflow
Farland	Loamy
Shambo	Loamy
Regent	Clayey
Daglum	Claypan
Stady	Loamy
Amor	Loamy
6:	
Regan	Wet Meadow
Arveson	Wet Meadow
Harriet	Saline Lowland
Marysland, saline	Saline Lowland
Straw	Loamy Overflow
Peta	Subirrigated

Ecological Site Report--Continued

Map symbol and soil name	Ecological site
7:	
Arnegard	Loamy
Farnuf	Loamy
Parshall	Sandy
Belfield	Clayey
Grail	Clayey
Stady	Loamy
Savage	Clayey
Amor	Loamy
9F:	
Cabba	Shallow Loamy
Sen	Loamy
Chama	Thin Loamy
Shambo	Loamy
Regent	Clayey
Vebar	Sandy
Janesburg	Claypan
Rock outcrop	Not Assigned
Straw	Loamy Terrace
Regan	Wet Meadow
12B:	
Rhoades	Thin Claypan
Daglum	Claypan
Belfield	Clayey
Savage	Clayey
Moreau	Clayey
Slickspots	Not Assigned
13B:	
Dogtooth	Thin Claypan
Janesburg	Claypan
Daglum	Claypan
Savage	Clayey
Wayden	Shallow Clayey
Slickspots	Not Assigned

Ecological Site Report--Continued

Map symbol and soil same	Ecological site
13B:(cont.)	
Regent	Clayey
Chama	Thin Loamy
13D:	
Janesburg	Claypan
Dogtooth	Thin Claypan
Rhoades	Thin Claypan
Belfield	Clayey
Cabba	Shallow Loamy
Chama	Thin Loamy
Reeder	Loamy
Stady	Loamy
14E:	
Brandenburg	Very Shallow
Amor	Loamy
Shambo	Loamy
Searing	Loamy
Cabba	Shallow Loamy
Daglum	Claypan
Savage	Clayey
Arnegard	Loamy Overflow
Scoria outcrop	Not Assigned
15B:	
Daglum	Claypan
Rhoades	Thin Claypan
Belfield	Clayey
Savage	Clayey
Farland	Loamy
Grail	Clayey
Heil	Closed Depression
17:	
Amor	Loamy
Reeder	Loamy
Arnegard	Loamy Overflow
Farnuf	Loamy

Ecological Site Report--Continued

Map symbol and soil name	Ecological site
17:(cont.)	
Vebar	Sandy
Stady	Loamy
Daglum	Claypan
Parshall	Loamy Overflow
Cabba	Shallow Loamy
17B:	
Amor	Loamy
Shambo	Loamy
Morton	Loamy
Chama	Thin Loamy
Cabba	Shallow Loamy
Arnegard	Loamy Overflow
Vebar	Sandy
17C:	
Amor	Loamy
Cabba	Shallow Loamy
Amor, gently sloping	Loamy
Shambo	Loamy
Chama	Thin Loamy
Regent	Clayey
Cohagen	Shallow Sandy
Savage	Clayey
17D:	
Amor	Loamy
Cabba	Shallow Loamy
Amor, moderately sloping	Loamy
Shambo	Loamy
Chama	Thin Loamy
Cohagen	Shallow Sandy
Vebar	Sandy
Arnegard	Loamy Overflow
Dogtooth	Thin Claypan
Regent	Clayey
Savage	Clayey

Ecological Site Report--Continued

Map symbol and soil name	Ecological site
18E:	
Manning	Sandy
Wabek	Very Shallow
Schaller	Sands
Stady	Loamy
Tally	Sandy
Cabba	Shallow Loamy
Janesburg	Claypan
19:	
Sen	Loamy
Amor	Loamy
Chama	Thin Loamy
Golva	Loamy
Shambo	Loamy
Cabba	Shallow Loamy
Vebar	Sandy
19B:	
Chama	Thin Loamy
Sen	Loamy
Cabba	Shallow Loamy
Golva	Loamy
Chama, moderately sloping	Loamy
Maschetah	Thin Loamy
Janesburg	Claypan
19C:	
Chama	Thin Loamy
Cabba	Shallow Loamy
Sen	Loamy
Cohagen	Shallow Sandy
Golva	Loamy
Grail	Loamy Overflow
Chama, gently sloping	Thin Loamy
Janesburg	Claypan
Vebar	Sandy

Ecological Site Report--Continued

Map symbol and soil name	Ecological site
19D:	
Cabba	Shallow Loamy
Chama	Thin Loamy
Sen	Loamy
Vebar	Sandy
Cabba, gently sloping	Shallow Loamy
Arnegard	Loamy
Janesburg	Claypan
Golva	Loamy
Maschetah	Thin Loamy
21B:	
Parshall	Sandy
Tally	Sandy
Arnegard	Loamy
Lihen	Sands
Vebar	Sandy
Daglum	Claypan
Manning	Sandy
Regan	Wet Meadow
22B:	
Regent	Clayey
Savage	Clayey
Moreau	Clayey
Wayden	Shallow Clayey
Cabba	Shallow Loamy
Daglum	Claypan
Chama	Thin Loamy
24B:	
Janesburg	Claypan
Tally	Sandy
Evridge	Sandy Claypan
Vebar	Sandy
Daglum	Claypan
Dogtooth	Thin Claypan
Desart	Sandy

Ecological Site Report--Continued

Map symbol and soil name	Ecological site
24B:(cont.)	
Shambo	Loamy
Lihen	Sands
Regent	Clayey
25B:	
Lefor	Sandy
Parshall	Loamy Overflow
Vebar	Sandy
Cohagen	Shallow Sandy
Dogtooth	Thin Claypan
Belfield	Clayey
Lihen	Sands
Heil	Closed Depression
27F:	
Badland, outcrop	Not Assigned
Lambert	Thin Loamy
Cabba	Shallow Loamy
Daglum	Claypan
Rhoades	Thin Claypan
Vebar	Sandy
Arikara	Not Assigned
Havrelon	Loamy Terrace
28F:	
Flasher	Shallow Sandy
Rock outcrop	Not Assigned
Vebar	Sandy
Beisigl	Limy Sands
Tally	Sandy
Telfer	Sands
Cohagen	Shallow Sandy
Amor	Loamy
Cabba	Shallow Loamy
29F:	
Arikara	Not Assigned
Shambo	Loamy
Cabba	Shallow Loamy

Ecological Site Report--Continued

Map symbol and soil name	Ecological site
29F:(cont.)	
Lambert	Thin Loamy
Chama	Thin Loamy
Tally	Sandy
Daglum	Claypan
Badland, outcrop	Not Assigned
Regent	Clayey
30F:	
Vebar, extremely stony	Sandy
Amor, extremely stony	Loamy
Parshall, very stony	Loamy Overflow
Cabba, extremely stony	Shallow Loamy
Flasher, extremely stony	Shallow Sandy
Arnegard	Loamy Overflow
Amor, extremely stony, moderately steep	Loamy
Regent, very stony	Clayey
Janesburg	Claypan
31B:	
Janesburg	Claypan
Sen	Loamy
Regent	Clayey
Farland	Loamy
Dogtooth	Thin Claypan
Reeder	Loamy
Chama	Thin Loamy
Belfield	Clayey
Cabba	Shallow Loamy
31C:	
Sen	Loamy
Janesburg	Claypan
Shambo	Loamy
Dogtooth	Thin Claypan
Cabba	Shallow Loamy
Daglum	Claypan
Savage	Clayey

Ecological Site Report--Continued

Map symbol and soil name	Ecological site
31C:(cont.)	
Regent	Clayey
Belfield	Clayey
Tally	Sandy
35F:	
Flasher	Shallow Sandy
Vebar	Sandy
Parshall	Sandy
Beisigl	Limy Sands
Telfer	Sands
Cohagen	Shallow Sandy
Amor	Loamy
Rock outcrop	Not Assigned
36B:	
Ekalaka	Sandy Claypan
Parshall	Sandy
Desart	Sandy
Daglum, fine sandy loam	Claypan
Telfer	Sands
Farnuf	Loamy
Daglum, silt loam	Claypan
Janesburg, fine sandy loam	Claypan
Rhoades	Thin Claypan
37B:	
Farfeld	Shallow Loamy
Cedarpan	Claypan
Amor	Loamy
Janesburg	Claypan
Dogtooth	Thin Claypan
Savage	Clayey
Farnuf	Loamy
37F:	
Cedarpan	Claypan
Slickspots, stony	Not Assigned
Cabba	Shallow Loamy
Farfeld	Shallow Loamy

Ecological Site Report--Continued

Map symbol and soil name	Ecological site
37F:(cont.)	
Janesburg	Claypan
Vebar	Sandy
Felor	Loamy
Dogtooth	Thin Claypan
Wayden	Shallow Clayey
Savage	Clayey
41C:	
Wayden	Shallow Clayey
Moreau	Clayey
Cabba	Shallow Loamy
Sen	Loamy
Dogtooth	Thin Claypan
Regent	Clayey
Lawther	Clayey
Daglum	Claypan
42B:	
Searing	Loamy
Ringling	Very Shallow
Farnuf	Loamy
Belfield	Clayey
Amor	Loamy
Brandenburg	Very Shallow
Cabba	Shallow Loamy
Chama	Thin Loamy
43:	
Belfield	Clayey
Grail	Clayey
Savage	Clayey
Daglum	Claypan
Farnuf	Loamy
Straw	Loamy Terrace
Arnegard	Loamy
Lawther	Clayey
Regent	Clayey

Ecological Site Report--Continued

Map symbol and soil name	Ecological site
44:	
Shambo	Loamy
Shambo, gravelly substratum	Loamy
Arnegard	Loamy Overflow
Farnuf	Loamy
Stady	Loamy
Amor	Loamy
Parshall	Loamy Overflow
Tally	Sandy
44B:	
Shambo	Loamy
Arnegard	Loamy Overflow
Farnuf	Loamy
Shambo, gravelly substratum	Loamy
Stady	Loamy
Parshall	Loamy Overflow
Arnegard, level	Loamy Overflow
Amor	Loamy
47:	
Stady	Loamy
Bowdle	Loamy
Arnegard	Loamy Overflow
Lehr	Shallow Sandy
Belfield	Clayey
Marysland	Wet Meadow
Manning	Sandy
Amor	Loamy
48B:	
Manning	Sandy
Parshall	Loamy Overflow
Stady	Loamy
Shambo, gravelly substratum	Loamy
Wabek	Very Shallow
Vebar	Sandy

Ecological Site Report--Continued

Map symbol and soil name	Ecological site
49B:	
Lihen	Sands
Telfer	Sands
Parshall	Loamy Overflow
Tally	Sandy
Stady	Loamy
Lihen, fine sandy loam	Sands
Shambo	Loamy
Seroco	Thin Sands
Beisigl	Limy Sands
Manning	Sandy
51B:	
Janesburg	Claypan
Dogtooth	Thin Claypan
Belfield	Clayey
Regent	Clayey
Janesburg, fine sandy loam	Claypan
Moreau	Clayey
Farland	Loamy
Slickspots	Not Assigned
52:	
Heil	Closed Depression
Heil, silty clay	Closed Depression
Belfield	Clayey
Dimmick	Wet Land
Rhoades	Thin Claypan
Regan	Wet Meadow
53B:	
Savage	Clayey
Daglum	Claypan
Golva	Loamy
Grail	Loamy Overflow
Rhoades	Thin Claypan
Maschetah	Thin Loamy
Regent	Clayey

Ecological Site Report--Continued

Map symbol and soil name	Ecological site
53B:(cont.)	
Belfield	Clayey
Regan	Wet Meadow
54:	
Channel	Not Assigned
Straw	Loamy Overflow
Korell	Loamy Terrace
Belfield	Clayey
Velva	Loamy Overflow
Rhoades	Thin Claypan
Dimmick	Wet Land
55:	
Pits, gravel and sand	Not Assigned
Wabek	Very Shallow
Lehr	Shallow Sandy
57:	
Straw	Loamy Terrace
Rhoades	Thin Claypan
Korell	Loamy Terrace
Daglum	Claypan
Harriet	Saline Lowland
Magnus	Loamy Terrace
Channel	Not Assigned
Trembles	Sandy Terrace
Regan	Wet Meadow
58:	
Straw	Loamy Terrace
Korell	Loamy Terrace
Velva	Sandy Terrace
Channel	Not Assigned
Arnegard	Loamy Terrace
Havrelon, fine sandy loam	Loamy Terrace
Belfield	Clayey
60:	
Korell	Loamy Terrace
Straw	Loamy Terrace

Ecological Site Report--Continued

Map symbol and soil name	Ecological site
60:(cont.)	
Channel	Not Assigned
Velva, very fine sandy loam	Sandy
Velva, loam	Sandy Terrace
Havrelon	Loamy Terrace
Daglum	Claypan
Magnus	Loamy Terrace
62F:	
Janesburg	Claypan
Dogtooth	Thin Claypan
Brandenburg	Very Shallow
Cabba	Shallow Loamy
Amor	Loamy
Harriet	Saline Lowland
Wayden	Shallow Clayey
Searing	Loamy
Regent	Clayey
63F:	
Dogtooth	Thin Claypan
Janesburg	Claypan
Cabba	Shallow Loamy
Moreau	Clayey
Wayden	Shallow Clayey
Regan	Wet Meadow
Chama	Thin Loamy
Ekalaka	Sandy Claypan
Amor	Loamy
Slickspots	Not Assigned
65:	
Channel	Not Assigned
Banks	Loamy Overflow
Trembles	Loamy Overflow
Straw	Loamy Overflow
Dogiecreek	Wet Meadow
Shambo	Loamy

Ecological Site Report--Continued

Map symbol and soil name	Ecological site
65:(cont.)	
Havrelon	Loamy Overflow
66B:	
Stady	Loamy
Bowdle	Loamy
Lehr	Shallow Sandy
Manning	Sandy
Shambo, gravelly substratum	Loamy
Parshall	Loamy Overflow
Daglum	Claypan
Amor	Loamy
67B:	
Evridge	Sandy Claypan
Desart	Sandy
Telfer	Sands
Janesburg	Claypan
Tally	Sandy
Ekalaka	Sandy Claypan
Beisigl	Limy Sands
Slickspots	Not Assigned
Reeder	Loamy
Heil	Closed Depression
68F:	
Cabbart	Shallow Loamy
Badland, outcrop	Not Assigned
Boxwell	Loamy
Patent	Thin Loamy
Blacksheep	Shallow Sandy
Fleak	Shallow Sandy
Kremlin	Loamy
Kirby	Very Shallow
Gerda	Thin Claypan
69F:	
Patent	Thin Loamy
Badland, outcrop	Not Assigned
Cabbart	Shallow Loamy

Ecological Site Report--Continued

Map symbol and soil name	Ecological site
69F:(cont.)	
Lonna	Thin Loamy
Gerda	Thin Claypan
Kremlin	Loamy
Arikara	Not Assigned
Kirby	Very Shallow
Maltese	Claypan
70B:	
Maltese	Claypan
Gerda	Thin Claypan
Tanna	Clayey
Kremlin	Loamy
Scairt	Thin Claypan
Lonna	Loamy
Slickspots	Not Assigned
Rhame	Sandy
71B:	
Chinook	Sandy
Rhame	Sandy
Kremlin	Loamy
Boxwell	Loamy
Chinook, moderately sloping	Sandy
Blacksheep	Shallow Sandy
Ethridge	Clayey
Maltese	Claypan
71D:	
Rhame	Sandy
Chinook	Sandy
Kremlin	Loamy
Tusler	Limy Sands
Fleak	Shallow Sandy
Blacksheep	Shallow Sandy
Maltese	Claypan
Burgraff	Thin Loamy

Ecological Site Report--Continued

Map symbol and soil name	Ecological site
72F:	
Rhame	Sandy
Fleak	Shallow Sandy
Chinook	Sandy
Blacksheep	Shallow Sandy
Cabbart	Shallow Loamy
Rhame, strongly sloping	Sandy
Tusler	Limy Sands
Kremlin	Loamy
Rock outcrop	Not Assigned
Gerda	Thin Claypan
73D:	
Kirby	Very Shallow
Scairt	Thin Claypan
Gerda	Thin Claypan
Kremlin	Loamy
Maltese	Claypan
Absher	Thin Claypan
Searing, aridic-ustic	Loamy
Ethridge	Clayey
Cabbart	Shallow Loamy
Harriet	Saline Lowland
74:	
Channel	Not Assigned
Glendive	Loamy Overflow
Havre	Loamy Overflow
Hanly	Loamy Overflow
Lonna	Loamy
Regan	Wet Meadow
75:	
Havre	Loamy Terrace
Havre, loam	Loamy Terrace
Glendive	Sandy Terrace
Channel	Not Assigned
Kremlin	Loamy

Ecological Site Report--Continued

Map symbol and soil name	Ecological site
75:(cont.)	
Wolf Point	Loamy Terrace
76B:	
Lonna	Thin Loamy
Ethridge	Clayey
Patent	Thin Loamy
Lonna, moderately sloping	Loamy
Maltese	Claypan
76C:	
Lonna	Thin Loamy
Lonna, gently sloping	Loamy
Patent	Thin Loamy
Kremlin	Loamy
Sham	Sandy Claypan
Cabbart	Shallow Loamy
77:	
Glendive	Sandy Terrace
Hanly	Sandy Terrace
Glendive, loam	Sandy Terrace
Channel	Not Assigned
Havre	Loamy Terrace
78B:	
Hanly	Sandy Terrace
Glendive	Sandy Terrace
Riverwash	Not Assigned
Minnewaukan	Wet Meadow
79C:	
Zeona	Thin Sands
Glendive	Sandy Terrace
Hanly	Sandy Terrace
Havre	Loamy Terrace
80:	
Ethridge	Clayey
Ethridge, silty clay loam	Clayey
Kremlin	Loamy
Tanna	Clayey
Maltese	Claypan

Ecological Site Report--Continued

Map symbol and soil name	Ecological site
80:(cont.)	
Lonna	Loamy
Gerda	Thin Claypan
81B:	
Vebar	Sandy
Parshall	Loamy Overflow
Tally	Sandy
Beisigl	Limy Sands
Arnegard	Loamy Overflow
Flasher	Shallow Sandy
Cohagen	Shallow Sandy
Amor	Loamy
81C:	
Vebar	Sandy
Tally	Sandy
Parshall	Loamy Overflow
Cohagen	Shallow Sandy
Vebar, nearly level	Sandy
Amor	Loamy
Farnuf	Loamy
Ekalaka	Sandy Claypan
81D:	
Vebar	Sandy
Flasher	Shallow Sandy
Tally	Sandy
Cohagen	Shallow Sandy
Vebar, moderately sloping	Sandy
Beisigl	Limy Sands
Parshall	Loamy Overflow
Amor	Loamy
Telfer	Sands
82E:	
Badland, outcrop	Not Assigned
Patent	Thin Loamy
Patent, moderately steep	Thin Loamy
Cabbart	Shallow Loamy

Ecological Site Report--Continued

Map symbol and soil name	Ecological site
82E:(cont.)	
Lonna	Thin Loamy
Scoria outcrop	Not Assigned
Havre	Loamy Terrace
83:	
Badland	Not Assigned
Patent	Thin Loamy
Cabbart	Shallow Loamy
Scoria outcrop	Not Assigned
85F:	
Lonna	Thin Loamy
Cabbart	Shallow Loamy
Lonna, moderately steep	Loamy
Kremlin	Loamy
Gerda	Thin Claypan
Ethridge	Clayey
Blacksheep	Shallow Sandy
Arikara	Not Assigned
86F:	
Kirby	Very Shallow
Badland, outcrop	Not Assigned
Patent	Thin Loamy
Cabbart	Shallow Loamy
Patent, strongly sloping	Thin Loamy
Maltese	Claypan
Kremlin	Loamy
88:	
Littlemo	Loamy
Kremlin	Loamy
Chanta	Loamy
Boxwell	Loamy
89B:	
Patent	Thin Loamy
Sham	Sandy Claypan
Lonna	Thin Loamy

Ecological Site Report--Continued

Map symbol and soil name	Ecological site
89B:(cont.)	
Benz	Thin Claypan
Kremlin	Loamy
91F:	
Lonna	Thin Loamy
Kirby	Very Shallow
Cabbart	Shallow Loamy
Boxwell	Loamy
Maltese	Claypan
Scairt	Thin Claypan
Scoria, outcrop	Not Assigned
92B:	
Kremlin	Loamy
Ethridge	Clayey
Gerda	Thin Claypan
Maltese	Claypan
Boxwell	Loamy
Patent	Thin Loamy
94F:	
Kirby	Very Shallow
Arikara	Not Assigned
Badland, outcrop	Not Assigned
Patent	Thin Loamy
Cabbart	Shallow Loamy
Scairt	Thin Claypan
Lonna	Thin Loamy
95F:	
Tinsley	Very Shallow
Chanta	Loamy
Chinook	Sandy
Cozberg	Sandy
Cabbart	Shallow Loamy
Rhame	Sandy
Kremlin	Loamy

Ecological Site Report--Continued

Map symbol and soil name	Ecological site
97:	
Kremlin	Loamy
Littlemo	Loamy
Chanta	Loamy
Haydraw	Loamy
Chinook	Sandy
98:	
Wolf Point	Loamy Terrace
Havre	Loamy Terrace
Channel	Not Assigned
Ethridge	Clayey
Glendive	Sandy Terrace
99F:	
Badland, outcrop	Not Assigned
Cabbart	Shallow Loamy
Arikara	Not Assigned
Boxwell	Loamy
Rock outcrop	Not Assigned
Patent	Thin Loamy
100C:	
Patent	Thin Loamy
Gullied land	Not Assigned
Glendive	Sandy Terrace
Lonna	Thin Loamy
Hanly	Sandy Terrace
Kremlin	Loamy
Havre	Loamy Terrace
Gerda	Thin Claypan
Ethridge	Clayey
Sham	Sandy Claypan
101F:	
Boxwell	Loamy
Cabbart	Shallow Loamy
Arikara	Not Assigned
Rhame	Sandy
Ethridge	Clayey

Ecological Site Report--Continued

Map symbol and soil name	Ecological site
101F:(cont.)	
Scairt	Thin Claypan
Maltese	Claypan
Fleak	Shallow Sandy
Badland, outcrop	Not Assigned
102B:	
Boxwell	Loamy
Kremlin	Loamy
Rhame	Sandy
Gerda	Thin Claypan
Chanta	Loamy
Burgraff	Thin Loamy
Cabbart	Shallow Loamy
102D:	
Boxwell	Loamy
Kremlin	Loamy
Kremlin, gently sloping	Loamy
Cabbart	Shallow Loamy
Burgraff	Thin Loamy
Boxwell, gently sloping	Loamy
Haydraw	Loamy
Blacksheep	Shallow Sandy
Maltese	Claypan
103F:	
Badland, outcrop	Not Assigned
Arikara	Not Assigned
Cabbart	Shallow Loamy
Boxwell	Loamy
Lonna	Thin Loamy
Rhame	Sandy
Kirby	Very Shallow
Scairt	Thin Claypan
105:	
Harriet	Saline Lowland
Regan	Wet Meadow
Slickspots	Not Assigned

Ecological Site Report--Continued

Map symbol and soil name	Ecological site
105:(cont.)	
Rhoades	Thin Claypan
Heil	Closed Depression
Daglum	Claypan
106:	
Riverwash	Not Assigned
Hanly	Sandy Terrace
Minnewaukan	Wet Meadow
107D:	
Rhame	Sandy
Chinook	Sandy
Kremlin	Loamy
Maltese	Claypan
Blacksheep	Shallow Sandy
Ethridge	Clayey
Boxwell	Loamy
Tusler	Limy Sands
Scairt	Thin Claypan
Heil	Closed Depression
108D:	
Boxwell	Loamy
Scairt	Thin Claypan
Maltese	Claypan
Kremlin	Loamy
Burgraff	Thin Loamy
Ethridge	Clayey
Lonna	Loamy
Cabbart	Shallow Loamy
Yawdim	Shallow Clayey
109F:	
Rhame	Sandy
Arikara	Not Assigned
Fleak	Shallow Sandy
Tusler	Limy Sands
Chinook	Sandy
Kremlin	Loamy

Ecological Site Report--Continued

Map symbol and soil name	Ecological site
109F:(cont.)	
Rhame, strongly sloping	Sandy
Maltese	Claypan
Blacksheep	Shallow Sandy
110C:	
Patent	Thin Loamy
Gerda	Thin Claypan
Slickspots	Not Assigned
Benz	Thin Claypan
Haydraw	Loamy
Ethridge	Clayey
Chinook	Sandy
Sham	Sandy Claypan
Yawdim	Shallow Clayey
111F:	
Lonna	Thin Loamy
Arikara	Not Assigned
Cabbart	Shallow Loamy
Badland, outcrop	Not Assigned
Fleak	Shallow Sandy
Burgraff	Thin Loamy
Rhame	Sandy
Havre	Loamy Terrace
112:	
Wolf Point, wooded	Loamy Terrace
Havre	Loamy Terrace
Channel	Not Assigned
Glendive	Sandy Terrace
Ethridge	Clayey
113:	
Havre, wooded	Loamy Terrace
Glendive, wooded	Sandy Terrace
Channel	Not Assigned
Wolf Point	Loamy Terrace
Kremlin	Loamy
Harriet	Saline Lowland

Ecological Site Report--Continued

Map symbol and soil name	Ecological site
114B:	
Haplustolls	Not Assigned
Ustorthents	Not Assigned
Spoil pile	Not Assigned
115B:	
Cozberg	Sandy
Chanta	Loamy
Chinook	Sandy
Kremlin	Loamy
Tinsley	Very Shallow
116F:	
Kremlin, strongly sloping	Loamy
Kremlin	Loamy
Shibah	Very Shallow
Boxwell	Loamy
Tanna	Clayey
Blacksheep	Shallow Sandy
Arikara	Not Assigned
Maltese	Claypan
Scairt	Thin Claypan
Lonna	Loamy
117B:	
Kremlin	Loamy
Chanta	Loamy
Littlemo	Loamy
Chinook	Sandy
Tinsley	Very Shallow
118F:	
Shibah	Very Shallow
Rubbleland	Not Assigned
Arikara	Not Assigned
Kremlin	Loamy
Rock outcrop	Not Assigned
119:	
Glendive, wooded	Sandy Terrace
Glendive	Sandy Terrace

Ecological Site Report--Continued

Map symbol and soil name	Ecological site
119:(cont.)	
Hanly	Sandy Terrace
Channel	Not Assigned
Havre	Loamy Terrace
120B:	
Hanly, wooded	Sandy Terrace
Hanly	Sandy Terrace
Glendive	Sandy Terrace
Riverwash	Not Assigned
Minnewaukan	Wet Meadow
121F:	
Maltese	Claypan
Lonna	Thin Loamy
Arikara	Not Assigned
Scairt	Thin Claypan
Tanna	Clayey
Cabbart	Shallow Loamy
Yawdim	Shallow Clayey
Lallie	Wet Meadow
122C:	
Bulltop	Loamy
Shibah	Very Shallow
Kremlin	Loamy
Cabbart	Shallow Loamy
Burgraff	Thin Loamy
123E:	
Scairt	Thin Claypan
Maltese	Claypan
Gerda	Thin Claypan
Boxwell	Loamy
Cabbart	Shallow Loamy
Kremlin	Loamy
Burgraff	Thin Loamy
Rhame	Sandy
Yawdim	Shallow Clayey

Ecological Site Report--Continued

Map symbol and soil name	Ecological site
152:	
Heil	Closed Depression
Ethridge	Clayey
Gerda	Thin Claypan
Harriet	Saline Lowland
155:	
Dumps and pits, mine	Not Assigned
Cabba	Shallow Loamy
Flasher	Shallow Sandy
159:	
Channel	Not Assigned
Straw	Loamy Overflow
Daglum	Claypan
Rhoades	Thin Claypan
Savage	Clayey
Harriet	Saline Lowland
Grail	Loamy Overflow
Belfield	Clayey
175:	
Havre, rarely flooded	Loamy Terrace
Channel	Not Assigned
Glendive	Sandy Terrace
Patent	Thin Loamy
177:	
Glendive, rarely flooded	Sandy Terrace
Hanly	Sandy Terrace
Channel	Not Assigned
Havre	Loamy Terrace
Patent	Thin Loamy
183:	
Badland, high precipitation	Not Assigned
Cabba	Shallow Loamy
Lambert	Thin Loamy
Moreau	Clayey

Ecological Site Report--Continued

Map symbol and soil name	Ecological site
205:	
Harriet	Saline Lowland
Slickspots	Not Assigned
Gerda	Thin Claypan
210C:	
Lambert	Thin Loamy
Slickspots	Not Assigned
Rhoades	Thin Claypan
Daglum	Claypan
Korell	Loamy Terrace
Rhoades	Thin Claypan
255:	
Pits, gravel and sand, low precipitation	Not Assigned
Chanta	Loamy
Tinsley	Very Shallow
M-W:	
Miscellaneous water	Not Assigned
W:	
Water	Not Assigned

Recreation

The soils of the survey area are rated in the “Recreation” tables according to limitations that affect their suitability for recreational uses. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the recreational uses. **Not limited** indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. **Somewhat limited** indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. **Very limited** indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The ratings in the tables are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation also are important. Soils that are subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

The information in the tables can be supplemented by other information in this survey, for example, interpretations for building site development, construction materials, sanitary facilities, and water management.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The ratings are based on the soil properties that affect the ease of developing camp areas and the performance of the areas after development. Slope, stoniness, and depth to bedrock or a cemented pan are the main concerns affecting the development of camp areas. The soil properties that affect the performance of the areas after development are those that influence trafficability and promote the growth of vegetation, especially in heavily used areas. For good trafficability, the surface of camp areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The ratings are based on the soil properties that affect the ease of developing picnic areas and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of picnic areas. For good trafficability, the surface of picnic areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Playgrounds require soils that are nearly level, are free of stones, and can withstand intensive foot traffic. The ratings are based on the soil properties that affect the ease of developing playgrounds and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of playgrounds. For good trafficability, the surface of the playgrounds should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Paths and trails used for hiking and horseback riding should require little or no slope modification through cutting and filling. The ratings are based on the soil properties that affect trafficability and erodibility. These properties are stoniness, depth to a water table, ponding, flooding, slope, and texture of the surface layer.

Off-road motorcycle trails require little or no site preparation. They are not covered with surfacing material or vegetation. Considerable compaction of the soil material is likely. The ratings are based on the soil properties that influence erodibility, trafficability, dustiness, and the ease of revegetation. These properties are stoniness, slope, depth to a water table, ponding, flooding, and texture of the surface layer.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer. The suitability of the soil for traps, tees, roughs, and greens in not considered in the ratings.

Recreation - Part I

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
3:							
Peta	68	Not limited		Not limited		Not limited	
5:							
Savage	61	Not limited		Not limited		Not limited	
5B:							
Savage	67	Not limited		Not limited		Somewhat limited	
						Slope	0.50
6:							
Regan	64	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Flooding	1.00			Flooding	0.60
7:							
Arnegard	68	Not limited		Not limited		Not limited	
9F:							
Cabba	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
Sen	18	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
						Depth to bedrock	0.46
Chama	15	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
						Depth to bedrock	0.46
12B:							
Rhoades	55	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Restricted permeability	0.44
Daglum	33	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Restricted permeability	0.44
13B:							
Dogtooth	59	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Depth to bedrock	0.46
						Restricted permeability	0.44
						Slope	0.12
Janesburg	27	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Depth to bedrock	0.46
						Restricted permeability	0.44
						Slope	0.12

Recreation - Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
13D:							
Dogtooth----------	37	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Slope	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Sodium content	1.00
		Slope	0.37	Slope	0.37	Depth to bedrock	0.46
						Restricted permeability	0.44
Janesburg----------	37	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Slope	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Sodium content	1.00
		Slope	0.37	Slope	0.37	Depth to bedrock	0.46
						Restricted permeability	0.44
14E:							
Amor----------	20	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.04	Slope	0.04	Slope	1.00
						Depth to bedrock	0.46
Brandenburg---------	39	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.96	Slope	0.96	Gravel content	1.00
		Gravel content	0.59	Gravel content	0.59	Slope	1.00
15B:							
Daglum----------	50	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Restricted permeability	0.44
Rhoades----------	25	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Restricted permeability	0.44
17:							
Amor----------	58	Not limited		Not limited		Not limited	
Arnegard----------	10	Not limited		Not limited		Not limited	
17B:							
Amor----------	67	Not limited		Not limited		Somewhat limited	
						Slope	0.88
						Depth to bedrock	0.46
Shambo----------	15	Not limited		Not limited		Somewhat limited	
						Slope	0.88
17C:							
Amor----------	39	Not limited		Not limited		Very limited	
						Slope	1.00
						Depth to bedrock	0.46
Cabba----------	29	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
						Depth to bedrock	1.00

Recreation - Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
17D:							
Amor	42	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
						Depth to bedrock	0.46
Cabba	29	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Slope	0.63	Slope	0.63	Depth to bedrock	1.00
18E:							
Manning	24	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.16	Slope	0.16	Slope	1.00
Schaller	22	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Wabek	22	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
19:							
Sen	56	Not limited		Not limited		Not limited	
Golva	11	Not limited		Not limited		Not limited	
19B:							
Chama	43	Not limited		Not limited		Somewhat limited	
						Slope	0.88
						Depth to bedrock	0.46
Sen	25	Not limited		Not limited		Somewhat limited	
						Slope	0.88
						Depth to bedrock	0.46
Cabba	14	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
						Slope	0.88
19C:							
Chama	40	Not limited		Not limited		Very limited	
						Slope	1.00
						Depth to bedrock	0.46
Cabba	28	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
						Depth to bedrock	1.00
Sen	17	Not limited		Not limited		Very limited	
						Slope	1.00
						Depth to bedrock	0.46
19D:							
Cabba	38	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Slope	0.63	Slope	0.63	Depth to bedrock	1.00
Chama	26	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
						Depth to bedrock	0.46

Recreation - Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
19D:(cont.)							
Sen	16	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
						Depth to bedrock	0.46
21B:							
Parshall	67	Not limited		Not limited		Somewhat limited	
						Slope	0.12
22B:							
Regent	71	Somewhat limited		Somewhat limited		Somewhat limited	
		Restricted permeability	0.41	Restricted permeability	0.41	Slope	0.88
						Depth to bedrock	0.46
						Restricted permeability	0.41
Savage	15	Not limited		Not limited		Somewhat limited	
						Slope	0.50
24B:							
Janesburg	51	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Depth to bedrock	0.46
						Restricted permeability	0.44
						Slope	0.12
25B:							
Lefor	78	Not limited		Not limited		Somewhat limited	
						Depth to bedrock	0.46
						Slope	0.12
27F:							
Badland, outcrop	42	Not rated		Not rated		Not rated	
Lambert	34	Very limited		Somewhat limited		Very limited	
		Flooding	1.00	Slope	0.37	Slope	1.00
		Slope	0.37			Flooding	0.60
Cabba	12	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
28F:							
Flasher	35	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Too sandy	0.94	Too sandy	0.94	Too sandy	0.94
Rock outcrop	22	Not rated		Not rated		Not rated	
Vebar	13	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
						Depth to bedrock	0.29
29F:							
Arikara	33	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00

Recreation - Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
29F:(cont.)							
Shambo	21	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Cabba	18	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
30F:							
Vebar, extremely stony	27	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Too stony	1.00	Too stony	1.00	Too stony	1.00
						Depth to bedrock	0.46
						Content of large stones	0.46
Amor, extremely stony	21	Very limited		Very limited		Very limited	
		Too stony	1.00	Too stony	1.00	Slope	1.00
		Slope	0.37	Slope	0.37	Too stony	1.00
						Depth to bedrock	0.46
						Content of large stones	0.46
31B:							
Sen	25	Not limited		Not limited		Somewhat limited	
						Depth to bedrock	0.46
						Slope	0.12
Janesburg	34	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Depth to bedrock	0.46
						Restricted permeability	0.44
						Slope	0.12
31C:							
Sen	22	Not limited		Not limited		Very limited	
						Slope	1.00
						Depth to bedrock	0.46
Janesburg	21	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Slope	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Sodium content	1.00
						Depth to bedrock	0.46
						Restricted permeability	0.44
35F:							
Flasher	32	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Too sandy	0.94	Too sandy	0.94	Too sandy	0.94
Vebar	22	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
						Depth to bedrock	0.46

Recreation - Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
35F:(cont.)							
Parshall----------	15	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
36B:							
Ekalaka----------	32	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Restricted permeability	0.44
						Slope	0.12
Parshall----------	32	Not limited		Not limited		Somewhat limited	
						Slope	0.12
Desart----------	15	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Restricted permeability	0.44
						Slope	0.12
37B:							
Farfeld----------	39	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Depth to cemented pan	1.00
		Depth to cemented pan	1.00	Depth to cemented pan	1.00	Sodium content	1.00
						Slope	0.12
Cedarpan----------	27	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Depth to cemented pan	1.00
		Depth to cemented pan	1.00	Depth to cemented pan	1.00	Sodium content	1.00
		Restricted permeability	0.45	Restricted permeability	0.45	Restricted permeability	0.45
						Slope	0.12
37F:							
Cedarpan----------	25	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Depth to cemented pan	1.00
		Depth to cemented pan	1.00	Depth to cemented pan	1.00	Sodium content	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
		Restricted permeability	0.45	Restricted permeability	0.45	Restricted permeability	0.45
Slickspots, stony---	24	Not rated		Not rated		Not rated	
Farfeld----------	10	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Depth to cemented pan	1.00
		Depth to cemented pan	1.00	Depth to cemented pan	1.00	Sodium content	1.00
						Slope	0.88
41C:							
Wayden----------	58	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Too clayey	0.50	Too clayey	0.50	Slope	1.00
		Restricted permeability	0.41	Restricted permeability	0.41	Too clayey	0.50
						Restricted permeability	0.41

Recreation - Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
41C:(cont.)							
Moreau	15	Somewhat limited		Somewhat limited		Very limited	
		Too clayey	0.50	Too clayey	0.50	Slope	1.00
		Restricted permeability	0.41	Restricted permeability	0.41	Too clayey	0.50
						Depth to bedrock	0.46
						Restricted permeability	0.41
42B:							
Searing	60	Not limited		Not limited		Somewhat limited	
						Slope	0.12
Ringling	19	Not limited		Not limited		Somewhat limited	
						Slope	0.50
						Gravel content	0.03
						Content of large stones	0.01
43:							
Belfield	49	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Restricted permeability	0.41	Restricted permeability	0.41	Restricted permeability	0.41
Grail	26	Somewhat limited		Somewhat limited		Somewhat limited	
		Restricted permeability	0.05	Restricted permeability	0.05	Restricted permeability	0.05
44:							
Shambo	48	Not limited		Not limited		Not limited	
44B:							
Shambo	59	Not limited		Not limited		Somewhat limited	
						Slope	0.50
47:							
Stady	41	Not limited		Not limited		Not limited	
48B:							
Manning	66	Not limited		Not limited		Somewhat limited	
						Slope	0.12
49B:							
Lihen	38	Somewhat limited		Somewhat limited		Somewhat limited	
		Too sandy	0.37	Too sandy	0.37	Too sandy	0.37
						Slope	0.12
Parshall	15	Not limited		Not limited		Somewhat limited	
						Slope	0.12
51B:							
Janesburg	40	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Depth to bedrock	0.46
						Restricted permeability	0.44
						Slope	0.12

Recreation - Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
51B:(cont.)							
Dogtooth----------	29	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Depth to bedrock	0.46
						Restricted permeability	0.44
						Slope	0.12
52:							
Heil----------	84	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Restricted permeability	1.00	Restricted permeability	1.00	Restricted permeability	1.00
		Ponding	1.00	Ponding	1.00	Ponding	1.00
53B:							
Savage----------	25	Not limited		Not limited		Somewhat limited	
						Slope	0.12
Daglum----------	24	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Restricted permeability	0.44
54:							
Channel----------	40	Not rated		Not rated		Not rated	
Straw----------	40	Very limited		Somewhat limited		Very limited	
		Flooding	1.00	Flooding	0.40	Flooding	1.00
55:							
Pits, gravel and sand----------	85	Not rated		Not rated		Not rated	
57:							
Straw----------	28	Very limited		Not limited		Not limited	
		Flooding	1.00				
Rhoades----------	21	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Restricted permeability	0.44
Daglum----------	12	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Restricted permeability	0.44
58:							
Straw----------	67	Very limited		Not limited		Not limited	
		Flooding	1.00				
60:							
Korell----------	75	Very limited		Not limited		Not limited	
		Flooding	1.00				

Recreation - Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
62F:							
Dogtooth----------	23	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Depth to bedrock	0.46
						Restricted permeability	0.44
Janesburg----------	23	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Depth to bedrock	0.46
						Restricted permeability	0.44
Brandenburg---------	18	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Gravel content	0.59	Gravel content	0.59	Gravel content	1.00
63F:							
Dogtooth----------	33	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Depth to bedrock	0.46
						Restricted permeability	0.44
Janesburg----------	22	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Depth to bedrock	0.46
						Restricted permeability	0.44
Cabba----------	20	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
65:							
Channel----------	40	Not rated		Not rated		Not rated	
Banks----------	29	Very limited		Somewhat limited		Very limited	
		Flooding	1.00	Flooding	0.40	Flooding	1.00
Trembles----------	18	Very limited		Somewhat limited		Very limited	
		Flooding	1.00	Flooding	0.40	Flooding	1.00
66B:							
Stady----------	50	Not limited		Not limited		Somewhat limited	
						Slope	0.88
67B:							
Evridge----------	28	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Depth to bedrock	0.46
						Restricted permeability	0.44
						Slope	0.12

Recreation - Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
67B:(cont.)							
Desart	18	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Restricted permeability	0.44
						Slope	0.12
Telfer	13	Not limited		Not limited		Somewhat limited	
						Slope	0.12
68F:							
Cabbart	41	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
Badland, outcrop	27	Not rated		Not rated		Not rated	
69F:							
Patent	33	Very limited		Somewhat limited		Very limited	
		Flooding	1.00	Dusty	0.50	Slope	1.00
		Dusty	0.50	Slope	0.37	Flooding	0.60
		Slope	0.37			Dusty	0.50
Badland, outcrop	21	Not rated		Not rated		Not rated	
Cabbart	21	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
70B:							
Maltese	39	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
		Restricted permeability	0.44	Restricted permeability	0.44	Restricted permeability	0.44
						Slope	0.12
Gerda	30	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Restricted permeability	0.44
						Slope	0.12
71B:							
Chinook	42	Not limited		Not limited		Somewhat limited	
						Slope	0.50
Rhame	28	Not limited		Not limited		Somewhat limited	
						Slope	0.50
						Depth to bedrock	0.46
71D:							
Rhame	42	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.37	Slope	0.37	Slope	1.00
						Depth to bedrock	0.46
Chinook	32	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.37	Slope	0.37	Slope	1.00

Recreation - Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
72F:							
Rhame----------	29	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
						Depth to bedrock	0.46
Fleak----------	27	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Too sandy	0.92	Too sandy	0.92	Too sandy	0.92
73D:							
Gerda----------	16	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Slope	0.88
						Restricted permeability	0.44
Kirby----------	23	Somewhat limited		Somewhat limited		Very limited	
		Gravel content	0.76	Gravel content	0.76	Slope	1.00
		Dusty	0.50	Dusty	0.50	Gravel content	1.00
		Slope	0.37	Slope	0.37	Dusty	0.50
						Content of large stones	0.03
74:							
Channel----------	40	Not rated		Not rated		Not rated	
Glendive----------	35	Very limited		Not limited		Not limited	
		Flooding	1.00				
Havre----------	18	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Dusty	0.50	Dusty	0.50
		Dusty	0.50				
75:							
Havre----------	77	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Dusty	0.50	Flooding	0.60
		Dusty	0.50			Dusty	0.50
76B:							
Lonna----------	87	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Dusty	0.50	Dusty	0.50	Slope	0.50
						Dusty	0.50
76C:							
Lonna----------	64	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Slope	1.00
		Dusty	0.50	Dusty	0.50	Sodium content	1.00
						Dusty	0.50
77:							
Glendive----------	70	Very limited		Not limited		Somewhat limited	
		Flooding	1.00			Flooding	0.60
78B:							
Hanly----------	81	Very limited		Not limited		Somewhat limited	
		Flooding	1.00			Flooding	0.60
						Slope	0.12

Recreation - Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
79C:							
Zeona	76	Somewhat limited		Somewhat limited		Somewhat limited	
		Too sandy	0.37	Too sandy	0.37	Slope	0.88
						Too sandy	0.37
80:							
Ethridge	64	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Dusty	0.50
		Restricted permeability	0.41	Restricted permeability	0.41	Restricted permeability	0.41
81B:							
Vebar	46	Not limited		Not limited		Somewhat limited	
						Depth to bedrock	0.46
						Slope	0.12
Parshall	19	Not limited		Not limited		Somewhat limited	
						Slope	0.12
81C:							
Vebar	34	Not limited		Not limited		Very limited	
						Slope	1.00
						Depth to bedrock	0.46
Tally	32	Not limited		Not limited		Very limited	
						Slope	1.00
81D:							
Vebar	32	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
						Depth to bedrock	0.46
Flasher	16	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Too sandy	0.94	Too sandy	0.94	Depth to bedrock	1.00
		Slope	0.63	Slope	0.63	Too sandy	0.94
Tally	15	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
82E:							
Badland, outcrop	54	Not rated		Not rated		Not rated	
Patent	25	Very limited		Somewhat limited		Very limited	
		Flooding	1.00	Dusty	0.50	Slope	1.00
		Dusty	0.50	Slope	0.37	Flooding	0.60
		Slope	0.37			Dusty	0.50
83:							
Badland	88	Not rated		Not rated		Not rated	
85F:							
Lonna	34	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Slope	1.00
		Dusty	0.50	Dusty	0.50	Sodium content	1.00
		Slope	0.37	Slope	0.37	Dusty	0.50

Recreation - Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
83F:(cont.)							
Cabbart	33	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
86F:							
Kirby	39	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Gravel content	0.76	Gravel content	0.76	Gravel content	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
						Content of large stones	0.03
Badland, outcrop	23	Not rated		Not rated		Not rated	
Patent	13	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Flooding	1.00	Dusty	0.50	Flooding	0.60
		Dusty	0.50			Dusty	0.50
88:							
Littlemo	58	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Dusty	0.50
Chanta	20	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Dusty	0.50
89B:							
Patent	80	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Dusty	0.50	Flooding	0.60
		Dusty	0.50			Slope	0.50
						Dusty	0.50
91F:							
Lonna	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
Kirby	34	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Gravel content	0.76	Gravel content	0.76	Gravel content	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
						Content of large stones	0.03
Cabbart	16	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
92B:							
Kremlin	26	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Slope	0.50
						Dusty	0.50

Recreation - Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
92B:(cont.)							
Ethridge----------	22	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Slope	0.50
		Restricted permeability	0.41	Restricted permeability	0.41	Dusty	0.50
						Restricted permeability	0.41
Gerda----------	19	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Restricted permeability	0.44
						Slope	0.12
94F:							
Kirby----------	42	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Gravel content	0.76	Gravel content	0.76	Gravel content	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
						Content of large stones	0.03
Arikara----------	27	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Badland, outcrop----	16	Not rated		Not rated		Not rated	
95F:							
Tinsley----------	53	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Gravel content	0.04	Gravel content	0.04	Gravel content	1.00
						Content of large stones	0.01
Chanta----------	17	Somewhat limited		Somewhat limited		Very limited	
		Dusty	0.50	Dusty	0.50	Slope	1.00
		Slope	0.37	Slope	0.37	Dusty	0.50
97:							
Kremlin----------	77	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Dusty	0.50
98:							
Wolf Point----------	85	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Restricted permeability	0.41	Flooding	0.60
		Restricted permeability	0.41			Restricted permeability	0.41
99F:							
Badland, outcrop----	63	Not rated		Not rated		Not rated	
Cabbart----------	30	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
100C:							
Patent----------	32	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Dusty	0.50	Slope	0.88
		Dusty	0.50			Flooding	0.60
						Dusty	0.50

Recreation - Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
100C:(cont.)							
Gullied land--------	19	Not rated		Not rated		Not rated	
Glendive----------	13	Very limited		Not limited		Somewhat limited	
		Flooding	1.00			Flooding	0.60
						Slope	0.12
101F:							
Boxwell----------	34	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
						Depth to bedrock	0.46
Cabbart----------	32	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
Arikara----------	16	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
102B:							
Boxwell----------	46	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Slope	0.50
						Dusty	0.50
						Depth to bedrock	0.46
Kremlin----------	43	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Slope	0.50
						Dusty	0.50
102D:							
Boxwell----------	38	Somewhat limited		Somewhat limited		Very limited	
		Dusty	0.50	Dusty	0.50	Slope	1.00
		Slope	0.37	Slope	0.37	Dusty	0.50
						Depth to bedrock	0.46
Kremlin----------	28	Somewhat limited		Somewhat limited		Very limited	
		Dusty	0.50	Dusty	0.50	Slope	1.00
		Slope	0.37	Slope	0.37	Dusty	0.50
103F:							
Badland, outcrop----	30	Not rated		Not rated		Not rated	
Arikara----------	28	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Cabbart----------	16	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
105:							
Harriet----------	80	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Flooding	1.00	Restricted permeability	1.00	Restricted permeability	1.00
		Restricted permeability	1.00			Flooding	0.60

Recreation - Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
106:							
Riverwash----------	85	Not rated		Not rated		Not rated	
107D:							
Rhame----------	23	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.04	Slope	0.04	Slope	1.00
						Depth to bedrock	0.46
Kremlin----------	16	Somewhat limited		Somewhat limited		Very limited	
		Dusty	0.50	Dusty	0.50	Slope	1.00
						Dusty	0.50
Maltese----------	15	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Dusty	0.50	Dusty	0.50	Slope	0.88
		Restricted permeability	0.44	Restricted permeability	0.44	Dusty	0.50
						Restricted permeability	0.44
108D:							
Boxwell----------	27	Somewhat limited		Somewhat limited		Very limited	
		Dusty	0.50	Dusty	0.50	Slope	1.00
		Slope	0.37	Slope	0.37	Dusty	0.50
						Depth to bedrock	0.46
Scairt----------	18	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Slope	1.00
		Dusty	0.50	Dusty	0.50	Sodium content	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Dusty	0.50
		Slope	0.37	Slope	0.37	Depth to bedrock	0.46
						Restricted permeability	0.44
Maltese----------	14	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Slope	1.00
		Dusty	0.50	Dusty	0.50	Sodium content	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Dusty	0.50
		Slope	0.37	Slope	0.37	Restricted permeability	0.44
109F:							
Rhame----------	24	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
						Depth to bedrock	0.46
Arikara----------	23	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Fleak----------	16	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Too sandy	0.92	Too sandy	0.92	Too sandy	0.92
110C:							
Patent----------	38	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Dusty	0.50	Slope	0.88
		Dusty	0.50			Flooding	0.60
						Dusty	0.50

Recreation - Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
110C:(cont.)							
Gerda	27	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Slope	0.88
						Restricted permeability	0.44
Slickspots	10	Not rated		Not rated		Not rated	
111F:							
Lonna	37	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
Arikara	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Cabbart	18	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
112:							
Wolf Point, wooded	78	Not rated		Not rated		Not rated	
113:							
Havre, wooded	80	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Dusty	0.50	Flooding	0.60
		Dusty	0.50			Dusty	0.50
114B:							
Haplustolls	51	Somewhat limited		Somewhat limited		Very limited	
		Gravel content	0.30	Gravel content	0.30	Gravel content	1.00
						Slope	0.12
Ustorthents	45	Not limited		Not limited		Somewhat limited	
						Slope	0.12
115B:							
Cozberg	39	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Slope	0.50
						Dusty	0.50
Chanta	35	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Slope	0.50
						Dusty	0.50
116F:							
Kremlin	21	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
Shibah	20	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
						Gravel content	0.49
						Content of large stones	0.20

Recreation - Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
117B:							
Kremlin----------	43	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Slope	0.50
						Dusty	0.50
Chanta----------	42	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Slope	0.50
						Dusty	0.50
118F:							
Shibah----------	39	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
						Gravel content	0.49
						Content of large stones	0.20
Rubbleland----------	29	Not rated		Not rated		Not rated	
Arikara----------	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
119:							
Glendive, wooded----	74	Very limited		Not limited		Somewhat limited	
		Flooding	1.00			Flooding	0.60
120B:							
Hanly, wooded-------	61	Very limited		Not limited		Somewhat limited	
		Flooding	1.00			Flooding	0.60
						Slope	0.12
121F:							
Maltese----------	25	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Slope	1.00
		Dusty	0.50	Dusty	0.50	Sodium content	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Dusty	0.50
		Slope	0.04	Slope	0.04	Restricted permeability	0.44
Lonna----------	24	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
Arikara----------	22	Not rated		Not rated		Not rated	
122C:							
Bulltop----------	59	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Slope	0.50
						Dusty	0.50
Shibah----------	25	Somewhat limited		Somewhat limited		Very limited	
		Dusty	0.50	Dusty	0.50	Slope	1.00
						Dusty	0.50
						Gravel content	0.49
						Content of large stones	0.20

Recreation - Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
123E:							
Scairt----------	31	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Slope	1.00
		Dusty	0.50	Dusty	0.50	Sodium content	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Dusty	0.50
						Depth to bedrock	0.46
		Slope	0.37	Slope	0.37	Restricted permeability	0.44
Maltese----------	22	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Slope	1.00
		Slope	0.96	Slope	0.96	Sodium content	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
		Restricted permeability	0.44	Restricted permeability	0.44	Restricted permeability	0.44
Boxwell----------	10	Somewhat limited		Somewhat limited		Very limited	
		Dusty	0.50	Dusty	0.50	Slope	1.00
		Slope	0.37	Slope	0.37	Dusty	0.50
						Depth to bedrock	0.46
152:							
Heil----------	94	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Restricted permeability	1.00	Restricted permeability	1.00	Restricted permeability	1.00
		Ponding	1.00	Ponding	1.00	Ponding	1.00
155:							
Dumps and pits, mine	90	Not rated		Not rated		Not rated	
159:							
Channel----------	40	Not rated		Not rated		Not rated	
Straw----------	28	Very limited		Somewhat limited		Very limited	
		Flooding	1.00	Flooding	0.40	Flooding	1.00
Daglum----------	18	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Restricted permeability	0.44
175:							
Havre, rarely flooded----------	89	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Dusty	0.50	Dusty	0.50
		Dusty	0.50				
177:							
Glendive, rarely flooded----------	84	Very limited		Not limited		Not limited	
		Flooding	1.00				
183:							
Badland, high precipitation------	90	Not rated		Not rated		Not rated	

Recreation - Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
205:							
Harriet, low precipitation------	85	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Flooding	1.00	Restricted permeability	1.00	Restricted permeability	1.00
		Restricted permeability	1.00			Flooding	0.60
210C:							
Lambert----------	41	Very limited		Not limited		Somewhat limited	
		Flooding	1.00			Slope	0.88
						Flooding	0.60
Slickspots----------	21	Not rated		Not rated		Not rated	
Rhoades----------	15	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Restricted permeability	0.44	Restricted permeability	0.44	Slope	0.50
						Restricted permeability	0.44
255:							
Pits, gravel and sand, low precipitation------	90	Not rated		Not rated		Not rated	
M-W:							
Miscellaneous water-	100	Not rated		Not rated		Not rated	
W:							
Water----------	100	Not rated		Not rated		Not rated	

Recreation - Part II

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
3:							
Peta	68	Not limited		Not limited		Not limited	
5:							
Savage	61	Not limited		Not limited		Not limited	
5B:							
Savage	67	Not limited		Not limited		Not limited	
6:							
Regan	64	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
						Flooding	0.60
7:							
Arnegard	68	Not limited		Not limited		Not limited	
9F:							
Cabba	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
						Slope	1.00
						Droughty	0.88
Sen	18	Somewhat limited		Not limited		Very limited	
		Slope	0.50			Slope	1.00
						Depth to bedrock	0.46
Chama	15	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Slope	0.22	Slope	1.00
						Depth to bedrock	0.46
12B:							
Rhoades	55	Not limited		Not limited		Very limited	
						Sodium content	1.00
Daglum	33	Not limited		Not limited		Very limited	
						Sodium content	1.00
13B:							
Dogtooth	59	Not limited		Not limited		Very limited	
						Sodium content	1.00
						Depth to bedrock	0.46
Janesburg	27	Not limited		Not limited		Very limited	
						Sodium content	1.00
						Depth to bedrock	0.46
13D:							
Dogtooth	37	Not limited		Not limited		Very limited	
						Sodium content	1.00
						Slope	0.37
Janesburg	37	Not limited		Not limited		Very limited	
						Sodium content	1.00
						Depth to bedrock	0.46
						Slope	0.37

Recreation - Part II--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
14E:							
Amor	20	Not limited		Not limited		Somewhat limited	
						Depth to bedrock	0.46
						Slope	0.04
Brandenburg	39	Not limited		Not limited		Very limited	
						Droughty	1.00
						Slope	0.96
						Gravel content	0.59
15B:							
Daglum	50	Not limited		Not limited		Very limited	
						Sodium content	1.00
Rhoades	25	Not limited		Not limited		Very limited	
						Sodium content	1.00
17:							
Amor	58	Not limited		Not limited		Somewhat limited	
						Depth to bedrock	0.46
Arnegard	10	Not limited		Not limited		Not limited	
17B:							
Amor	67	Not limited		Not limited		Somewhat limited	
						Depth to bedrock	0.46
Shambo	15	Not limited		Not limited		Not limited	
17C:							
Amor	39	Not limited		Not limited		Somewhat limited	
						Depth to bedrock	0.46
Cabba	29	Not limited		Not limited		Very limited	
						Depth to bedrock	1.00
						Droughty	0.88
17D:							
Amor	42	Not limited		Not limited		Somewhat limited	
						Slope	0.63
						Depth to bedrock	0.46
Cabba	29	Not limited		Not limited		Very limited	
						Depth to bedrock	1.00
						Droughty	0.88
						Slope	0.63
18E:							
Manning	24	Not limited		Not limited		Somewhat limited	
						Slope	0.16
Schaller	22	Somewhat limited		Not limited		Very limited	
		Slope	0.02			Slope	1.00
						Droughty	0.98
Wabek	22	Somewhat limited		Not limited		Very limited	
		Slope	0.08			Droughty	1.00
						Slope	1.00

Recreation - Part II--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
19:							
Sen	56	Not limited		Not limited		Somewhat limited	
						Depth to bedrock	0.46
Golva	11	Not limited		Not limited		Not limited	
19B:							
Chama	43	Not limited		Not limited		Somewhat limited	
						Depth to bedrock	0.46
Sen	25	Not limited		Not limited		Somewhat limited	
						Depth to bedrock	0.46
Cabba	14	Not limited		Not limited		Very limited	
						Depth to bedrock	1.00
						Droughty	0.88
19C:							
Chama	40	Not limited		Not limited		Somewhat limited	
						Depth to bedrock	0.46
Cabba	28	Not limited		Not limited		Very limited	
						Depth to bedrock	1.00
						Droughty	0.88
Sen	17	Not limited		Not limited		Somewhat limited	
						Depth to bedrock	0.46
19D:							
Cabba	38	Not limited		Not limited		Very limited	
						Depth to bedrock	1.00
						Droughty	0.88
						Slope	0.63
Chama	26	Not limited		Not limited		Somewhat limited	
						Slope	0.63
						Depth to bedrock	0.46
Sen	16	Not limited		Not limited		Somewhat limited	
						Slope	0.63
						Depth to bedrock	0.46
21B:							
Parshall	67	Not limited		Not limited		Not limited	
22B:							
Regent	71	Not limited		Not limited		Somewhat limited	
						Depth to bedrock	0.46
Savage	15	Not limited		Not limited		Not limited	
24B:							
Janesburg	51	Not limited		Not limited		Very limited	
						Sodium content	1.00
						Depth to bedrock	0.46
25B:							
Lefor	78	Not limited		Not limited		Somewhat limited	
						Depth to bedrock	0.46

Recreation - Part II--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
27F:							
Badland, outcrop----	42	Not rated		Not rated		Very limited	
						Depth to bedrock	1.00
						Droughty	1.00
						Slope	1.00
						Salinity	1.00
						Sodium content	1.00
Lambert----------	34	Very limited		Very limited		Somewhat limited	
		Water erosion	1.00	Water erosion	1.00	Flooding	0.60
						Slope	0.37
Cabba----------	12	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Slope	0.22	Depth to bedrock	1.00
						Slope	1.00
						Droughty	0.88
28F:							
Flasher----------	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Too sandy	0.94	Too sandy	0.94	Droughty	1.00
						Slope	1.00
Rock outcrop--------	22	Not rated		Not rated		Not rated	
Vebar----------	13	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Slope	0.56	Slope	1.00
						Depth to bedrock	0.29
29F:							
Arikara----------	33	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Shambo----------	21	Somewhat limited		Not limited		Very limited	
		Slope	0.82			Slope	1.00
Cabba----------	18	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
						Slope	1.00
						Droughty	0.88
30F:							
Vebar, extremely stony----------	27	Very limited		Very limited		Very limited	
		Too stony	1.00	Too stony	1.00	Slope	1.00
		Slope	1.00			Depth to bedrock	0.46
						Content of large stones	0.46
Amor, extremely stony----------	21	Very limited		Very limited		Somewhat limited	
		Too stony	1.00	Too stony	1.00	Depth to bedrock	0.46
						Content of large stones	0.46
						Slope	0.37
31B:							
Sen----------	25	Not limited		Not limited		Somewhat limited	
						Depth to bedrock	0.46

Recreation - Part II--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
31B:(cont.)							
Janesburg	34	Not limited		Not limited		Very limited	
						Sodium content	1.00
						Depth to bedrock	0.46
31C:							
Sen	22	Not limited		Not limited		Somewhat limited	
						Depth to bedrock	0.46
Janesburg	21	Not limited		Not limited		Very limited	
						Sodium content	1.00
						Depth to bedrock	0.46
35F:							
Flasher	32	Somewhat limited		Somewhat limited		Very limited	
		Too sandy	0.94	Too sandy	0.94	Depth to bedrock	1.00
		Slope	0.82			Droughty	1.00
						Slope	1.00
Vebar	22	Very limited		Not limited		Very limited	
		Slope	1.00			Slope	1.00
						Depth to bedrock	0.46
Parshall	15	Not limited		Not limited		Somewhat limited	
						Slope	0.63
36B:							
Ekalaka	32	Not limited		Not limited		Very limited	
						Sodium content	1.00
Parshall	32	Not limited		Not limited		Not limited	
Desart	15	Not limited		Not limited		Very limited	
						Sodium content	1.00
37B:							
Farfeld	39	Not limited		Not limited		Very limited	
						Depth to cemented pan	1.00
						Sodium content	1.00
						Droughty	0.61
Cedarpan	27	Not limited		Not limited		Very limited	
						Depth to cemented pan	1.00
						Sodium content	1.00
37F:							
Cedarpan	25	Somewhat limited		Not limited		Very limited	
		Slope	0.32			Depth to cemented pan	1.00
						Sodium content	1.00
						Slope	1.00
Slickspots, stony	24	Not rated		Not rated		Very limited	
						Salinity	1.00
						Too clayey	1.00
						Sodium content	1.00
						Slope	0.96

Recreation - Part II--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
37F:(cont.)							
Farfeld	10	Not limited		Not limited		Very limited	
						Depth to cemented pan	1.00
						Sodium content	1.00
						Droughty	0.61
41C:							
Wayden	58	Somewhat limited		Somewhat limited		Very limited	
		Too clayey	0.50	Too clayey	0.50	Depth to bedrock	1.00
						Too clayey	1.00
						Droughty	0.83
Moreau	15	Somewhat limited		Somewhat limited		Very limited	
		Too clayey	0.50	Too clayey	0.50	Too clayey	1.00
						Depth to bedrock	0.46
42B:							
Searing	60	Not limited		Not limited		Not limited	
Ringling	19	Not limited		Not limited		Very limited	
						Droughty	1.00
						Content of large stones	0.01
43:							
Belfield	49	Not limited		Not limited		Very limited	
						Sodium content	1.00
Grail	26	Not limited		Not limited		Not limited	
44:							
Shambo	48	Not limited		Not limited		Not limited	
44B:							
Shambo	59	Not limited		Not limited		Not limited	
47:							
Stady	41	Not limited		Not limited		Not limited	
48B:							
Manning	66	Not limited		Not limited		Not limited	
49B:							
Lihen	38	Somewhat limited		Somewhat limited		Not limited	
		Too sandy	0.37	Too sandy	0.37		
Parshall	15	Not limited		Not limited		Not limited	
51B:							
Janesburg	40	Not limited		Not limited		Very limited	
						Sodium content	1.00
						Depth to bedrock	0.46
Dogtooth	29	Not limited		Not limited		Very limited	
						Sodium content	1.00
						Depth to bedrock	0.46

Recreation - Part II--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
52:							
Heil	84	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Sodium content	1.00
						Depth to saturated zone	1.00
		Ponding	1.00	Ponding	1.00		
						Ponding	1.00
53B:							
Savage	25	Not limited		Not limited		Not limited	
Daglum	24	Not limited		Not limited		Very limited	
						Sodium content	1.00
54:							
Channel	40	Not rated		Not rated		Not rated	
Straw	40	Somewhat limited		Somewhat limited		Very limited	
		Flooding	0.40	Flooding	0.40	Flooding	1.00
55:							
Pits, gravel and sand	85	Not rated		Not rated		Very limited	
						Droughty	1.00
						Gravel content	1.00
						Slope	1.00
						Too sandy	0.50
57:							
Straw	28	Not limited		Not limited		Not limited	
Rhoades	21	Not limited		Not limited		Very limited	
						Sodium content	1.00
Daglum	12	Not limited		Not limited		Very limited	
						Sodium content	1.00
58:							
Straw	67	Not limited		Not limited		Not limited	
60:							
Korell	75	Not limited		Not limited		Not limited	
62F:							
Dogtooth	23	Somewhat limited		Not limited		Very limited	
		Slope	0.08			Slope	1.00
						Sodium content	1.00
						Depth to bedrock	0.46
Janesburg	23	Somewhat limited		Not limited		Very limited	
		Slope	0.08			Slope	1.00
						Sodium content	1.00
						Depth to bedrock	0.46
Brandenburg	18	Somewhat limited		Not limited		Very limited	
		Slope	0.82			Droughty	1.00
						Slope	1.00
						Gravel content	0.59

Recreation - Part II--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
63F:							
Dogtooth----------	33	Somewhat limited		Not limited		Very limited	
		Slope	0.02			Slope	1.00
						Sodium content	1.00
						Depth to bedrock	0.46
Janesburg----------	22	Somewhat limited		Not limited		Very limited	
		Slope	0.02			Slope	1.00
						Sodium content	1.00
						Depth to bedrock	0.46
Cabba----------	20	Somewhat limited		Not limited		Very limited	
		Slope	0.50			Depth to bedrock	1.00
						Slope	1.00
						Droughty	0.88
65:							
Channel----------	40	Not rated		Not rated		Not rated	
Banks----------	29	Somewhat limited		Somewhat limited		Very limited	
		Flooding	0.40	Flooding	0.40	Flooding	1.00
Trembles----------	18	Somewhat limited		Somewhat limited		Very limited	
		Flooding	0.40	Flooding	0.40	Flooding	1.00
66B:							
Stady----------	50	Not limited		Not limited		Not limited	
67B:							
Evridge----------	28	Not limited		Not limited		Very limited	
						Sodium content	1.00
						Depth to bedrock	0.46
Desart----------	18	Not limited		Not limited		Very limited	
						Sodium content	1.00
Telfer----------	13	Not limited		Not limited		Somewhat limited	
						Droughty	0.06
68F:							
Cabbart----------	41	Very limited		Very limited		Very limited	
		Slope	1.00	Water erosion	1.00	Depth to bedrock	1.00
		Water erosion	1.00	Slope	0.96	Slope	1.00
		Dusty	0.50	Dusty	0.50	Droughty	0.80
Badland, outcrop----	27	Not rated		Not rated		Very limited	
						Depth to bedrock	1.00
						Droughty	1.00
						Slope	1.00
						Salinity	1.00
						Sodium content	1.00
69F:							
Patent----------	33	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Flooding	0.60
						Slope	0.37

Recreation - Part II--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
69F:(cont.)							
Badland, outcrop----	21	Not rated		Not rated		Very limited	
						Depth to bedrock	1.00
						Droughty	1.00
						Slope	1.00
						Salinity	1.00
						Sodium content	1.00
Cabbart----------	21	Very limited		Very limited		Very limited	
		Water erosion	1.00	Water erosion	1.00	Depth to bedrock	1.00
		Slope	1.00	Dusty	0.50	Slope	1.00
		Dusty	0.50	Slope	0.22	Droughty	0.80
70B:							
Maltese----------	39	Somewhat limited		Somewhat limited		Very limited	
		Dusty	0.50	Dusty	0.50	Sodium content	1.00
Gerda----------	30	Not limited		Not limited		Very limited	
						Sodium content	1.00
71B:							
Chinook----------	42	Not limited		Not limited		Not limited	
Rhame----------	28	Not limited		Not limited		Somewhat limited	
						Depth to bedrock	0.46
71D:							
Rhame----------	42	Not limited		Not limited		Somewhat limited	
						Depth to bedrock	0.46
						Slope	0.37
Chinook----------	32	Not limited		Not limited		Somewhat limited	
						Slope	0.37
72F:							
Rhame----------	29	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Slope	0.56	Slope	1.00
						Depth to bedrock	0.46
Fleak----------	27	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Too sandy	0.92	Depth to bedrock	1.00
		Too sandy	0.92	Slope	0.56	Slope	1.00
						Droughty	1.00
73D:							
Gerda----------	16	Not limited		Not limited		Very limited	
						Sodium content	1.00
Kirby----------	23	Somewhat limited		Somewhat limited		Very limited	
		Dusty	0.50	Dusty	0.50	Droughty	1.00
						Gravel content	0.76
						Slope	0.37
						Content of large stones	0.03
74:							
Channel----------	40	Not rated		Not rated		Not rated	
Glendive----------	35	Not limited		Not limited		Not limited	

Recreation - Part II--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
74:(cont.)							
Havre	18	Somewhat limited		Somewhat limited		Not limited	
		Dusty	0.50	Dusty	0.50		
75:							
Havre	77	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Flooding	0.60
76B:							
Lonna	87	Somewhat limited		Somewhat limited		Very limited	
		Dusty	0.50	Dusty	0.50	Sodium content	1.00
76C:							
Lonna	64	Somewhat limited		Somewhat limited		Very limited	
		Dusty	0.50	Dusty	0.50	Sodium content	1.00
77:							
Glendive	70	Not limited		Not limited		Somewhat limited	
						Flooding	0.60
78B:							
Hanly	81	Not limited		Not limited		Somewhat limited	
						Flooding	0.60
79C:							
Zeona	76	Somewhat limited		Somewhat limited		Somewhat limited	
		Too sandy	0.37	Too sandy	0.37	Droughty	0.26
80:							
Ethridge	64	Somewhat limited		Somewhat limited		Not limited	
		Dusty	0.50	Dusty	0.50		
81B:							
Vebar	46	Not limited		Not limited		Somewhat limited	
						Depth to bedrock	0.46
Parshall	19	Not limited		Not limited		Not limited	
81C:							
Vebar	34	Not limited		Not limited		Somewhat limited	
						Depth to bedrock	0.46
Tally	32	Not limited		Not limited		Not limited	
81D:							
Vebar	32	Not limited		Not limited		Somewhat limited	
						Slope	0.63
						Depth to bedrock	0.46
Flasher	16	Somewhat limited		Somewhat limited		Very limited	
		Too sandy	0.94	Too sandy	0.94	Depth to bedrock	1.00
						Droughty	1.00
						Slope	0.63
Tally	15	Not limited		Not limited		Somewhat limited	
						Slope	0.63

Recreation - Part II--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
82E:							
Badland, outcrop----	54	Not rated		Not rated		Very limited	
						Depth to bedrock	1.00
						Droughty	1.00
						Slope	1.00
						Salinity	1.00
						Sodium content	1.00
Patent----------	25	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Flooding	0.60
						Slope	0.37
83:							
Badland----------	88	Not rated		Not rated		Very limited	
						Depth to bedrock	1.00
						Droughty	1.00
						Slope	1.00
						Salinity	1.00
						Sodium content	1.00
85F:							
Lonna----------	34	Very limited		Very limited		Very limited	
		Water erosion	1.00	Water erosion	1.00	Sodium content	1.00
		Dusty	0.50	Dusty	0.50	Slope	0.37
Cabbart----------	33	Very limited		Very limited		Very limited	
		Water erosion	1.00	Water erosion	1.00	Depth to bedrock	1.00
		Slope	0.68	Dusty	0.50	Slope	1.00
		Dusty	0.50			Droughty	0.80
86F:							
Kirby----------	39	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Droughty	1.00
		Dusty	0.50	Dusty	0.50	Slope	1.00
						Gravel content	0.76
						Content of large stones	0.03
Badland, outcrop----	23	Not rated		Not rated		Very limited	
						Depth to bedrock	1.00
						Droughty	1.00
						Slope	1.00
						Salinity	1.00
						Sodium content	1.00
Patent----------	13	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.50	Dusty	0.50	Slope	1.00
		Dusty	0.50			Flooding	0.60
88:							
Littlemo----------	58	Somewhat limited		Somewhat limited		Not limited	
		Dusty	0.50	Dusty	0.50		
Chanta----------	20	Somewhat limited		Somewhat limited		Not limited	
		Dusty	0.50	Dusty	0.50		
89B:							
Patent----------	80	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Flooding	0.60

Recreation - Part II--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
91F:							
Lonna	35	Very limited		Very limited		Very limited	
		Water erosion	1.00	Water erosion	1.00	Slope	1.00
		Dusty	0.50	Dusty	0.50	Sodium content	1.00
Kirby	34	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Dusty	0.50	Droughty	1.00
		Dusty	0.50	Slope	0.08	Slope	1.00
						Gravel content	0.76
						Content of large stones	0.03
Cabbart	16	Very limited		Very limited		Very limited	
		Slope	1.00	Water erosion	1.00	Depth to bedrock	1.00
		Water erosion	1.00	Dusty	0.50	Slope	1.00
		Dusty	0.50	Slope	0.08	Droughty	0.80
92B:							
Kremlin	26	Somewhat limited		Somewhat limited		Not limited	
		Dusty	0.50	Dusty	0.50		
Ethridge	22	Somewhat limited		Somewhat limited		Not limited	
		Dusty	0.50	Dusty	0.50		
Gerda	19	Not limited		Not limited		Very limited	
						Sodium content	1.00
94F:							
Kirby	42	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Dusty	0.50	Dusty	0.50	Droughty	1.00
						Gravel content	0.76
						Content of large stones	0.03
Arikara	27	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Badland, outcrop	16	Not rated		Not rated		Very limited	
						Depth to bedrock	1.00
						Slope	1.00
						Droughty	1.00
						Salinity	1.00
						Sodium content	1.00
95F:							
Tinsley	53	Somewhat limited		Not limited		Very limited	
		Slope	0.68			Droughty	1.00
						Slope	1.00
						Gravel content	0.04
						Content of large stones	0.01
Chanta	17	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Slope	0.37
97:							
Kremlin	77	Somewhat limited		Somewhat limited		Not limited	
		Dusty	0.50	Dusty	0.50		

Recreation - Part II--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
98:							
Wolf Point----------	85	Not rated		Not rated		Somewhat limited	
						Flooding	0.60
99F:							
Badland, outcrop----	63	Not rated		Not rated		Very limited	
						Depth to bedrock	1.00
						Droughty	1.00
						Slope	1.00
						Salinity	1.00
						Sodium content	1.00
Cabbart----------	30	Very limited		Very limited		Very limited	
		Slope	1.00	Water erosion	1.00	Depth to bedrock	1.00
		Water erosion	1.00	Slope	0.96	Slope	1.00
		Dusty	0.50	Dusty	0.50	Droughty	0.80
100C:							
Patent----------	32	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Flooding	0.60
Gullied land--------	19	Not rated		Not rated		Very limited	
						Slope	1.00
						Salinity	1.00
						Depth to bedrock	1.00
						Droughty	0.46
Glendive----------	13	Not limited		Not limited		Somewhat limited	
						Flooding	0.60
101F:							
Boxwell----------	34	Very limited		Very limited		Very limited	
		Water erosion	1.00	Water erosion	1.00	Slope	1.00
		Slope	1.00	Dusty	0.50	Depth to bedrock	0.46
		Dusty	0.50	Slope	0.22		
Cabbart----------	32	Very limited		Very limited		Very limited	
		Water erosion	1.00	Water erosion	1.00	Depth to bedrock	1.00
		Slope	1.00	Dusty	0.50	Slope	1.00
		Dusty	0.50	Slope	0.22	Droughty	0.80
Arikara----------	16	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Slope	0.56	Slope	1.00
102B:							
Boxwell----------	46	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Depth to bedrock	0.46
Kremlin----------	43	Somewhat limited		Somewhat limited		Not limited	
		Dusty	0.50	Dusty	0.50		
102D:							
Boxwell----------	38	Very limited		Very limited		Somewhat limited	
		Water erosion	1.00	Water erosion	1.00	Depth to bedrock	0.46
		Dusty	0.50	Dusty	0.50	Slope	0.37
Kremlin----------	28	Very limited		Very limited		Somewhat limited	
		Water erosion	1.00	Water erosion	1.00	Slope	0.37
		Dusty	0.50	Dusty	0.50		

Recreation - Part II--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
103F:							
Badland, outcrop----	30	Not rated		Not rated		Very limited	
						Depth to bedrock	1.00
						Slope	1.00
						Salinity	1.00
						Sodium content	1.00
Arikara----------	28	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Cabbart----------	16	Very limited		Very limited		Very limited	
		Water erosion	1.00	Water erosion	1.00	Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
		Dusty	0.50	Dusty	0.50	Droughty	0.80
105:							
Harriet----------	80	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Sodium content	1.00
						Depth to saturated zone	1.00
						Flooding	0.60
106:							
Riverwash----------	85	Not rated		Not rated		Very limited	
						Flooding	1.00
						Droughty	1.00
						Depth to saturated zone	1.00
						Too sandy	0.50
107D:							
Rhame----------	23	Not limited		Not limited		Somewhat limited	
						Depth to bedrock	0.46
						Slope	0.04
Kremlin----------	16	Somewhat limited		Somewhat limited		Not limited	
		Dusty	0.50	Dusty	0.50		
Maltese----------	15	Somewhat limited		Somewhat limited		Very limited	
		Dusty	0.50	Dusty	0.50	Sodium content	1.00
108D:							
Boxwell----------	27	Very limited		Very limited		Somewhat limited	
		Water erosion	1.00	Water erosion	1.00	Depth to bedrock	0.46
		Dusty	0.50	Dusty	0.50	Slope	0.37
Scairt----------	18	Somewhat limited		Somewhat limited		Very limited	
		Dusty	0.50	Dusty	0.50	Sodium content	1.00
						Depth to bedrock	0.46
						Slope	0.37
Maltese----------	14	Somewhat limited		Somewhat limited		Very limited	
		Dusty	0.50	Dusty	0.50	Sodium content	1.00
						Slope	0.37
109F:							
Rhame----------	24	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Slope	0.56	Slope	1.00
						Depth to bedrock	0.46

Recreation - Part II--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
109F:(cont.)							
Arikara----------	23	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Slope	0.56	Slope	1.00
Fleak----------	16	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Too sandy	0.92	Depth to bedrock	1.00
		Too sandy	0.92	Slope	0.56	Slope	1.00
						Droughty	1.00
110C:							
Patent----------	38	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Flooding	0.60
Gerda----------	27	Not limited		Not limited		Very limited	
						Sodium content	1.00
Slickspots----------	10	Not rated		Not rated		Very limited	
						Salinity	1.00
						Depth to saturated zone	1.00
						Too clayey	1.00
						Sodium content	1.00
						Flooding	0.60
111F:							
Lonna----------	37	Very limited		Very limited		Very limited	
		Water erosion	1.00	Water erosion	1.00	Slope	1.00
		Dusty	0.50	Dusty	0.50	Sodium content	1.00
		Slope	0.08				
Arikara----------	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Cabbart----------	18	Very limited		Very limited		Very limited	
		Water erosion	1.00	Water erosion	1.00	Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
		Dusty	0.50	Dusty	0.50	Droughty	0.80
112:							
Wolf Point, wooded--	78	Not rated		Not rated		Somewhat limited	
						Flooding	0.60
113:							
Havre, wooded-------	80	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Flooding	0.60
114B:							
Haplustolls---------	51	Not limited		Not limited		Somewhat limited	
						Gravel content	0.30
Ustorthents---------	45	Not limited		Not limited		Not limited	
115B:							
Cozberg----------	39	Somewhat limited		Somewhat limited		Not limited	
		Dusty	0.50	Dusty	0.50		
Chanta----------	35	Somewhat limited		Somewhat limited		Not limited	
		Dusty	0.50	Dusty	0.50		

Recreation - Part II--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
116F:							
Kremlin----------	21	Very limited		Very limited		Very limited	
		Water erosion	1.00	Water erosion	1.00	Slope	1.00
		Slope	0.50	Dusty	0.50		
		Dusty	0.50				
Shibah----------	20	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Slope	0.78	Slope	1.00
		Dusty	0.50	Dusty	0.50	Droughty	0.43
						Content of large stones	0.20
117B:							
Kremlin----------	43	Somewhat limited		Somewhat limited		Not limited	
		Dusty	0.50	Dusty	0.50		
Chanta----------	42	Somewhat limited		Somewhat limited		Not limited	
		Dusty	0.50	Dusty	0.50		
118F:							
Shibah----------	39	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Dusty	0.50	Slope	1.00
		Dusty	0.50	Slope	0.22	Droughty	0.43
						Content of large stones	0.20
Rubbleland----------	29	Not rated		Not rated		Not rated	
Arikara----------	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
119:							
Glendive, wooded----	74	Not limited		Not limited		Somewhat limited	
						Flooding	0.60
120B:							
Hanly, wooded-------	61	Not limited		Not limited		Somewhat limited	
						Flooding	0.60
121F:							
Maltese----------	25	Somewhat limited		Somewhat limited		Very limited	
		Dusty	0.50	Dusty	0.50	Sodium content	1.00
						Slope	0.04
Lonna----------	24	Very limited		Very limited		Very limited	
		Water erosion	1.00	Water erosion	1.00	Slope	1.00
		Dusty	0.50	Dusty	0.50	Sodium content	1.00
Arikara----------	22	Not rated		Not rated		Not rated	
122C:							
Bulltop----------	59	Somewhat limited		Somewhat limited		Not limited	
		Dusty	0.50	Dusty	0.50		
Shibah----------	25	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Droughty	0.43
						Content of large stones	0.20

Recreation - Part II--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
123E:							
Scairt----------	31	Somewhat limited		Somewhat limited		Very limited	
		Dusty	0.50	Dusty	0.50	Sodium content	1.00
						Depth to bedrock	0.46
						Slope	0.37
Maltese----------	22	Somewhat limited		Somewhat limited		Very limited	
		Dusty	0.50	Dusty	0.50	Sodium content	1.00
						Slope	0.96
Boxwell----------	10	Very limited		Very limited		Somewhat limited	
		Water erosion	1.00	Water erosion	1.00	Depth to bedrock	0.46
		Dusty	0.50	Dusty	0.50	Slope	0.37
152:							
Heil----------	94	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Sodium content	1.00
						Depth to saturated zone	1.00
		Ponding	1.00	Ponding	1.00		
						Ponding	1.00
155:							
Dumps and pits, mine	90	Not rated		Not rated		Very limited	
						Slope	1.00
						Content of large stones	0.01
159:							
Channel----------	40	Not rated		Not rated		Not rated	
Straw----------	28	Somewhat limited		Somewhat limited		Very limited	
		Flooding	0.40	Flooding	0.40	Flooding	1.00
Daglum----------	18	Not limited		Not limited		Very limited	
						Sodium content	1.00
175:							
Haver, rarely flooded----------	89	Somewhat limited		Somewhat limited		Not limited	
		Dusty	0.50	Dusty	0.50		
177:							
Glendive, rarely flooded----------	84	Not limited		Not limited		Not limited	
183:							
Badland, high precipitation------	90	Not rated		Not rated		Very limited	
						Depth to bedrock	1.00
						Droughty	1.00
						Slope	1.00
						Salinity	1.00
						Sodium content	1.00
205:							
Harriet, low Precipitation------	85	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Sodium content	1.00
						Depth to saturated zone	1.00
						Flooding	0.60

Recreation - Part II--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
210C:							
Lambert	41	Not limited		Not limited		Somewhat limited	
						Flooding	0.60
Slickspots	21	Not rated		Not rated		Very limited	
						Salinity	1.00
						Too clayey	1.00
						Sodium content	1.00
Rhoades	15	Not limited		Not limited		Very limited	
						Sodium content	1.00
255:							
Pits. gravel and sand, low precipitation	90	Not rated		Not rated		Very limited	
						Droughty	1.00
						Gravel content	1.00
						Slope	1.00
						Too sandy	0.50
M-W:							
Miscellaneous water	100	Not rated		Not rated		Not rated	
W:							
Water	100	Not rated		Not rated		Not rated	

Wildlife Habitat

Soils affect the kind and amount of vegetation that is available to wildlife for food and cover. They also affect the construction of water impoundments. If food, cover, or water is missing, inadequate, or inaccessible, wildlife will be scarce or will not inhabit the area.

If the soils have potential for habitat development, wildlife habitat can be created or improved by planting appropriate vegetation, properly managing existing plant cover and fostering the natural establishment of desirable plants.

The soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife. It can also be used for selecting soils suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat. More detailed information is available in Section II of the electronic Field Office Technical Guide (eFOTG) at www.nrcs.usda.gov/techical/efotg.

The potential of the soil for wildlife habitat is rated **good, fair, poor** or **very poor**. A rating of **good** indicates the kind of habitat is easily established, improved, or maintained. Few or no limitations affect management and satisfactory results can be expected. A rating of **fair** indicates the kind of wildlife habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of **poor** indicates limitations are severe for the designated kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of **very poor** indicates restrictions for the element or kind of wildlife habitat are very severe and unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants used by wildlife. Examples are wheat, rye, oats, corn, beans, sunflower, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes planted for wildlife food and cover. Examples are intermediate wheatgrass, tall wheatgrass, sweetclover, and alfalfa.

Wild herbaceous plants are native grasses and forbs that provide food and cover for wildlife. Examples are big bluestem, little bluestem, blue grama, green needlegrass, western wheatgrass, and various native forbs and legumes. The major soil properties affecting the growth of grain and forage crops and wild herbaceous plants are depth of the root zone, texture of the surface layer, the amount of water available to plants, wetness, salinity or sodicity, and flooding.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark and foliage that wildlife eat. Examples are oak, poplar, boxelder, green ash, willow, and American elm.

Coniferous plants provide habitat or supply food in the form of browse, seed, or fruitlike cones. Examples are pine, spruce, cedar, and juniper.

Shrubs are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of shrubs are depth of the rooting zone, available water capacity, salinity and soil moisture. Examples of shrubs are common chokecherry, buffaloberry, snowberry, juneberry, hawthorn, skunkbush sumac, silver sagebrush, American plum, and redosier dogwood.

The major soil properties affecting the growth of hardwood and coniferous trees and shrubs are depth of the root zone, the amount of water available to plants, and wetness.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Wetland plants produce food or cover for wetland wildlife. Examples of these plants are smartweed, sedges, bulrushes, white top, common reedgrass, saltgrass, prairie cordgrass, and cattail.

The major soil properties affecting wetland plants are texture of the surface layer, wetness, acidity or alkalinity, and slope.

Shallow water areas have an average depth of less than 6 feet. They are useful as habitat for many wildlife species including amphibians. They are naturally wet areas, streams, or are created by dams. Examples are wetlands occurring in natural depressions or in natural drainageways adjacent to streams, dams, dugouts, creeks, or beaver ponds.

The major soil properties affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and saturated hydraulic conductivity.

Habitat for wildlife consists of cropland, pasture, rangeland, and other areas that have a cover of grasses, herbs, and/or shrubs. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include grassland nesting birds, such as Hungarian partridge, pheasant, sharptail grouse, waterfowl, mule deer, cottontail rabbits, coyote, and red fox.

Habitat for wildlife associated with wetlands consists of open, marshy or swampy, shallow water areas that support water-tolerant plants. The wildlife attracted to this habitat includes ducks, geese, shore birds, muskrat, mink, beaver, and various amphibians.

Wildlife habitat associated with woodland consists of areas of hardwoods or conifers or a mixture of these and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to this habitat includes bird species associated with woodland, tree squirrels, raccoon, turkeys, and white-tailed deer.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil between the surface and a depth of 5 to 7 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about particle-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 7 feet of the surface, soil wetness, depth to a water table, ponding, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the "Glossary."

Building Site Development

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. The “Building Site Development” tables show the degree and kind of soil limitations that affect dwellings with and without basements, small commercial buildings, local roads and streets, shallow excavations, and lawns and landscaping.

The ratings in the tables are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. **Not limited** indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. **Slightly limited** indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. **Somewhat limited** indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. **Very limited** indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet. The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Small commercial buildings are structures that are less than three stories high and do not have basements. The foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility (which is inferred from the Unified classification). The properties that affect the ease and amount of excavation include flooding, depth to a water table, ponding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or soil material stabilized by lime or cement; and a surface of flexible

material (asphalt), rigid material (concrete), or gravel with a binder. The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. The properties that affect the ease of excavation and grading are depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, depth to a water table, ponding, flooding, the amount of large stones, and slope. The properties that affect the traffic-supporting capacity are soil strength (as inferred from the AASHTO group index number), subsidence, linear extensibility (shrink-swell potential), the potential for frost action, depth to a water table, and ponding.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for graves, utility lines, open ditches, or other purposes. The ratings are based on the soil properties that influence the ease of digging and the resistance to sloughing. Depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to the seasonal high water table, flooding, and ponding may restrict the period when excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer.

Sanitary Facilities

The “Sanitary Facilities” tables show the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, sanitary landfills, and daily cover for landfill. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. **Not limited** indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. **Slightly limited** indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. **Somewhat limited** indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. **Very limited** indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 60 inches is evaluated. The ratings are based on the soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health. Permeability, depth to a water table, ponding, depth to bedrock or a cemented pan, and flooding affect absorption of the effluent. Stones and

boulders, ice, and bedrock or a cemented pan interfere with installation. Subsidence interferes with installation and maintenance. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas.

Some soils are underlain by loose sand and gravel or fractured bedrock at a depth of less than 4 feet below the distribution lines. In these soils the absorption field may not adequately filter the effluent, particularly when the system is new. As a result, the ground water may become contaminated.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Considered in the ratings are slope, permeability, depth to a water table, ponding, depth to bedrock or a cemented pan, flooding, large stones, and content of organic matter.

Soil permeability is a critical property affecting the suitability for sewage lagoons. Most porous soils eventually become sealed when they are used as sites for sewage lagoons. Until sealing occurs, however, the hazard of pollution is severe. Soils that have a permeability rate of more than 2 inches per hour are too porous for the proper functioning of sewage lagoons. In these soils, seepage of the effluent can result in contamination of the ground water. Ground-water contamination is also a hazard if fractured bedrock is within a depth of 40 inches, if the water table is high enough to raise the level of sewage in the lagoon, or if floodwater overtops the lagoon.

A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor. If the lagoon is to be uniformly deep throughout, the slope must be gentle enough and the soil material must be thick enough over bedrock or a cemented pan to make land smoothing practical.

A **trench sanitary landfill** is an area where solid waste is placed in successive layers in an excavated trench. The waste is spread, compacted, and covered daily with a thin layer of soil excavated at the site. When the trench is full, a final cover of soil material at least 2 feet thick is placed over the landfill. The ratings in the table are based on the soil properties that affect the risk of pollution, the ease of excavation, trafficability, and revegetation. These properties include permeability, depth to bedrock or a cemented pan, depth to a water table, ponding, slope, flooding, texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, onsite investigation may be needed.

Hard, nonrippable bedrock, creviced bedrock, or highly permeable strata in or directly below the proposed trench bottom can affect the ease of excavation and the hazard of ground-water pollution. Slope affects construction of the trenches and the movement of surface water around the landfill. It also affects the construction and performance of roads in areas of the landfill.

Soil texture and consistence affect the ease with which the trench is dug and the ease with which the soil can be used as daily or final cover. They determine the workability of the soil when dry and when wet. Soils that are plastic and sticky when wet are difficult to excavate, grade, or compact and are difficult to place as a uniformly thick cover over a layer of refuse.

The soil material used as the final cover for a trench landfill should be suitable for plants. It should not have excess sodium or salts and should not be too acid. The surface layer generally has the best workability, the highest content of organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

In an **area sanitary landfill**, solid waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site. A final cover of soil material at least 2 feet thick is placed over the completed landfill. The ratings in the table are based on the soil properties that affect trafficability and the risk of pollution. These properties include flooding, permeability, depth to a water table, ponding, slope, and depth to bedrock or a cemented pan.

Flooding is a serious problem because it can result in pollution in areas downstream from the landfill. If permeability is too rapid or if fractured bedrock, a fractured cemented pan, or the water table is close to the surface, the leachate can contaminate the water supply. Slope is a consideration because of the extra grading required to maintain roads in the steeper areas of the landfill. Also, leachate may flow along the surface of the soils in the steeper areas and cause difficult seepage problems.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste. The ratings in the table also apply to the final cover for a landfill. They are based on the soil properties that affect workability, the ease of digging, and the ease of moving and spreading the material over the refuse daily during wet and dry periods. These properties include soil texture, depth to a water table, ponding, rock fragments, slope, depth to bedrock or a cemented pan, reaction, and content of salts, sodium, or lime.

Loamy or silty soils that are free of large stones and excess gravel are the best cover for a landfill. Clayey soils may be sticky and difficult to spread; sandy soils are subject to wind erosion.

Slope affects the ease of excavation and of moving the cover material. Also, it can influence runoff, erosion, and reclamation of the borrow area.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. It should not have excess sodium, salts, or lime and should not be too acid.

Construction Materials

The “Construction Materials” table gives information about the soils as potential sources of gravel, sand, topsoil, and roadfill. Normal compaction, minor processing, and other standard construction practices are assumed.

Sand and **gravel** are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. Only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material. The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the Unified classification of the soil), the thickness of suitable material, and the content of rock fragments. If the lowest layer of the soil contains sand or gravel, the soil is rated as a probable source regardless of thickness. The assumption is that the sand or gravel layer below the depth of observation exceeds the minimum thickness.

The soils are rated **good, fair,** or **poor** as potential sources of sand and gravel. A rating of **good** or **fair** means that the source material is likely to be in or below the soil. The bottom layer and the thickest layer of the soils are assigned numerical ratings. These ratings indicate the likelihood that the layer is a source of sand or gravel. The number 0.00 indicates that the layer is a **poor** source. The number 1.00 indicates that the layer is a good source. A number between 0.00 and 1.00 indicates the degree to which the layer is a likely source.

The soils are rated **good, fair,** or **poor** as potential sources of topsoil and roadfill. The features that limit the soils as sources of these materials are specified in the tables. The numerical ratings given after the specified features indicate the degree to which the features limit the soils as sources of topsoil or roadfill. The lower the number, the greater the limitation.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area. The ratings are based on the soil properties that affect plant growth; the ease of excavating, loading, and spreading the material; and reclamation of the borrow area. Toxic substances, soil reaction, and the properties that are inferred from soil texture, such as available water capacity and fertility, affect plant growth. The ease of excavating, loading, and spreading is affected by rock fragments, slope, depth to a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, depth to a water table, rock fragments, depth to bedrock or a cemented pan, and toxic material.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the whole soil, from the surface to a depth of about 5 feet. It is assumed that soil layers will be mixed when the soil material is excavated and spread.

The ratings are based on the amount of suitable material and on soil properties that affect the ease of excavation and the performance of the material after it is in place. The thickness of the suitable material is a major consideration. The ease of excavation is affected by large stones, depth to a water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the AASHTO classification of the soil) and linear extensibility (shrink-swell potential).

Water Management

The “Water Management” table gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. **Not limited** indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. **Somewhat limited** indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. **Very limited** indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Building Site Development - Part I

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
3:							
Peta	68	Somewhat limited		Very limited		Somewhat limited	
		Shrink-swell	0.50	Depth to saturated zone	1.00	Shrink-swell	0.50
5:							
Savage	61	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
5B:							
Savage	67	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
6:							
Regan	64	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
7:							
Arnegard	68	Not limited		Not limited		Not limited	
9F:							
Cabba	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to soft bedrock	1.00
Sen	18	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.46		
Chama	15	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.46		
12B:							
Rhoades	55	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
				Depth to saturated zone	0.47		
Daglum	33	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
				Depth to saturated zone	0.47		
13B:							
Dogtooth	59	Not limited		Somewhat limited		Not limited	
				Depth to soft bedrock	0.46		

Building Site Development - Part I--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
13B:(cont.)							
Janesburg	27	Not limited		Somewhat limited		Not limited	
				Depth to soft bedrock	0.46		
13D:							
Dogtooth	37	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.37	Depth to soft bedrock	0.46	Slope	1.00
				Slope	0.37		
Janesburg	37	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.37	Depth to soft bedrock	0.46	Slope	1.00
				Slope	0.37		
14E:							
Amor	20	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.04	Depth to soft bedrock	0.46	Slope	1.00
				Slope	0.04		
Brandenburg	39	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.96	Slope	0.96	Slope	1.00
		Content of large stones	0.09	Content of large stones	0.09	Content of large stones	0.09
15B:							
Daglum	50	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
				Depth to saturated zone	0.47		
Rhoades	25	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
				Depth to saturated zone	0.47		
17:							
Amor	58	Not limited		Somewhat limited		Not limited	
				Depth to soft bedrock	0.46		
Arnegard	10	Not limited		Not limited		Not limited	
17B:							
Amor	67	Not limited		Somewhat limited		Somewhat limited	
				Depth to soft bedrock	0.46	Slope	0.12
Shambo	15	Not limited		Not limited		Somewhat limited	
						Slope	0.12
17C:							
Amor	39	Not limited		Somewhat limited		Very limited	
				Depth to soft bedrock	0.46	Slope	1.00

Building Site Development - Part I--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
17C:(cont.)							
Cabba	29	Somewhat limited Depth to soft bedrock	1.00	Very limited Depth to soft bedrock	1.00	Very limited Depth to soft bedrock Slope	1.00 1.00
17D:							
Amor	42	Somewhat limited Slope	0.63	Somewhat limited Slope Depth to soft bedrock	0.63 0.46	Very limited Slope	1.00
Cabba	29	Somewhat limited Depth to soft bedrock Slope	1.00 0.63	Very limited Depth to soft bedrock Slope	1.00 0.63	Very limited Slope Depth to soft bedrock	1.00 1.00
18E:							
Manning	24	Somewhat limited Slope	0.16	Somewhat limited Slope	0.16	Very limited Slope	1.00
Schaller	22	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope	1.00
Wabek	22	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope	1.00
19:							
Sen	56	Not limited		Somewhat limited Depth to soft bedrock	0.46	Not limited	
Golva	11	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50
19B:							
Chama	43	Not limited		Somewhat limited Depth to soft bedrock	0.46	Somewhat limited Slope	0.12
Sen	25	Not limited		Somewhat limited Depth to soft bedrock	0.46	Somewhat limited Slope	0.12
Cabba	14	Somewhat limited Depth to soft bedrock	1.00	Very limited Depth to soft bedrock	1.00	Somewhat limited Depth to soft bedrock Slope	1.00 0.12
19C:							
Chama	40	Not limited		Somewhat limited Depth to soft bedrock	0.46	Very limited Slope	1.00
Cabba	28	Somewhat limited Depth to soft bedrock	1.00	Very limited Depth to soft bedrock	1.00	Very limited Depth to soft bedrock Slope	1.00 1.00

Building Site Development - Part I--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
19C:(cont.)							
Sen	17	Not limited		Somewhat limited		Very limited	
				Depth to soft bedrock	0.46	Slope	1.00
19D:							
Cabba	38	Somewhat limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Slope	1.00
						Depth to soft bedrock	1.00
		Slope	0.63	Slope	0.63		
Chama	26	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
				Depth to soft bedrock	0.46		
Sen	16	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
				Depth to soft bedrock	0.46		
21B:							
Parshall	67	Not limited		Not limited		Not limited	
22B:							
Regent	71	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
				Depth to soft bedrock	0.46	Slope	0.12
Savage	15	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
24B:							
Janesburg	51	Not limited		Somewhat limited		Not limited	
				Depth to soft bedrock	0.46		
25B:							
Lefor	78	Not limited		Somewhat limited		Not limited	
				Depth to soft bedrock	0.46		
27F:							
Badland, outcrop	42	Not rated		Not rated		Not rated	
Lambert	34	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Slope	1.00
		Slope	0.37	Slope	0.37	Shrink-swell	0.50
Cabba	12	Very limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Slope	1.00
						Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00		

Building Site Development - Part I--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
28F:							
Flasher	35	Very limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Depth to soft bedrock	1.00
Rock outcrop	22	Not rated		Not rated		Not rated	
Vebar	13	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.29		
29F:							
Arikara	33	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Shambo	21	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Cabba	18	Very limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Slope	1.00
						Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00		
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
30F:							
Vebar, extremely stony	27	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.46		
Amor, extremely stony	21	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.37	Depth to soft bedrock	0.46	Slope	1.00
				Slope	0.37		
31B:							
Sen	25	Not limited		Somewhat limited		Not limited	
				Depth to soft bedrock	0.46		
Janesburg	34	Not limited		Somewhat limited		Not limited	
				Depth to soft bedrock	0.46		
31C:							
Sen	22	Not limited		Somewhat limited		Very limited	
				Depth to soft bedrock	0.46	Slope	1.00
Janesburg	21	Not limited		Somewhat limited		Somewhat limited	
				Depth to soft bedrock	0.46	Slope	0.88

Building Site Development - Part I--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
35F:							
Flasher	32	Very limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Depth to soft bedrock	1.00
Vebar	22	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.46		
Parshall	15	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
36B:							
Ekalaka	32	Not limited		Not limited		Not limited	
Parshall	32	Not limited		Not limited		Not limited	
Desart	15	Not limited		Not limited		Not limited	
37B:							
Farfeld	39	Not limited		Not limited		Not limited	
Cedarpan	27	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
37F:							
Cedarpam	25	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
Slickspots, stony	24	Not rated		Not rated		Not rated	
Farfeld	10	Not limited		Not limited		Somewhat limited	
						Slope	0.12
41C:							
Wayden	58	Very limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Shrink-swell	1.00	Depth to soft bedrock	1.00
		Shrink-swell	1.00	Depth to soft bedrock	1.00	Shrink-swell	1.00
						Slope	0.50
Moreau	15	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
				Depth to soft bedrock	0.46	Slope	0.50
42B:							
Searing	60	Not limited		Not limited		Not limited	
Ringling	19	Not limited		Not limited		Not limited	

Building Site Development - Part I--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
43:							
Belfield	49	Very limited Shrink-swell	 1.00	Very limited Shrink-swell Depth to saturated zone	 1.00 0.47	Very limited Shrink-swell	 1.00
Grail	26	Very limited Shrink-swell	 1.00	Very limited Shrink-swell Depth to saturated zone	 1.00 0.47	Very limited Shrink-swell	 1.00
44:							
Shambo	48	Not limited		Not limited		Not limited	
44B:							
Shambo	59	Not limited		Not limited		Not limited	
47:							
Stady	41	Not limited		Not limited		Not limited	
48B:							
Manning	66	Not limited		Not limited		Not limited	
49B:							
Lihen	38	Not limited		Not limited		Not limited	
Parshall	15	Not limited		Not limited		Not limited	
51B:							
Janesburg	40	Not limited		Somewhat limited Depth to soft bedrock	 0.46	Not limited	
Dogtooth	29	Not limited		Somewhat limited Depth to soft bedrock	 0.46	Not limited	
52:							
Heil	84	Very limited Depth to saturated zone Shrink-swell Ponding	 1.00 1.00 1.00	Very limited Depth to saturated zone Shrink-swell Ponding	 1.00 1.00 1.00	Very limited Depth to saturated zone Shrink-swell Ponding	 1.00 1.00 1.00
53B:							
Savage	25	Very limited Shrink-swell	 1.00	Very limited Shrink-swell	 1.00	Very limited Shrink-swell	 1.00
Daglum	24	Very limited Shrink-swell	 1.00	Very limited Shrink-swell Depth to saturated zone	 1.00 0.47	Very limited Shrink-swell	 1.00
54:							
Channel	40	Not rated		Not rated		Not rated	

Building Site Development - Part I--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
54:(cont.)							
Straw	40	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
				Shrink-swell	0.50		
				Depth to saturated zone	0.47		
55:							
Pits, gravel and sand	85	Not rated		Not rated		Not rated	
57:							
Straw	28	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
				Shrink-swell	0.50		
Rhoades	21	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
				Depth to saturated zone	0.47		
Daglum	12	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
				Depth to saturated zone	0.47		
58:							
Straw	67	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
				Shrink-swell	0.50		
60:							
Korell	75	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
62F:							
Dogtooth	23	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.46		
Janesburg	23	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.46		
Brandenburg	18	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Content of large stones	0.09	Content of large stones	0.09	Content of large stones	0.09
63F:							
Dogtooth	33	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.46		

Building Site Development - Part I--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
63F:(cont.)							
Janesburg----------	22	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.46		
Cabba----------	20	Very limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Depth to soft bedrock	1.00
65:							
Channel----------	40	Not rated		Not rated		Not rated	
Banks----------	29	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
Trembles----------	18	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
66B:							
Stady----------	50	Not limited		Not limited		Somewhat limited	
						Slope	0.12
67B:							
Evridge----------	28	Not limited		Somewhat limited		Not limited	
				Depth to soft bedrock	0.46		
Desart----------	18	Not limited		Not limited		Not limited	
Telfer----------	13	Not limited		Not limited		Not limited	
68F:							
Cabbart----------	41	Very limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Badland, outcrop----	27	Not rated		Not rated		Not rated	
69F:							
Patent----------	33	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Slope	1.00
		Slope	0.37	Slope	0.37	Shrink-swell	0.50
Badland, outcrop----	21	Not rated		Not rated		Not rated	
Cabbart----------	21	Very limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Depth to soft bedrock	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50

Building Site Development - Part I--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
70B:							
Maltese	39	Very limited		Somewhat limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	0.50	Shrink-swell	1.00
Gerda	30	Very limited		Not limited		Very limited	
		Shrink-swell	1.00			Shrink-swell	1.00
71B:							
Chinook	42	Not limited		Not limited		Not limited	
Rhame	28	Not limited		Somewhat limited		Not limited	
				Depth to soft bedrock	0.46		
71D:							
Rhame	42	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.37	Depth to soft bedrock	0.46	Slope	1.00
				Slope	0.37		
Chinook	32	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.37	Slope	0.37	Slope	1.00
72F:							
Rhame	29	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.46		
Fleak	27	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to soft bedrock	1.00
73D:							
Gerda	16	Very limited		Not limited		Very limited	
		Shrink-swell	1.00			Shrink-swell	1.00
						Slope	0.12
Kirby	23	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.37	Slope	0.37	Slope	1.00
		Content of large stones	0.03	Content of large stones	0.03	Content of large stones	0.03
74:							
Channel	40	Not rated		Not rated		Not rated	
Glendive	35	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
Havre	18	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
75:							
Havre	77	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00

Building Site Development - Part I--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
76B:							
Lonna	87	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
76C:							
Lonna	64	Somewhat limited		Somewhat limited		Very limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Slope	1.00
						Shrink-swell	0.50
77:							
Glendive	70	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
78B:							
Hanly	81	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
79C:							
Zeona	76	Not limited		Not limited		Somewhat limited	
						Slope	0.12
80:							
Ethridge	64	Very limited		Somewhat limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	0.50	Shrink-swell	1.00
81B:							
Vebar	46	Not limited		Somewhat limited		Not limited	
				Depth to soft bedrock	0.46		
Parshall	19	Not limited		Not limited		Not limited	
81C:							
Vebar	34	Not limited		Somewhat limited		Very limited	
				Depth to soft bedrock	0.46	Slope	1.00
Tally	32	Not limited		Not limited		Very limited	
						Slope	1.00
81D:							
Vebar	32	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
				Depth to soft bedrock	0.46		
Flasher	16	Somewhat limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Slope	1.00
		Slope	0.63	Slope	0.63	Depth to soft bedrock	1.00
Tally	15	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00

Building Site Development - Part I--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
82E:							
Badland, outcrop----	54	Not rated		Not rated		Not rated	
Patent----------	25	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Slope	1.00
		Slope	0.37	Slope	0.37	Shrink-swell	0.50
83:							
Badland----------	88	Not rated		Not rated		Not rated	
85F:							
Lonna----------	34	Somewhat limited		Somewhat limited		Very limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Slope	1.00
		Slope	0.37	Slope	0.37	Shrink-swell	0.50
Cabbart----------	33	Very limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
86F:							
Kirby----------	39	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Content of large stones	0.03	Content of large stones	0.03	Content of large stones	0.03
Badland, outcrop----	23	Not rated		Not rated		Not rated	
Patent----------	13	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
88:							
Littlemo----------	58	Not limited		Not limited		Not limited	
Chanta----------	20	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
89B:							
Patent----------	80	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
91F:							
Lonna----------	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Kirby----------	34	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Content of large stones	0.03	Content of large stones	0.03	Content of large stones	0.03

Building Site Development - Part I--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
91F:(cont.)							
Cabbart----------	16	Very limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
92B:							
Kremlin----------	26	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Ethridge----------	22	Very limited		Somewhat limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	0.50	Shrink-swell	1.00
Gerda----------	19	Very limited		Not limited		Very limited	
		Shrink-swell	1.00			Shrink-swell	1.00
94F:							
Kirby----------	42	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Content of large stones	0.03	Content of large stones	0.03	Content of large stones	0.03
Arikara----------	27	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Badland, outcrop----	16	Not rated		Not rated		Not rated	
95F:							
Tinsley----------	53	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Chanta----------	17	Somewhat limited		Somewhat limited		Very limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Slope	1.00
		Slope	0.37	Slope	0.37	Shrink-swell	0.50
97:							
Kremlin----------	77	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
98:							
Wolf Point----------	85	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
99F:							
Badland, outcrop----	63	Not rated		Not rated		Not rated	
Cabbart----------	30	Very limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50

Building Site Development - Part I--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
100C:							
Patent	32	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
						Slope	0.12
Gullied land	19	Not rated		Not rated		Not rated	
Glendive	13	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
101F:							
Boxwell	34	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.46		
Cabbart	32	Very limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Depth to soft bedrock	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Arikara	16	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
102B:							
Boxwell	46	Not limited		Somewhat limited		Not limited	
				Depth to soft bedrock	0.46		
Kremlin	43	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
102D:							
Boxwell	38	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.37	Depth to soft bedrock	0.46	Slope	1.00
				Slope	0.37		
Kremlin	28	Somewhat limited		Somewhat limited		Very limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Slope	1.00
		Slope	0.37	Slope	0.37	Shrink-swell	0.50
103F:							
Badland, outcrop	30	Not rated		Not rated		Not rated	
Arikara	28	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Cabbart	16	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to soft bedrock	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50

Building Site Development - Part I--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
105:							
Harriet	80	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
				Shrink-swell	0.50		
106:							
Riverwash	85	Not rated		Not rated		Not rated	
107D:							
Rhame	23	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.04	Depth to soft bedrock	0.46	Slope	1.00
				Slope	0.04		
Kremlin	16	Somewhat limited		Somewhat limited		Very limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Slope	1.00
						Shrink-swell	0.50
Maltese	15	Very limited		Somewhat limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	0.50	Shrink-swell	1.00
						Slope	0.12
108D:							
Boxwell	27	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.37	Depth to soft bedrock	0.46	Slope	1.00
				Slope	0.37		
Scairt	18	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.37	Depth to soft bedrock	0.46	Slope	1.00
				Slope	0.37		
Maltese	14	Very limited		Somewhat limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	0.50	Shrink-swell	1.00
		Slope	0.37	Slope	0.37	Slope	1.00
109F:							
Rhame	24	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.46		
Arikara	23	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Fleak	16	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to soft bedrock	1.00

Building Site Development - Part I--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
110C:							
Patent	38	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
						Slope	0.12
Gerda	27	Very limited		Not limited		Very limited	
		Shrink-swell	1.00			Shrink-swell	1.00
						Slope	0.12
Slickspots	10	Not rated		Not rated		Not rated	
111F:							
Lonna	37	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Arikara	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Cabbart	18	Very limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Slope	1.00
						Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00		
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
112:							
Wolf Point, wooded	78	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
				Depth to saturated zone	0.15		
113:							
Havre, wooded	80	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
				Depth to saturated zone	0.15		
114B:							
Haplustolls	51	Not limited		Not limited		Not limited	
Ustorthents	45	Not limited		Not limited		Not limited	
115B:							
Cozberg	39	Not limited		Not limited		Not limited	
Chanta	35	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
116F:							
Kremlin	21	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Shibah	20	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00

Building Site Development - Part I--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
117B:							
Kremlin----------	43	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Chanta----------	42	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
118F:							
Shibah----------	39	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Rubbleland----------	29	Not rated		Not rated		Not rated	
Arikara----------	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
119:							
Glendive, wooded----	74	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
				Depth to saturated zone	0.15		
120B:							
Hanly, wooded-------	61	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
				Depth to saturated zone	0.15		
121F:							
Maltese----------	25	Very limited		Somewhat limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	0.50	Shrink-swell	1.00
		Slope	0.04	Slope	0.04	Slope	1.00
Lonna----------	24	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Arikara----------	22	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
122C:							
Bulltop----------	59	Not limited		Not limited		Not limited	
Shibah----------	25	Not limited		Not limited		Somewhat limited	
						Slope	0.50
123E:							
Scairt----------	31	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.37	Depth to soft bedrock	0.46	Slope	1.00
				Slope	0.37		
Maltese----------	22	Very limited		Somewhat limited		Very limited	
		Shrink-swell	1.00	Slope	0.96	Shrink-swell	1.00
		Slope	0.96	Shrink-swell	0.50	Slope	1.00

Building Site Development - Part I--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
123E:(cont.)							
Boxwell	10	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.37	Depth to soft bedrock	0.46	Slope	1.00
				Slope	0.37		
152:							
Heil	94	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
		Ponding	1.00	Ponding	1.00	Ponding	1.00
155:							
Dumps and pits, mine	90	Not rated		Not rated		Not rated	
159:							
Channel	40	Not rated		Not rated		Not rated	
Straw	28	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
				Shrink-swell	0.50		
				Depth to saturated zone	0.47		
Daglum	18	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
				Depth to saturated zone	0.47		
175:							
Havre, rarely flooded	89	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
177:							
Glendive, rarely flooded	84	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
183:							
Badland, high precipitation	90	Not rated		Not rated		Not rated	
205:							
Harriet, low precipitation	85	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
				Shrink-swell	0.50		
210C:							
Lambert	41	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
						Slope	0.12
Slickspots	21	Not rated		Not rated		Not rated	

Building Site Development - Part I--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
210C:(cont.)							
Rhoades	15	Very limited Shrink-swell	1.00	Very limited Shrink-swell Depth to saturated zone	1.00 0.16	Very limited Shrink-swell	1.00
255:							
Pits, gravel and sand, low precipitation	90	Not rated		Not rated		Not rated	
M-W:							
Miscellaneous water	100	Not rated		Not rated		Not rated	
W:							
Water	100	Not rated		Not rated		Not rated	

Building Site Development - Part II

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
3:							
Peta----------	68	Very limited		Very limited		Not limited	
		Low strength	1.00	Depth to saturated zone	1.00		
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
5:							
Savage----------	61	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Too clayey	0.12		
		Shrink-swell	1.00	Cutbanks cave	0.10		
5B:							
Savage----------	67	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Too clayey	0.12		
		Shrink-swell	1.00	Cutbanks cave	0.10		
6:							
Regan----------	64	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Frost action	1.00	Flooding	0.60	Flooding	0.60
		Flooding	1.00	Cutbanks cave	0.10		
		Low strength	1.00				
		Shrink-swell	0.50				
7:							
Arnegard----------	68	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Cutbanks cave	0.10		
		Frost action	0.50				
9F:							
Cabba----------	45	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00	Depth to bedrock	1.00
		Depth to soft bedrock	1.00	Slope	1.00	Slope	1.00
		Low strength	0.78	Cutbanks cave	0.10	Droughty	0.88
		Frost action	0.50				
Sen----------	18	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Low strength	1.00	Depth to soft bedrock	0.46	Depth to bedrock	0.46
		Frost action	0.50	Cutbanks cave	0.10		
Chama----------	15	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Low strength	1.00	Depth to soft bedrock	0.46	Depth to bedrock	0.46
		Frost action	0.50	Cutbanks cave	0.10		

Building Site Development - Part II--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
12B:							
Rhoades----------	55	Very limited		Somewhat limited		Very limited	
		Shrink-swell	1.00	Depth to saturated zone	0.47	Sodium content	1.00
		Low strength	1.00	Cutbanks cave	0.10		
				Too clayey	0.02		
Daglum----------	33	Very limited		Somewhat limited		Very limited	
		Low strength	1.00	Too clayey	0.50	Sodium content	1.00
		Shrink-swell	1.00	Depth to saturated zone	0.47		
		Frost action	0.50	Cutbanks cave	0.10		
13B:							
Dogtooth----------	59	Very limited		Somewhat limited		Very limited	
		Low strength	1.00	Too clayey	0.50	Sodium content	1.00
		Shrink-swell	1.00	Depth to soft bedrock	0.46	Depth to bedrock	0.46
				Cutbanks cave	0.10		
Janesburg----------	27	Very limited		Somewhat limited		Very limited	
		Low strength	1.00	Too clayey	0.50	Sodium content	1.00
		Shrink-swell	1.00	Depth to soft bedrock	0.46	Depth to bedrock	0.46
		Frost action	0.50	Cutbanks cave	0.10		
13D:							
Dogtooth----------	37	Very limited		Somewhat limited		Very limited	
		Low strength	1.00	Too clayey	0.50	Sodium content	1.00
		Shrink-swell	1.00	Depth to soft bedrock	0.46	Depth to bedrock	0.46
		Slope	0.37	Slope	0.37	Slope	0.37
				Cutbanks cave	0.10		
Janesburg----------	37	Somewhat limited		Somewhat limited		Very limited	
		Low strength	1.00	Too clayey	0.50	Sodium content	1.00
		Shrink-swell	1.00	Depth to soft bedrock	0.46	Depth to bedrock	0.46
		Frost action	0.50	Slope	0.37	Slope	0.37
		Slope	0.37	Cutbanks cave	0.10		
14E:							
Amor----------	20	Somewhat limited		Somewhat limited		Somewhat limited	
		Frost action	0.50	Depth to soft bedrock	0.46	Depth to bedrock	0.46
		Low strength	0.22	Cutbanks cave	0.10	Slope	0.04
		Slope	0.04	Slope	0.04		
Brandenburg---------	39	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.96	Slope	0.96	Droughty	1.00
		Content of large stones	0.09	Cutbanks cave	0.10	Slope	0.96
				Content of large stones	0.09	Gravel content	0.59

Building Site Development - Part II--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
15B:							
Daglum	50	Very limited		Somewhat limited		Very limited	
		Low strength	1.00	Too clayey	0.50	Sodium content	1.00
		Shrink-swell	1.00	Depth to saturated zone	0.47		
		Frost action	0.50	Cutbanks cave	0.10		
Rhoades	25	Very limited		Somewhat limited		Very limited	
		Shrink-swell	1.00	Depth to saturated zone	0.47	Sodium content	1.00
		Low strength	1.00	Cutbanks cave	0.10		
				Too clayey	0.02		
17:							
Amor	58	Somewhat limited		Somewhat limited		Somewhat limited	
		Frost action	0.50	Depth to soft bedrock	0.46	Depth to bedrock	0.46
		Low strength	0.22	Cutbanks cave	0.10		
Arnegard	10	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Cutbanks cave	0.10		
		Frost action	0.50				
17B:							
Amor	67	Somewhat limited		Somewhat limited		Somewhat limited	
		Frost action	0.50	Depth to soft bedrock	0.46	Depth to bedrock	0.46
		Low strength	0.22	Cutbanks cave	0.10		
Shambo	15	Somewhat limited		Somewhat limited		Not limited	
		Frost action	0.50	Cutbanks cave	0.10		
17C:							
Amor	39	Somewhat limited		Somewhat limited		Somewhat limited	
		Frost action	0.50	Depth to soft bedrock	0.46	Depth to bedrock	0.46
		Low strength	0.22	Cutbanks cave	0.10		
Cabba	29	Somewhat limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to bedrock	1.00
		Low strength	0.78	Cutbanks cave	0.10	Droughty	0.88
		Frost action	0.50				
17D:							
Amor	42	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Slope	0.63
		Frost action	0.50	Depth to soft bedrock	0.46	Depth to bedrock	0.46
		Low strength	0.22	Cutbanks cave	0.10		
Cabba	29	Somewhat limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to bedrock	1.00
		Low strength	0.78	Slope	0.63	Droughty	0.88
		Slope	0.63	Cutbanks cave	0.10	Slope	0.63
		Frost action	0.50				

Building Site Development - Part II--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
18E:							
Manning	24	Somewhat limited		Very limited		Somewhat limited	
		Slope	0.16	Cutbanks cave	1.00	Slope	0.16
				Slope	0.16		
Schaller	22	Very limited		Very limited		Very limited	
		Slope	1.00	Cutbanks cave	1.00	Slope	1.00
				Slope	1.00	Droughty	0.98
Wabek	22	Very limited		Very limited		Very limited	
		Slope	1.00	Cutbanks cave	1.00	Droughty	1.00
				Slope	1.00	Slope	1.00
19:							
Sen	56	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Depth to soft bedrock	0.46	Depth to bedrock	0.46
		Frost action	0.50	Cutbanks cave	0.10		
Golva	11	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Cutbanks cave	0.10		
		Shrink-swell	0.50				
		Frost action	0.50				
19B:							
Chama	43	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Depth to soft bedrock	0.46	Depth to bedrock	0.46
		Frost action	0.50	Cutbanks cave	0.10		
Sen	25	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Depth to soft bedrock	0.46	Depth to bedrock	0.46
		Frost action	0.50	Cutbanks cave	0.10		
Cabba	14	Somewhat limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to bedrock	1.00
						Droughty	0.88
		Low strength	0.78	Cutbanks cave	0.10		
		Frost action	0.50				
19C:							
Chama	40	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Depth to soft bedrock	0.46	Depth to bedrock	0.46
		Frost action	0.50	Cutbanks cave	0.10		
Cabba	28	Somewhat limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to bedrock	1.00
						Droughty	0.88
		Low strength	0.78	Cutbanks cave	0.10		
		Frost action	0.50				
Sen	17	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Depth to soft bedrock	0.46	Depth to bedrock	0.46
		Frost action	0.50	Cutbanks cave	0.10		

Building Site Development - Part II--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
19D:							
Cabba	38	Somewhat limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to bedrock	1.00
						Droughty	0.88
		Low strength	0.78	Slope	0.63	Slope	0.63
		Slope	0.63	Cutbanks cave	0.10		
		Frost action	0.50				
Chama	26	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Slope	0.63	Slope	0.63
		Slope	0.63	Depth to soft bedrock	0.46	Depth to bedrock	0.46
		Frost action	0.50				
				Cutbanks cave	0.10		
Sen	16	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Slope	0.63	Slope	0.63
		Slope	0.63	Depth to soft bedrock	0.46	Depth to bedrock	0.46
		Frost action	0.50				
				Cutbanks cave	0.10		
21B:							
Parshall	67	Somewhat limited		Very limited		Not limited	
		Frost action	0.50	Cutbanks cave	1.00		
22B:							
Regent	71	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Too clayey	0.50	Depth to bedrock	0.46
		Shrink-swell	1.00	Depth to soft bedrock	0.46		
				Cutbanks cave	0.10		
Savage	15	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Too clayey	0.12		
		Shrink-swell	1.00	Cutbanks cave	0.10		
24B:							
Janesburg	51	Somewhat limited		Somewhat limited		Very limited	
		Low strength	1.00	Too clayey	0.50	Sodium content	1.00
		Shrink-swell	1.00	Depth to soft bedrock	0.46	Depth to bedrock	0.46
		Frost action	0.50				
				Cutbanks cave	0.10		
25B:							
Lefor	78	Somewhat limited		Somewhat limited		Somewhat limited	
		Frost action	0.50	Depth to soft bedrock	0.46	Depth to bedrock	0.46
				Cutbanks cave	0.10		
27F:							
Badland, outcrop	42	Not rated		Not rated		Not rated	
Lambert	34	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Flooding	0.60	Flooding	0.60
		Low strength	0.78	Slope	0.37	Slope	0.37
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
		Slope	0.37				

Building Site Development - Part II--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
27F:(cont.)							
Cabba	12	Very limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
		Low strength	0.78	Cutbanks cave	0.10	Droughty	0.88
		Frost action	0.50				
28F:							
Flasher	35	Very limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Droughty	1.00
				Cutbanks cave	0.10	Slope	1.00
Rock outcrop	22	Not rated		Not rated		Not rated	
Vebar	13	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Depth to soft bedrock	0.29	Depth to bedrock	0.29
				Cutbanks cave	0.10		
29F:							
Arikara	33	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Low strength	0.78	Cutbanks cave	0.10		
		Shrink-swell	0.50				
		Frost action	0.50				
Shambo	21	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		
Cabba	18	Very limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to bedrock	1.00
		Low strength	1.00	Slope	1.00	Slope	1.00
		Slope	1.00	Cutbanks cave	0.10	Droughty	0.88
		Shrink-swell	0.50				
		Frost action	0.50				
30F:							
Vebar, extremely stony	27	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Depth to soft bedrock	0.46	Depth to bedrock	0.46
				Cutbanks cave	0.10	Content of large stones	0.46
Amor, extremely stony	21	Somewhat limited		Somewhat limited		Somewhat limited	
		Frost action	0.50	Depth to soft bedrock	0.46	Depth to bedrock	0.46
		Slope	0.37	Slope	0.37	Content of large stones	0.46
		Low strength	0.22	Cutbanks cave	0.10	Slope	0.37

Building Site Development - Part II--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
31B:							
Sen	25	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Depth to soft bedrock	0.46	Depth to bedrock	0.46
		Frost action	0.50	Cutbanks cave	0.10		
Janesburg	34	Somewhat limited		Somewhat limited		Very limited	
		Frost action	0.50	Too clayey	0.50	Sodium content	1.00
				Depth to soft bedrock	0.46	Depth to bedrock	0.46
				Cutbanks cave	0.10		
31C:							
Sen	22	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Depth to soft bedrock	0.46	Depth to bedrock	0.46
		Frost action	0.50	Cutbanks cave	0.10		
Janesburg	21	Somewhat limited		Somewhat limited		Very limited	
		Frost action	0.50	Too clayey	0.50	Sodium content	1.00
				Depth to soft bedrock	0.46	Depth to bedrock	0.46
				Cutbanks cave	0.10		
35F:							
Flasher	32	Very limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to bedrock	1.00
						Droughty	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
				Cutbanks cave	0.10		
Vebar	22	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Depth to soft bedrock	0.46	Depth to bedrock	0.46
				Cutbanks cave	0.10		
Parshall	15	Somewhat limited		Very limited		Somewhat limited	
		Slope	0.63	Cutbanks cave	1.00	Slope	0.63
		Frost action	0.50	Slope	0.63		
36B:							
Ekalaka	32	Somewhat limited		Very limited		Very limited	
		Frost action	0.50	Cutbanks cave	1.00	Sodium content	1.00
Parshall	32	Somewhat limited		Very limited		Not limited	
		Frost action	0.50	Cutbanks cave	1.00		
Desart	15	Somewhat limited		Very limited		Very limited	
		Frost action	0.50	Cutbanks cave	1.00	Sodium content	1.00
37B:							
Farfeld	39	Somewhat limited		Somewhat limited		Very limited	
		Frost action	0.50	Dense layer	0.50	Depth to cemented pan	1.00
				Too clayey	0.12		
				Cutbanks cave	0.10	Sodium content	1.00
						Droughty	0.61

Building Site Development - Part II--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
37B:(cont.)							
Cedarpan----------	27	Very limited		Somewhat limited		Very limited	
		Low strength	1.00	Dense layer	0.50	Depth to cemented pan	1.00
		Shrink-swell	1.00	Too clayey	0.12		
		Frost action	0.50	Cutbanks cave	0.10	Sodium content	1.00
37F:							
Cedarpan----------	25	Very limited		Very limited		Very limited	
		Low strength	1.00	Slope	1.00	Depth to cemented pan	1.00
		Shrink-swell	1.00	Dense layer	0.50		
		Slope	1.00	Too clayey	0.12	Sodium content	1.00
		Frost action	0.50	Cutbanks cave	0.12	Slope	1.00
Slickspots, stony---	24	Not rated		Not rated		Not rated	
Farfeld----------	10	Somewhat limited		Somewhat limited		Very limited	
		Frost action	0.50	Dense layer	0.50	Depth to cemented pan	1.00
				Too clayey	0.12		
				Cutbanks cave	0.10	Sodium content	1.00
						Droughty	0.61
41C:							
Wayden----------	58	Very limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to bedrock	1.00
						Too clayey	1.00
		Low strength	1.00	Too clayey	1.00	Droughty	0.83
		Shrink-swell	1.00	Cutbanks cave	0.10		
Moreau----------	15	Very limited		Very limited		Very limited	
		Low strength	1.00	Too clayey	1.00	Too clayey	1.00
		Shrink-swell	1.00	Depth to soft bedrock	0.46	Depth to bedrock	0.46
				Cutbanks cave	0.10		
42B:							
Searing----------	60	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Cutbanks cave	0.10		
		Frost action	0.50				
Ringling----------	19	Not limited		Somewhat limited		Very limited	
				Cutbanks cave	0.10	Droughty	1.00
						Content of large stones	0.01
43:							
Belfield----------	49	Very limited		Somewhat limited		Very limited	
		Shrink-swell	1.00	Depth to saturated zone	0.47	Sodium content	1.00
		Low strength	1.00				
				Cutbanks cave	0.10		
Grail----------	26	Very limited		Somewhat limited		Not limited	
		Shrink-swell	1.00	Depth to saturated zone	0.47		
		Low strength	1.00				
		Frost action	0.50	Cutbanks cave	0.10		
44:							
Shambo----------	48	Somewhat limited		Somewhat limited		Not limited	
		Frost action	0.50	Cutbanks cave	0.10		

Building Site Development - Part II--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
44B:							
Shambo	59	Somewhat limited		Somewhat limited		Not limited	
		Frost action	0.50	Cutbanks cave	0.10		
47:							
Stady	41	Somewhat limited		Very limited		Not limited	
		Frost action	0.50	Cutbanks cave	1.00		
48B:							
Manning	66	Not limited		Very limited		Not limited	
				Cutbanks cave	1.00		
49B:							
Lihen	38	Not limited		Very limited		Not limited	
				Cutbanks cave	1.00		
Parshall	15	Somewhat limited		Very limited		Not limited	
		Frost action	0.50	Cutbanks cave	1.00		
51B:							
Janesburg	40	Somewhat limited		Somewhat limited		Very limited	
		Frost action	0.50	Too clayey	0.50	Sodium content	1.00
				Depth to soft bedrock	0.46	Depth to bedrock	0.46
				Cutbanks cave	0.10		
Dogtooth	29	Not limited		Somewhat limited		Very limited	
				Depth to soft bedrock	0.46	Sodium content	1.00
						Depth to bedrock	0.46
				Cutbanks cave	0.10		
52:							
Heil	84	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Sodium content	1.00
						Depth to saturated zone	1.00
		Low strength	1.00	Cutbanks cave	1.00		1.00
		Shrink-swell	1.00	Ponding	1.00	Ponding	1.00
		Ponding	1.00	Too clayey	0.50		
		Frost action	0.50				
53B:							
Savage	25	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Too clayey	0.12		
		Shrink-swell	1.00	Cutbanks cave	0.10		
Daglum	24	Very limited		Somewhat limited		Very limited	
		Low strength	1.00	Too clayey	0.50	Sodium content	1.00
		Shrink-swell	1.00	Depth to saturated zone	0.47		
		Frost action	0.50				
				Cutbanks cave	0.10		
54:							
Channel	40	Not rated		Not rated		Not rated	
Straw	40	Very limited		Somewhat limited		Very limited	
		Flooding	1.00	Flooding	0.80	Flooding	1.00
		Frost action	0.50	Depth to saturated zone	0.47		
				Cutbanks cave	0.10		

Building Site Development - Part II--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
55:							
Pits, gravel and sand	85	Not rated		Not rated		Not rated	
57:							
Straw	28	Somewhat limited		Somewhat limited		Not limited	
		Frost action	0.50	Cutbanks cave	0.10		
		Flooding	0.40				
Rhoades	21	Very limited		Somewhat limited		Very limited	
		Shrink-swell	1.00	Depth to saturated zone	0.47	Sodium content	1.00
		Low strength	1.00	Cutbanks cave	0.10		
				Too clayey	0.02		
Daglum	12	Very limited		Somewhat limited		Very limited	
		Low strength	1.00	Too clayey	0.50	Sodium content	1.00
		Shrink-swell	1.00	Depth to saturated zone	0.47		
		Frost action	0.50	Cutbanks cave	0.10		
58:							
Straw	67	Somewhat limited		Somewhat limited		Not limited	
		Frost action	0.50	Cutbanks cave	0.10		
		Flooding	0.40				
60:							
Korell	75	Somewhat limited		Somewhat limited		Not limited	
		Frost action	0.50	Cutbanks cave	0.10		
		Flooding	0.40				
62F:							
Dogtooth	23	Very limited		Very limited		Very limited	
		Low strength	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	1.00	Too clayey	0.50	Sodium content	1.00
		Slope	1.00	Depth to soft bedrock	0.46	Depth to bedrock	0.46
				Cutbanks cave	0.10		
Janesburg	23	Very limited		Very limited		Very limited	
		Low strength	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	1.00	Too clayey	0.50	Sodium content	1.00
		Slope	1.00	Depth to soft bedrock	0.46	Depth to bedrock	0.46
		Frost action	0.50	Cutbanks cave	0.10		
Brandenburg	18	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Droughty	1.00
		Content of large stones	0.09	Cutbanks cave	0.10	Slope	1.00
				Content of large stones	0.09	Gravel content	0.59
63F:							
Dogtooth	33	Very limited		Very limited		Very limited	
		Low strength	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	1.00	Too clayey	0.50	Sodium content	1.00
		Slope	1.00	Depth to soft bedrock	0.46	Depth to bedrock	0.46
				Cutbanks cave	0.10		

Building Site Development - Part II--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
63F:(cont.)							
Janesburg----------	22	Very limited		Very limited		Very limited	
		Low strength	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	1.00	Too clayey	0.50	Sodium content	1.00
		Slope	1.00	Depth to soft bedrock	0.46	Depth to bedrock	0.46
		Frost action	0.50	Cutbanks cave	0.10		
Cabba----------	20	Very limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
		Low strength	0.78	Cutbanks cave	0.10	Droughty	0.88
		Frost action	0.50				
65:							
Channel----------	40	Not rated		Not rated		Not rated	
Banks----------	29	Very limited		Very limited		Very limited	
		Flooding	1.00	Cutbanks cave	1.00	Flooding	1.00
				Flooding	0.80	Droughty	0.01
Trembles----------	18	Very limited		Very limited		Very limited	
		Flooding	1.00	Cutbanks cave	1.00	Flooding	1.00
		Frost action	0.50	Flooding	0.80		
66B:							
Stady----------	50	Somewhat limited		Very limited		Not limited	
		Frost action	0.50	Cutbanks cave	1.00		
67B:							
Evridge----------	28	Not limited		Very limited		Very limited	
				Cutbanks cave	1.00	Sodium content	1.00
				Depth to soft bedrock	0.46	Depth to bedrock	0.46
Desart----------	18	Somewhat limited		Very limited		Very limited	
		Frost action	0.50	Cutbanks cave	1.00	Sodium content	1.00
Telfer----------	13	Not limited		Very limited		Somewhat limited	
				Cutbanks cave	1.00	Droughty	0.06
68F:							
Cabbart----------	41	Very limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
		Low strength	1.00	Cutbanks cave	0.10	Droughty	0.80
		Shrink-swell	0.50				
		Frost action	0.50				
Badland, outcrop----	27	Not rated		Not rated		Not rated	
69F:							
Patent----------	33	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Flooding	0.60	Flooding	0.60
		Low strength	0.78	Slope	0.37	Slope	0.37
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
		Slope	0.37				

Building Site Development - Part II--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
69F:(cont.)							
Badland, outcrop----	21	Not rated		Not rated		Not rated	
Cabbart----------	21	Very limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
		Low strength	1.00	Cutbanks cave	0.10	Droughty	0.80
		Shrink-swell	0.50				
		Frost action	0.50				
70B:							
Maltese----------	39	Very limited		Somewhat limited		Very limited	
		Low strength	1.00	Too clayey	0.12	Sodium content	1.00
		Shrink-swell	1.00	Cutbanks cave	0.10		
		Frost action	0.50				
Gerda----------	30	Very limited		Somewhat limited		Very limited	
		Low strength	1.00	Too clayey	0.12	Sodium content	1.00
		Shrink-swell	1.00	Cutbanks cave	0.10		
71B:							
Chinook----------	42	Not limited		Somewhat limited		Not limited	
				Cutbanks cave	0.10		
Rhame----------	28	Somewhat limited		Somewhat limited		Somewhat limited	
		Frost action	0.50	Depth to soft bedrock	0.46	Depth to bedrock	0.46
				Cutbanks cave	0.10		
71D:							
Rhame----------	42	Somewhat limited		Somewhat limited		Somewhat limited	
		Frost action	0.50	Depth to soft bedrock	0.46	Depth to bedrock	0.46
		Slope	0.37			Slope	0.37
				Slope	0.37		
				Cutbanks cave	0.10		
Chinook----------	32	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.37	Slope	0.37	Slope	0.37
				Cutbanks cave	0.10		
72F:							
Rhame----------	29	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Depth to soft bedrock	0.46	Depth to bedrock	0.46
				Cutbanks cave	0.10		
Fleak----------	27	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00	Depth to bedrock	1.00
		Depth to soft bedrock	1.00	Slope	1.00	Slope	1.00
				Cutbanks cave	0.10	Droughty	1.00
73D:							
Gerda----------	16	Very limited		Somewhat limited		Very limited	
		Shrink-swell	1.00	Too clayey	0.12	Sodium content	1.00
				Cutbanks cave	0.10		

Building Site Development - Part II--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73D:(cont.)							
Kirby	23	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.37	Slope	0.37	Droughty	1.00
		Content of large stones	0.03	Cutbanks cave	0.10	Gravel content	0.76
				Content of large stones	0.03	Slope	0.37
						Content of large stones	0.03
74:							
Channel	40	Not rated		Not rated		Not rated	
Glendive	35	Somewhat limited		Very limited		Not limited	
		Frost action	0.50	Cutbanks cave	1.00		
		Flooding	0.40				
Havre	18	Somewhat limited		Somewhat limited		Not limited	
		Frost action	0.50	Cutbanks cave	0.10		
		Flooding	0.40				
75:							
Havre	77	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Flooding	0.60	Flooding	0.60
		Frost action	0.50	Cutbanks cave	0.10		
76B:							
Lonna	87	Very limited		Somewhat limited		Very limited	
		Low strength	1.00	Cutbanks cave	0.10	Sodium content	1.00
		Shrink-swell	0.50				
		Frost action	0.50				
76C:							
Lonna	64	Very limited		Somewhat limited		Very limited	
		Low strength	1.00	Cutbanks cave	0.10	Sodium content	1.00
		Shrink-swell	0.50				
		Frost action	0.50				
77:							
Glendive	70	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Cutbanks cave	1.00	Flooding	0.60
		Frost action	0.50	Flooding	0.60		
78B:							
Hanly	81	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Cutbanks cave	1.00	Flooding	0.60
				Flooding	0.60		
79C:							
Zeona	76	Not limited		Very limited		Somewhat limited	
				Cutbanks cave	1.00	Droughty	0.26
80:							
Ethridge	64	Very limited		Somewhat limited		Not limited	
		Shrink-swell	1.00	Cutbanks cave	0.10		
81B:							
Vebar	46	Somewhat limited		Somewhat limited		Somewhat limited	
		Frost action	0.50	Depth to soft bedrock	0.46	Depth to bedrock	0.46
				Cutbanks cave	0.10		

Building Site Development - Part II--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
81B:(cont.)							
Parshall----------	19	Somewhat limited		Very limited		Not limited	
		Frost action	0.50	Cutbanks cave	1.00		
81C:							
Vebar----------	34	Somewhat limited		Somewhat limited		Somewhat limited	
		Frost action	0.50	Depth to soft bedrock	0.46	Depth to bedrock	0.46
				Cutbanks cave	0.10		
Tally----------	32	Somewhat limited		Somewhat limited		Not limited	
		Frost action	0.50	Cutbanks cave	0.10		
81D:							
Vebar----------	32	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Slope	0.63
		Frost action	0.50	Depth to soft bedrock	0.46	Depth to bedrock	0.46
				Cutbanks cave	0.10		
Flasher----------	16	Somewhat limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to bedrock	1.00
						Droughty	1.00
		Slope	0.63	Slope	0.63	Slope	0.63
				Cutbanks cave	0.10		
Tally----------	15	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Slope	0.63
		Frost action	0.50	Cutbanks cave	0.10		
82E:							
Badland, outcrop----	54	Not rated		Not rated		Not rated	
Patent----------	25	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Flooding	0.60	Flooding	0.60
		Low strength	0.78	Slope	0.37	Slope	0.37
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
		Slope	0.37				
83:							
Badland----------	88	Not rated		Not rated		Not rated	
85F:							
Lonna----------	34	Very limited		Somewhat limited		Very limited	
		Low strength	1.00	Slope	0.37	Sodium content	1.00
		Shrink-swell	0.50	Cutbanks cave	0.10	Slope	0.37
		Frost action	0.50				
		Slope	0.37				
Cabbart----------	33	Very limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to bedrock	1.00
						Slope	1.00
		Slope	1.00	Slope	1.00	Droughty	0.80
		Low strength	1.00	Cutbanks cave	0.10		
		Shrink-swell	0.50				
		Frost action	0.50				

Building Site Development - Part II--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
86F:							
Kirby----------	39	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Droughty	1.00
		Content of large stones	0.03	Cutbanks cave	0.10	Slope	1.00
				Content of large stones	0.03	Gravel content	0.76
						Content of large stones	0.03
Badland, outcrop----	23	Not rated		Not rated		Not rated	
Patent----------	13	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Flooding	1.00	Flooding	0.60	Flooding	0.60
		Low strength	0.78	Cutbanks cave	0.10		
		Shrink-swell	0.50				
		Frost action	0.50				
88:							
Littlemo----------	58	Somewhat limited		Very limited		Not limited	
		Frost action	0.50	Cutbanks cave	1.00		
Chanta----------	20	Very limited		Very limited		Not limited	
		Low strength	1.00	Cutbanks cave	1.00		
		Shrink-swell	0.50				
		Frost action	0.50				
89B:							
Patent----------	80	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Flooding	0.60	Flooding	0.60
		Low strength	0.78	Cutbanks cave	0.10		
		Shrink-swell	0.50				
		Frost action	0.50				
91F:							
Lonna----------	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Low strength	1.00	Cutbanks cave	0.10	Sodium content	1.00
		Shrink-swell	0.50				
		Frost action	0.50				
Kirby----------	34	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Droughty	1.00
		Content of large stones	0.03	Cutbanks cave	0.10	Slope	1.00
				Content of large stones	0.03	Gravel content	0.76
						Content of large stones	0.03
Cabbart----------	16	Very limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to bedrock	1.00
						Slope	1.00
		Slope	1.00	Slope	1.00	Droughty	0.80
		Low strength	1.00	Cutbanks cave	0.10		
		Shrink-swell	0.50				
		Frost action	0.50				
92B:							
Kremlin----------	26	Somewhat limited		Somewhat limited		Not limited	
		Low strength	0.78	Cutbanks cave	0.10		
		Shrink-swell	0.50				
		Frost action	0.50				

Building Site Development - Part II--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
92B:(cont.)							
Ethridge----------	22	Very limited		Somewhat limited		Not limited	
		Shrink-swell	1.00	Cutbanks cave	0.10		
Gerda----------	19	Very limited		Somewhat limited		Very limited	
		Shrink-swell	1.00	Too clayey	0.12	Sodium content	1.00
				Cutbanks cave	0.10		
94F:							
Kirby----------	42	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Content of large stones	0.03	Cutbanks cave	0.10	Droughty	1.00
				Content of large stones	0.03	Gravel content	0.76
						Content of large stones	0.03
Arikara----------	27	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Low strength	0.78	Cutbanks cave	0.10		
		Shrink-swell	0.50				
		Frost action	0.50				
Badland, outcrop----	16	Not rated		Not rated		Not rated	
95F:							
Tinsley----------	53	Very limited		Very limited		Very limited	
		Slope	1.00	Cutbanks cave	1.00	Droughty	1.00
				Slope	1.00	Slope	1.00
						Gravel content	0.04
						Content of large stones	0.01
Chanta----------	17	Very limited		Very limited		Somewhat limited	
		Low strength	1.00	Cutbanks cave	1.00	Slope	0.37
		Shrink-swell	0.50	Slope	0.37		
		Frost action	0.50				
		Slope	0.37				
97:							
Kremlin----------	77	Somewhat limited		Somewhat limited		Not limited	
		Low strength	0.78	Cutbanks cave	0.10		
		Shrink-swell	0.50				
		Frost action	0.50				
98:							
Wolf Point----------	85	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Flooding	0.60	Flooding	0.60
		Low strength	1.00	Too clayey	0.12		
		Shrink-swell	1.00	Cutbanks cave	0.10		
99F:							
Badland, outcrop----	63	Not rated		Not rated		Not rated	
Cabbart----------	30	Very limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to bedrock	1.00
						Slope	1.00
		Slope	1.00	Slope	1.00	Droughty	0.80
		Low strength	1.00	Cutbanks cave	0.10		
		Shrink-swell	0.50				
		Frost action	0.50				

Building Site Development - Part II--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
100C:							
Patent----------	32	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Flooding	0.60	Flooding	0.60
		Low strength	0.78	Cutbanks cave	0.10		
		Shrink-swell	0.50				
		Frost action	0.50				
Gullied land--------	19	Not rated		Not rated		Not rated	
Glendive----------	13	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Cutbanks cave	1.00	Flooding	0.60
		Frost action	0.50	Flooding	0.60		
101F:							
Boxwell----------	34	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Depth to soft bedrock	0.46	Depth to bedrock	0.46
				Cutbanks cave	0.10		
Cabbart----------	32	Very limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to bedrock	1.00
						Slope	1.00
		Slope	1.00	Slope	1.00	Droughty	0.80
		Low strength	1.00	Cutbanks cave	0.10		
		Shrink-swell	0.50				
		Frost action	0.50				
Arikara----------	16	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Low strength	0.78	Cutbanks cave	0.10		
		Shrink-swell	0.50				
		Frost action	0.50				
102B:							
Boxwell----------	46	Somewhat limited		Somewhat limited		Somewhat limited	
		Frost action	0.50	Depth to soft bedrock	0.46	Depth to bedrock	0.46
				Cutbanks cave	0.10		
Kremlin----------	43	Somewhat limited		Somewhat limited		Not limited	
		Low strength	0.78	Cutbanks cave	0.10		
		Shrink-swell	0.50				
		Frost action	0.50				
102D:							
Boxwell----------	38	Somewhat limited		Somewhat limited		Somewhat limited	
		Frost action	0.50	Depth to soft bedrock	0.46	Depth to bedrock	0.46
		Slope	0.37			Slope	0.37
				Slope	0.37		
				Cutbanks cave	0.10		
Kremlin----------	28	Somewhat limited		Somewhat limited		Somewhat limited	
		Low strength	0.78	Slope	0.37	Slope	0.37
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
		Slope	0.37				

Building Site Development - Part II--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
103F:							
Badland, outcrop----	30	Not rated		Not rated		Not rated	
Arikara----------	28	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Low strength	0.78	Cutbanks cave	0.10		
		Shrink-swell	0.50				
		Frost action	0.50				
Cabbart----------	16	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00	Depth to bedrock	1.00
		Depth to soft bedrock	1.00	Slope	1.00	Slope	1.00
		Low strength	1.00	Cutbanks cave	0.10	Droughty	0.80
		Shrink-swell	0.50				
		Frost action	0.50				
105:							
Harriet----------	80	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Sodium content	1.00
		Frost action	1.00	Flooding	0.60	Depth to saturated zone	1.00
		Flooding	1.00	Cutbanks cave	0.10	Flooding	0.60
106:							
Riverwash----------	85	Not rated		Not rated		Not rated	
107D:							
Rhame----------	23	Somewhat limited		Somewhat limited		Somewhat limited	
		Frost action	0.50	Depth to soft bedrock	0.46	Depth to bedrock	0.46
		Slope	0.04	Cutbanks cave	0.10	Slope	0.04
				Slope	0.04		
Kremlin----------	16	Somewhat limited		Somewhat limited		Not limited	
		Low strength	0.78	Cutbanks cave	0.10		
		Shrink-swell	0.50				
		Frost action	0.50				
Maltese----------	15	Very limited		Somewhat limited		Very limited	
		Shrink-swell	1.00	Too clayey	0.12	Sodium content	1.00
		Frost action	0.50	Cutbanks cave	0.10		
108D:							
Boxwell----------	27	Somewhat limited		Somewhat limited		Somewhat limited	
		Frost action	0.50	Depth to soft bedrock	0.46	Depth to bedrock	0.46
		Slope	0.37	Slope	0.37	Slope	0.37
				Cutbanks cave	0.10		
Scairt----------	18	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.37	Too clayey	0.50	Sodium content	1.00
				Depth to soft bedrock	0.46	Depth to bedrock	0.46
				Slope	0.37	Slope	0.37
				Cutbanks cave	0.10		

Building Site Development - Part II--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
108D:(cont.)							
Maltese----------	14	Very limited		Somewhat limited		Very limited	
		Shrink-swell	1.00	Slope	0.37	Sodium content	1.00
		Frost action	0.50	Too clayey	0.12	Slope	0.37
		Slope	0.37	Cutbanks cave	0.10		
109F:							
Rhame----------	24	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Depth to soft bedrock	0.46	Depth to bedrock	0.46
				Cutbanks cave	0.10		
Arikara----------	23	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Low strength	0.78	Cutbanks cave	0.10		
		Shrink-swell	0.50				
		Frost action	0.50				
Fleak----------	16	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00	Depth to bedrock	1.00
		Depth to soft bedrock	1.00	Slope	1.00	Slope	1.00
				Cutbanks cave	0.10	Droughty	1.00
110C:							
Patent----------	38	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Flooding	0.60	Flooding	0.60
		Low strength	0.78	Cutbanks cave	0.10		
		Shrink-swell	0.50				
		Frost action	0.50				
Gerda----------	27	Very limited		Somewhat limited		Very limited	
		Shrink-swell	1.00	Too clayey	0.12	Sodium content	1.00
				Cutbanks cave	0.10		
Slickspots----------	10	Not rated		Not rated		Not rated	
111F:							
Lonna----------	37	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Low strength	1.00	Cutbanks cave	0.10	Sodium content	1.00
		Shrink-swell	0.50				
		Frost action	0.50				
Arikara----------	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Low strength	0.78	Cutbanks cave	0.10		
		Shrink-swell	0.50				
		Frost action	0.50				
Cabbart----------	18	Very limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
		Low strength	1.00	Cutbanks cave	0.10	Droughty	0.80
		Shrink-swell	0.50				
		Frost action	0.50				

Building Site Development - Part II--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
112:							
Wolf Point, wooded--	78	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Flooding	0.60	Flooding	0.60
		Low strength	1.00	Depth to saturated zone	0.15		
		Shrink-swell	1.00	Too clayey	0.12		
				Cutbanks cave	0.10		
113:							
Havre, wooded-------	80	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Flooding	0.60	Flooding	0.60
		Frost action	0.50	Depth to saturated zone	0.15		
				Cutbanks cave	0.10		
114B:							
Haplustolls---------	51	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Cutbanks cave	0.10	Gravel content	0.30
		Frost action	0.50				
Ustorthents---------	45	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Cutbanks cave	0.10		
		Frost action	0.50				
115B:							
Cozberg----------	39	Somewhat limited		Very limited		Not limited	
		Frost action	0.50	Cutbanks cave	1.00		
Chanta----------	35	Very limited		Very limited		Not limited	
		Low strength	1.00	Cutbanks cave	1.00		
		Shrink-swell	0.50				
		Frost action	0.50				
116F:							
Kremlin----------	21	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Low strength	0.78	Cutbanks cave	0.10		
		Shrink-swell	0.50				
		Frost action	0.50				
Shibah----------	20	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Dense layer	0.50	Droughty	0.43
				Cutbanks cave	0.10	Content of large stones	0.20
117B:							
Kremlin----------	43	Somewhat limited		Somewhat limited		Not limited	
		Low strength	0.78	Cutbanks cave	0.10		
		Shrink-swell	0.50				
		Frost action	0.50				
Chanta----------	42	Very limited		Very limited		Not limited	
		Low strength	1.00	Cutbanks cave	1.00		
		Shrink-swell	0.50				
		Frost action	0.50				

Building Site Development - Part II--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
118F:							
Shibah----------	39	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Dense layer	0.50	Droughty	0.43
				Cutbanks cave	0.10	Content of large stones	0.20
Rubbleland----------	29	Not rated		Not rated		Not rated	
Arikara----------	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Low strength	0.78	Cutbanks cave	0.10		
		Shrink-swell	0.50				
		Frost action	0.50				
119:							
Glendive, wooded----	74	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Cutbanks cave	1.00	Flooding	0.60
		Frost action	0.50	Flooding	0.60		
				Depth to saturated zone	0.15		
120B:							
Hanly, wooded-------	61	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Cutbanks cave	1.00	Flooding	0.60
				Flooding	0.60		
				Depth to saturated zone	0.15		
121F:							
Maltese----------	25	Very limited		Somewhat limited		Very limited	
		Shrink-swell	1.00	Too clayey	0.12	Sodium content	1.00
		Frost action	0.50	Cutbanks cave	0.10	Slope	0.04
		Slope	0.04	Slope	0.04		
Lonna----------	24	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Low strength	1.00	Cutbanks cave	0.10	Sodium content	1.00
		Shrink-swell	0.50				
		Frost action	0.50				
Arikara----------	22	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Low strength	0.78	Cutbanks cave	0.10		
		Shrink-swell	0.50				
		Frost action	0.50				
122C:							
Bulltop----------	59	Not limited		Very limited		Not limited	
				Cutbanks cave	1.00		
				Dense layer	0.50		
Shibah----------	25	Not limited		Somewhat limited		Somewhat limited	
				Dense layer	0.50	Droughty	0.43
				Cutbanks cave	0.10	Content of large stones	0.20

Building Site Development - Part II--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
123E:							
Scairt	31	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.37	Too clayey	0.50	Sodium content	1.00
				Depth to soft bedrock	0.46	Depth to bedrock	0.46
				Slope	0.37	Slope	0.37
				Cutbanks cave	0.10		
Maltese	22	Very limited		Somewhat limited		Very limited	
		Shrink-swell	1.00	Slope	0.96	Sodium content	1.00
		Slope	0.96	Too clayey	0.12	Slope	0.96
		Frost action	0.50	Cutbanks cave	0.10		
Boxwell	10	Somewhat limited		Somewhat limited		Somewhat limited	
		Frost action	0.50	Depth to soft bedrock	0.46	Depth to bedrock	0.46
		Slope	0.37	Slope	0.37	Slope	0.37
				Cutbanks cave	0.10		
152:							
Heil	94	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Sodium content	1.00
		Low strength	1.00	Cutbanks cave	1.00	Depth to saturated zone	1.00
		Shrink-swell	1.00	Ponding	1.00	Ponding	1.00
		Ponding	1.00	Too clayey	0.50		
		Frost action	0.50				
155:							
Dumps and pits, mine	90	Not rated		Not rated		Not rated	
159:							
Channel	40	Not rated		Not rated		Not rated	
Straw	28	Very limited		Somewhat limited		Very limited	
		Flooding	1.00	Flooding	0.80	Flooding	1.00
		Frost action	0.50	Depth to saturated zone	0.47		
				Cutbanks cave	0.10		
Daglum	18	Very limited		Somewhat limited		Very limited	
		Low strength	1.00	Depth to saturated zone	0.47	Sodium content	1.00
		Shrink-swell	1.00	Cutbanks cave	0.10		
		Frost action	0.50				
175:							
Havre, rarely flooded	89	Somewhat limited		Somewhat limited		Not limited	
		Frost action	0.50	Cutbanks cave	0.10		
		Flooding	0.40				
177:							
Glendive, rarely flooded	84	Somewhat limited		Very limited		Not limited	
		Frost action	0.50	Cutbanks cave	1.00		
		Flooding	0.40				

Building Site Development - Part II--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
183:							
Badland, high precipitation------	90	Not rated		Not rated		Not rated	
205:							
Harriet, low precipitation------	85	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Sodium content	1.00
		Frost action	1.00	Flooding	0.60	Depth to saturated zone	1.00
		Flooding	1.00	Cutbanks cave	0.10	Flooding	0.60
210C:							
Lambert----------	41	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Flooding	0.60	Flooding	0.60
		Low strength	0.78	Cutbanks cave	0.10		
		Shrink-swell	0.50				
		Frost action	0.50				
Slickspots----------	21	Not rated		Not rated		Not rated	
Rhoades----------	15	Very limited		Somewhat limited		Very limited	
		Shrink-swell	1.00	Depth to saturated zone	0.16	Sodium content	1.00
		Low strength	1.00	Cutbanks cave	0.10		
				Too clayey	0.02		
255:							
Pits, gravel and sand, low precipitation------	90	Not rated		Not rated		Not rated	
M-W:							
Miscellaneous water-	100	Not rated		Not rated		Not rated	
W:							
Water----------	100	Not rated		Not rated		Not rated	

Sanitary Facilities - Part I

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
3:					
Peta	68	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Restricted permeability	0.50	Seepage	1.00
5:					
Savage	61	Very limited		Not limited	
		Restricted permeability	1.00		
5B:					
Savage	67	Very limited		Somewhat limited	
		Restricted permeability	1.00	Slope	0.32
6:					
Regan	64	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Restricted permeability	0.72	Seepage	0.28
7:					
Arnegard	68	Somewhat limited		Somewhat limited	
		Restricted permeability	0.46	Seepage	0.53
9F:					
Cabba	45	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00
				Seepage	0.53
Sen	18	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00
				Seepage	0.53
Chama	15	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00
				Seepage	0.53

Sanitary Facilities - Part I--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
12B:					
Rhoades	55	Very limited		Somewhat limited	
		Restricted permeability	1.00	Depth to saturated zone	0.40
		Depth to saturated zone	0.94	Seepage	0.19
Daglum	33	Very limited		Somewhat limited	
		Restricted permeability	1.00	Depth to saturated zone	0.40
		Depth to saturated zone	0.94	Seepage	0.28
13B:					
Dogtooth	59	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Restricted permeability	1.00	Slope	0.08
Janesburg	27	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Restricted permeability	1.00	Seepage	0.22
				Slope	0.08
13D:					
Dogtooth	37	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Restricted permeability	1.00	Slope	1.00
		Slope	0.37		
Janesburg	37	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Restricted permeability	1.00	Slope	1.00
		Slope	0.37	Seepage	0.22
14E:					
Amor	20	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	0.04	Slope	1.00
				Seepage	0.53
Brandenburg	39	Very limited		Very limited	
		Filtering capacity	1.00	Content of large stones	1.00
		Slope	0.96	Seepage	1.00
		Content of large stones	0.09	Slope	1.00

Sanitary Facilities - Part I--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
15B:					
Daglum	50	Very limited		Somewhat limited	
		Restricted permeability	1.00	Depth to saturated zone	0.40
		Depth to saturated zone	0.94	Seepage	0.28
Rhoades	25	Very limited		Somewhat limited	
		Restricted permeability	1.00	Depth to saturated zone	0.40
		Depth to saturated zone	0.94	Seepage	0.19
17:					
Amor	58	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
				Seepage	0.53
Arnegard	10	Somewhat limited		Somewhat limited	
		Restricted permeability	0.46	Seepage	0.53
17B:					
Amor	67	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
				Slope	0.68
				Seepage	0.53
Shambo	15	Somewhat limited		Somewhat limited	
		Restricted permeability	0.46	Slope	0.68
				Seepage	0.53
17C:					
Amor	39	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
				Slope	1.00
				Seepage	0.53
Cabba	29	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
				Slope	1.00
				Seepage	0.53
17D:					
Amor	42	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	0.63	Slope	1.00
				Seepage	0.53
Cabba	29	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	0.63	Slope	1.00
				Seepage	0.53

Sanitary Facilities - Part I--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
18E:					
Manning	24	Very limited		Very limited	
		Filtering capacity	1.00	Seepage	1.00
				Slope	1.00
		Slope	0.16		
Schaller	22	Very limited		Very limited	
		Filtering capacity	1.00	Seepage	1.00
				Slope	1.00
		Slope	1.00		
Wabek	22	Very limited		Very limited	
		Filtering capacity	1.00	Slope	1.00
				Seepage	1.00
		Slope	1.00		
19:					
Sen	56	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
				Seepage	0.53
Golva	11	Somewhat limited		Somewhat limited	
		Restricted permeability	0.46	Seepage	0.53
19B:					
Chama	43	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
				Slope	0.68
				Seepage	0.53
Sen	25	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
				Slope	0.68
				Seepage	0.53
Cabba	14	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
				Slope	0.68
				Seepage	0.53
19C:					
Chama	40	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
				Slope	1.00
				Seepage	0.53
Cabba	28	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
				Slope	1.00
				Seepage	0.53

Sanitary Facilities - Part I--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
19C:(cont.)					
Sen	17	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
				Slope	1.00
				Seepage	0.53
19D:					
Cabba	38	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	0.63		
				Slope	1.00
				Seepage	0.53
Chama	26	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	0.63		
				Slope	1.00
				Seepage	0.53
Sen	16	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	0.63		
				Slope	1.00
				Seepage	0.53
21B:					
Parshall	67	Very limited		Very limited	
		Filtering capacity	1.00	Seepage	1.00
				Slope	0.08
22B:					
Regent	71	Very limited		Very limited	
		Restricted permeability	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	0.68
Savage	15	Very limited		Somewhat limited	
		Restricted permeability	1.00	Slope	0.32
24B:					
Janesburg	51	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Restricted permeability	1.00	Seepage	0.22
				Slope	0.08
25B:					
Lefor	78	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Restricted permeability	0.46	Seepage	1.00
				Slope	0.08

Sanitary Facilities - Part I--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
27F:					
Badland, outcrop----	42	Not rated		Not rated	
Lambert----------	34	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Restricted permeability	0.46	Slope	1.00
		Slope	0.37	Seepage	0.53
Cabba----------	12	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00
				Seepage	0.53
28F:					
Flasher----------	35	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00
				Seepage	0.18
Rock outcrop--------	22	Not rated		Not rated	
Vebar----------	13	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00
				Seepage	1.00
29F:					
Arikara----------	33	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Restricted permeability	0.46	Content of organic matter	1.00
				Seepage	0.53
Shambo----------	21	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Restricted permeability	0.46	Seepage	0.53
Cabba----------	18	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00
				Seepage	0.53
30F:					
Vebar, extremely stony----------	27	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00
				Seepage	1.00

Sanitary Facilities - Part I--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
30F:(cont.)					
Amor, extremely stony	21	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	0.37	Slope	1.00
				Seepage	0.53
31B:					
Sen	25	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
				Seepage	0.53
				Slope	0.08
Janesburg	34	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Restricted permeability	1.00	Seepage	0.22
				Slope	0.08
31C:					
Sen	22	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
				Slope	1.00
				Seepage	0.53
Janesburg	21	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Restricted permeability	1.00	Slope	1.00
				Seepage	0.22
35F:					
Flasher	32	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00
				Seepage	0.18
Vebar	22	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00
				Seepage	1.00
Parshall	15	Very limited		Very limited	
		Filtering capacity	1.00	Slope	1.00
		Slope	0.63	Seepage	1.00
36B:					
Ekalaka	32	Not limited		Very limited	
				Seepage	1.00
				Slope	0.08
Parshall	32	Very limited		Very limited	
		Filtering capacity	1.00	Seepage	1.00
				Slope	0.08

Sanitary Facilities - Part I--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
36B:(cont.)					
Desart	15	Very limited		Very limited	
		Restricted permeability	1.00	Seepage	1.00
				Slope	0.08
37B:					
Farfeld	39	Very limited		Very limited	
		Depth to cemented pan	1.00	Depth to cemented pan	1.00
				Seepage	0.53
				Slope	0.08
Cedarpan	27	Very limited		Very limited	
		Restricted permeability	1.00	Depth to cemented pan	1.00
		Depth to cemented pan	1.00	Slope	0.08
37F:					
Cedarpam	25	Very limited		Very limited	
		Restricted permeability	1.00	Depth to cemented pan	1.00
		Depth to cemented pan	1.00	Slope	1.00
		Slope	1.00		
Slickspots, stony	24	Not rated		Not rated	
Farfeld	10	Very limited		Very limited	
		Depth to cemented pan	1.00	Depth to cemented pan	1.00
				Slope	0.68
				Seepage	0.53
41C:					
Wayden	58	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
				Slope	0.92
Moreau	15	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
				Slope	0.92
42B:					
Searing	60	Not limited		Very limited	
				Seepage	1.00
				Slope	0.08
Ringling	19	Not limited		Very limited	
				Seepage	1.00
				Content of large stones	0.55
				Slope	0.32

Sanitary Facilities - Part I--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
43:					
Belfield----------	49	Very limited		Somewhat limited	
		Restricted permeability	1.00	Depth to saturated zone	0.40
		Depth to saturated zone	0.94		
Grail----------	26	Very limited		Somewhat limited	
		Restricted permeability	1.00	Depth to saturated zone	0.40
		Depth to saturated zone	0.94		
44:					
Shambo----------	48	Somewhat limited		Somewhat limited	
		Restricted permeability	0.46	Seepage	0.53
44B:					
Shambo----------	59	Somewhat limited		Somewhat limited	
		Restricted permeability	0.46	Seepage	0.53
				Slope	0.32
47:					
Stady----------	41	Very limited		Very limited	
		Filtering capacity	1.00	Seepage	1.00
		Restricted permeability	0.46		
48B:					
Manning----------	66	Very limited		Very limited	
		Filtering capacity	1.00	Seepage	1.00
				Slope	0.08
49B:					
Lihen----------	38	Very limited		Very limited	
		Filtering capacity	1.00	Seepage	1.00
				Slope	0.08
Parshall----------	15	Very limited		Very limited	
		Filtering capacity	1.00	Seepage	1.00
				Slope	0.08
51B:					
Janesburg----------	40	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Restricted permeability	1.00	Seepage	0.22
				Slope	0.08
Dogtooth----------	29	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Restricted permeability	1.00	Slope	0.08

Sanitary Facilities - Part I--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
52:					
Heil	84	Very limited		Very limited	
		Restricted permeability	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Ponding	1.00
		Ponding	1.00	Seepage	0.18
53B:					
Savage	25	Very limited		Somewhat limited	
		Restricted permeability	1.00	Slope	0.08
Daglum	24	Very limited		Somewhat limited	
		Restricted permeability	1.00	Depth to saturated zone	0.40
		Depth to saturated zone	0.94	Seepage	0.28
54:					
Channel	40	Not rated		Not rated	
Straw	40	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	0.94	Seepage	0.53
		Restricted permeability	0.50	Depth to saturated zone	0.40
55:					
Pits, gravel and sand	85	Not rated		Not rated	
57:					
Straw	28	Somewhat limited		Somewhat limited	
		Restricted permeability	0.50	Seepage	0.53
		Flooding	0.40	Flooding	0.40
Rhoades	21	Very limited		Somewhat limited	
		Restricted permeability	1.00	Depth to saturated zone	0.40
		Depth to saturated zone	0.94	Seepage	0.19
Daglum	12	Very limited		Somewhat limited	
		Restricted permeability	1.00	Depth to saturated zone	0.40
		Depth to saturated zone	0.94	Seepage	0.28
58:					
Straw	67	Somewhat limited		Somewhat limited	
		Restricted permeability	0.50	Seepage	0.53
		Flooding	0.40	Flooding	0.40

Sanitary Facilities - Part I--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
60:					
Korell	75	Somewhat limited		Somewhat limited	
		Restricted permeability	0.46	Seepage	0.53
		Flooding	0.40	Flooding	0.40
62F:					
Dogtooth	23	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Restricted permeability	1.00	Slope	1.00
		Slope	1.00		
Janesburg	23	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Restricted permeability	1.00	Slope	1.00
		Slope	1.00	Seepage	0.22
Brandenburg	18	Very limited		Very limited	
		Filtering capacity	1.00	Slope	1.00
		Slope	1.00	Content of large stones	1.00
		Content of large stones	0.09	Seepage	1.00
63F:					
Dogtooth	33	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Restricted permeability	1.00	Slope	1.00
		Slope	1.00		
Janesburg	22	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Restricted permeability	1.00	Slope	1.00
		Slope	1.00	Seepage	0.22
Cabba	20	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00
				Seepage	0.53
65:					
Channel	40	Not rated		Not rated	
Banks	29	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Filtering capacity	1.00	Seepage	1.00
Trembles	18	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Filtering capacity	1.00	Seepage	1.00

Sanitary Facilities - Part I--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
66B:					
Stady	50	Very limited		Very limited	
		Filtering capacity	1.00	Seepage	1.00
		Restricted permeability	0.46	Slope	0.68
67B:					
Evridge	28	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Restricted permeability	0.82	Seepage	1.00
				Slope	0.08
Desart	18	Very limited		Very limited	
		Restricted permeability	1.00	Seepage	1.00
				Slope	0.08
Telfer	13	Very limited		Very limited	
		Filtering capacity	1.00	Seepage	1.00
				Slope	0.08
68F:					
Cabbart	41	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00
				Seepage	0.53
Badland, outcrop	27	Not rated		Not rated	
69F:					
Patent	33	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Restricted permeability	0.46	Slope	1.00
		Slope	0.37	Seepage	0.53
Badland, outcrop	21	Not rated		Not rated	
Cabbart	21	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00
				Seepage	0.53
70B:					
Maltese	39	Very limited		Very limited	
		Restricted permeability	1.00	Seepage	1.00
				Slope	0.08
Gerda	30	Very limited		Very limited	
		Restricted permeability	1.00	Seepage	1.00
				Slope	0.08
71B:					
Chinook	42	Very limited		Very limited	
		Filtering capacity	1.00	Seepage	1.00
				Slope	0.32

Sanitary Facilities - Part I--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
71B:(cont.)					
Rhame	28	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
				Seepage	1.00
				Slope	0.32
71D:					
Rhame	42	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	0.37	Seepage	1.00
				Slope	1.00
Chinook	32	Very limited		Very limited	
		Filtering capacity	1.00	Seepage	1.00
		Slope	0.37	Slope	1.00
72F:					
Rhame	29	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00
				Seepage	1.00
Fleak	27	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00
				Seepage	1.00
73D:					
Gerda	16	Very limited		Very limited	
		Restricted permeability	1.00	Seepage	1.00
				Slope	0.68
Kirby	23	Very limited		Very limited	
		Filtering capacity	1.00	Seepage	1.00
				Slope	1.00
		Slope	0.37	Content of large stones	0.74
		Content of large stones	0.03		
74:					
Channel	40	Not rated		Not rated	
Glendive	35	Somewhat limited		Very limited	
		Flooding	0.40	Seepage	1.00
				Flooding	0.40
Havre	18	Somewhat limited		Somewhat limited	
		Restricted permeability	0.46	Seepage	0.53
				Flooding	0.40
		Flooding	0.40		

Sanitary Facilities - Part I--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
75:					
Havre	77	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Restricted permeability	0.46	Seepage	0.53
76B:					
Lonna	87	Somewhat limited		Somewhat limited	
		Restricted permeability	0.46	Seepage	0.53
				Slope	0.32
76C:					
Lonna	64	Somewhat limited		Very limited	
		Restricted permeability	0.46	Slope	1.00
				Seepage	0.53
77:					
Glendive	70	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
				Seepage	1.00
78B:					
Hanly	81	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Filtering capacity	1.00	Seepage	1.00
				Slope	0.08
79C:					
Zeona	76	Very limited		Very limited	
		Filtering capacity	1.00	Seepage	1.00
				Slope	0.68
80:					
Ethridge	64	Very limited		Not limited	
		Restricted permeability	1.00		
81B:					
Vebar	46	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
				Seepage	1.00
				Slope	0.08
Parshall	19	Very limited		Very limited	
		Filtering capacity	1.00	Seepage	1.00
				Slope	0.08
81C:					
Vebar	34	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
				Seepage	1.00
				Slope	1.00
Tally	32	Not limited		Very limited	
				Seepage	1.00
				Slope	1.00

Sanitary Facilities - Part I--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
81D:					
Vebar	32	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	0.63	Slope	1.00
				Seepage	1.00
Flasher	16	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	0.63	Slope	1.00
				Seepage	0.18
Tally	15	Somewhat limited		Very limited	
		Slope	0.63	Slope	1.00
				Seepage	1.00
82E:					
Badland, outcrop	54	Not rated		Not rated	
Patent	25	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Restricted permeability	0.46	Slope	1.00
		Slope	0.37	Seepage	0.53
83:					
Badland	88	Not rated		Not rated	
85F:					
Lonna	34	Somewhat limited		Very limited	
		Restricted permeability	0.46	Slope	1.00
		Slope	0.37	Seepage	0.53
Cabbart	33	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00
				Seepage	0.53
86F:					
Kirby	39	Very limited		Very limited	
		Filtering capacity	1.00	Slope	1.00
		Slope	1.00	Seepage	1.00
		Content of large stones	0.03	Content of large stones	0.74
Badland, outcrop	23	Not rated		Not rated	
Patent	13	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Slope	1.00	Slope	1.00
		Restricted permeability	0.46	Seepage	0.53

Sanitary Facilities - Part I--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
88:					
Littlemo----------	58	Very limited		Very limited	
		Filtering capacity	1.00	Seepage	1.00
		Restricted permeability	0.72		
Chanta----------	20	Very limited		Very limited	
		Filtering capacity	1.00	Seepage	1.00
89B:					
Patent----------	80	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Restricted permeability	0.46	Seepage	0.53
				Slope	0.32
91F:					
Lonna----------	35	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Restricted permeability	0.46	Seepage	0.53
Kirby----------	34	Very limited		Very limited	
		Filtering capacity	1.00	Seepage	1.00
				Slope	1.00
		Slope	1.00	Content of large stones	1.00
		Content of large stones	0.03		
Cabbart----------	16	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00		
				Slope	1.00
				Seepage	0.53
92B:					
Kremlin----------	26	Somewhat limited		Somewhat limited	
		Restricted permeability	0.46	Seepage	0.53
				Slope	0.32
Ethridge----------	22	Very limited		Somewhat limited	
		Restricted permeability	1.00	Slope	0.32
Gerda----------	19	Somewhat limited		Very limited	
		Restricted permeability	0.72	Seepage	1.00
				Slope	0.08
94F:					
Kirby----------	42	Very limited		Very limited	
		Filtering capacity	1.00	Slope	1.00
				Seepage	1.00
		Slope	1.00	Content of large stones	0.74
		Content of large stones	0.03		

Sanitary Facilities - Part I--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
94F:(cont.)					
Arikara----------	27	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Restricted permeability	0.46	Content of organic matter	1.00
				Seepage	0.53
Badland, outcrop----	16	Not rated		Not rated	
95F:					
Tinsley----------	53	Very limited		Very limited	
		Filtering capacity	1.00	Seepage	1.00
				Slope	1.00
		Slope	1.00	Content of large stones	0.06
Chanta----------	17	Very limited		Very limited	
		Filtering capacity	1.00	Seepage	1.00
				Slope	1.00
		Slope	0.37		
97:					
Kremlin----------	77	Somewhat limited		Somewhat limited	
		Restricted permeability	0.46	Seepage	0.53
98:					
Wolf Point----------	85	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Restricted permeability	1.00		
99F:					
Badland, outcrop----	63	Not rated		Not rated	
Cabbart----------	30	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00		
				Slope	1.00
				Seepage	0.53
100C:					
Patent----------	32	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Restricted permeability	0.46	Slope	0.68
				Seepage	0.53
Gullied land--------	19	Not rated		Not rated	
Glendive----------	13	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
				Seepage	1.00
				Slope	0.08
101F:					
Boxwell----------	34	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00		
		Restricted permeability	0.46	Slope	1.00
				Seepage	0.53

Sanitary Facilities - Part I--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
101F:(cont.)					
Cabbart	32	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00
				Seepage	0.53
Arikara	16	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Restricted permeability	0.46	Content of organic matter	1.00
				Seepage	0.53
102B:					
Boxwell	46	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Restricted permeability	0.46	Seepage	0.53
				Slope	0.32
Kremlin	43	Somewhat limited		Somewhat limited	
		Restricted permeability	0.46	Seepage	0.53
				Slope	0.32
102D:					
Boxwell	38	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Restricted permeability	0.46	Slope	1.00
		Slope	0.37	Seepage	0.53
Kremlin	28	Somewhat limited		Very limited	
		Restricted permeability	0.46	Slope	1.00
		Slope	0.37	Seepage	0.53
103F:					
Badland, outcrop	30	Not rated		Not rated	
Arikara	28	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Restricted permeability	0.46	Content of organic matter	1.00
				Seepage	0.53
Cabbart	16	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00
				Seepage	0.53
105:					
Harriet	80	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Restricted permeability	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Seepage	0.53

Sanitary Facilities - Part I--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
106:					
Riverwash	85	Not rated		Not rated	
107D:					
Rhame	23	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	0.04	Seepage	1.00
				Slope	1.00
Kremlin	16	Somewhat limited		Very limited	
		Restricted permeability	0.46	Slope	1.00
				Seepage	0.53
Maltese	15	Very limited		Very limited	
		Restricted permeability	1.00	Seepage	1.00
				Slope	0.68
108D:					
Boxwell	27	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Restricted permeability	0.46	Slope	1.00
		Slope	0.37	Seepage	0.53
Scairt	18	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Restricted permeability	1.00	Slope	1.00
		Slope	0.37		
Maltese	14	Very limited		Very limited	
		Restricted permeability	1.00	Slope	1.00
		Slope	0.37	Seepage	1.00
109F:					
Rhame	24	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00
				Seepage	1.00
Arikara	23	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Restricted permeability	0.46	Content of organic matter	1.00
				Seepage	0.53
Fleak	16	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00
				Seepage	1.00
110C:					
Patent	38	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Restricted permeability	0.46	Slope	0.68
				Seepage	0.53

Sanitary Facilities - Part I--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
110C:(cont.)					
Gerda	27	Somewhat limited		Very limited	
		Restricted permeability	0.72	Seepage	1.00
				Slope	0.68
Slickspots	10	Not rated		Not rated	
111F:					
Lonna	37	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Restricted permeability	0.46	Seepage	0.53
Arikara	30	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Restricted permeability	0.46	Content of organic matter	1.00
				Seepage	0.53
Cabbart	18	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00
				Seepage	0.53
112:					
Wolf Point, wooded	78	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Restricted permeability	1.00		
		Depth to saturated zone	0.40		
113:					
Havre, wooded	80	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Restricted permeability	0.46	Seepage	0.53
		Depth to saturated zone	0.40		
114B:					
Haplustolls	51	Not limited		Very limited	
				Seepage	1.00
				Slope	0.08
Ustorthents	45	Not limited		Very limited	
				Seepage	1.00
				Slope	0.08
115B:					
Cozberg	39	Very limited		Very limited	
		Filtering capacity	1.00	Seepage	1.00
				Slope	0.32
Chanta	35	Very limited		Very limited	
		Filtering capacity	1.00	Seepage	1.00
				Slope	0.32

Sanitary Facilities - Part I--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
116F:					
Kremlin----------	21	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Restricted permeability	0.46	Seepage	0.53
Shibah----------	20	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Filtering capacity	1.00	Seepage	1.00
				Content of large stones	0.16
117B:					
Kremlin----------	43	Somewhat limited		Somewhat limited	
		Restricted permeability	0.46	Seepage	0.53
				Slope	0.32
Chanta----------	42	Very limited		Very limited	
		Filtering capacity	1.00	Seepage	1.00
				Slope	0.32
118F:					
Shibah----------	39	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Filtering capacity	1.00	Seepage	1.00
				Content of large stones	0.16
Rubbleland----------	29	Not rated		Not rated	
Arikara----------	25	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Restricted permeability	0.46	Content of organic matter	1.00
				Seepage	0.53
119:					
Glendive, wooded----	74	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	0.40	Seepage	1.00
120B:					
Hanly, wooded-------	61	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Filtering capacity	1.00	Seepage	1.00
				Slope	0.08
		Depth to saturated zone	0.40		
121F:					
Maltese----------	25	Very limited		Very limited	
		Restricted permeability	1.00	Slope	1.00
				Seepage	1.00
		Slope	0.04		
Lonna----------	24	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Restricted permeability	0.46	Seepage	0.53

Sanitary Facilities - Part I--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
121F:(cont.)					
Arikara	22	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Restricted permeability	0.46	Content of organic matter	1.00
				Seepage	0.53
122C:					
Bulltop	59	Very limited		Very limited	
		Filtering capacity	1.00	Seepage	1.00
				Slope	0.32
Shibah	25	Very limited		Very limited	
		Filtering capacity	1.00	Seepage	1.00
				Slope	0.92
				Content of large stones	0.16
123E:					
Scairt	31	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Restricted permeability	1.00	Slope	1.00
		Slope	0.37		
Maltese	22	Very limited		Very limited	
		Restricted permeability	1.00	Slope	1.00
		Slope	0.96	Seepage	1.00
Boxwell	10	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Restricted permeability	0.46	Slope	1.00
		Slope	0.37	Seepage	0.53
152:					
Heil	94	Very limited		Very limited	
		Restricted permeability	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Ponding	1.00
		Ponding	1.00	Seepage	0.18
155:					
Dumps and pits, mine	90	Not rated		Not rated	
159:					
Channel	40	Not rated		Not rated	
Straw	28	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	0.94	Seepage	0.53
		Restricted permeability	0.50	Depth to saturated zone	0.40

Sanitary Facilities - Part I--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
159:(cont.)					
Daglum	18	Very limited		Somewhat limited	
		Restricted permeability	1.00	Depth to saturated zone	0.40
		Depth to saturated zone	0.94	Seepage	0.28
175:					
Havre, rarely flooded	89	Somewhat limited		Somewhat limited	
		Restricted permeability	0.46	Seepage	0.53
		Flooding	0.40	Flooding	0.40
177:					
Glendive, rarely flooded	84	Somewhat limited		Very limited	
		Flooding	0.40	Seepage	1.00
				Flooding	0.40
183:					
Badland, high precipitation	90	Not rated		Not rated	
205:					
Harriet, low precipitation	85	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Restricted permeability	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Seepage	0.53
210C:					
Lambert	41	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Restricted permeability	0.46	Slope	0.68
				Seepage	0.53
Slickspots	21	Not rated		Not rated	
Rhoades	15	Very limited		Somewhat limited	
		Restricted permeability	1.00	Slope	0.32
		Depth to saturated zone	0.43	Seepage	0.19
255:					
Pits, gravel and sand, low precipitation	90	Not rated		Not rated	
M-W:					
Miscellaneous water	100	Not rated		Not rated	
W:					
Water	100	Not rated		Not rated	

Sanitary Facilities - Part II

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
3:							
Peta	68	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	0.50
		Seepage	1.00	Seepage	1.00	Depth to saturated zone	0.44
5:							
Savage	61	Somewhat limited		Not limited		Very limited	
		Too clayey	0.50			Hard to compact	1.00
						Too clayey	0.50
5B:							
Savage	67	Somewhat limited		Not limited		Very limited	
		Too clayey	0.50			Hard to compact	1.00
						Too clayey	0.50
6:							
Regan	64	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00		
7:							
Arnegard	68	Not limited		Not limited		Not limited	
9F:							
Cabba	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
Sen	18	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
Chama	15	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
12B:							
Rhoades	55	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	1.00
		Too clayey	1.00			Sodium content	1.00
		Sodium content	1.00				
Daglum	33	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Hard to compact	1.00
		Sodium content	1.00			Sodium content	1.00
		Too clayey	0.50			Too clayey	0.50

Sanitary Facilities - Part II--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
13B:							
Dogtooth----------	59	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Sodium content	1.00			Hard to compact	1.00
						Sodium content	1.00
Janesburg----------	27	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Sodium content	1.00			Hard to compact	1.00
						Sodium content	1.00
13D:							
Dogtooth----------	37	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Sodium content	1.00	Slope	0.37	Hard to compact	1.00
		Slope	0.37			Sodium content	1.00
						Slope	0.37
Janesburg----------	37	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Sodium content	1.00	Slope	0.37	Hard to compact	1.00
		Slope	0.37			Sodium content	1.00
						Slope	0.37
14E:							
Amor----------	20	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	0.04	Slope	0.04	Slope	0.04
Brandenburg---------	39	Very limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Seepage	1.00
		Slope	0.96	Slope	0.96	Slope	0.96
		Content of large stones	0.09			Gravel content	0.11
						Content of large stones	0.09
15B:							
Daglum----------	50	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Hard to compact	1.00
		Sodium content	1.00			Sodium content	1.00
		Too clayey	0.50			Too clayey	0.50
Rhoades----------	25	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	1.00
		Too clayey	1.00			Sodium content	1.00
		Sodium content	1.00				
17:							
Amor----------	58	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
Arnegard----------	10	Not limited		Not limited		Not limited	

Sanitary Facilities - Part II--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
17B:							
Amor	67	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
Shambo	15	Not limited		Not limited		Not limited	
17C:							
Amor	39	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
Cabba	29	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
17D:							
Amor	42	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	0.63	Slope	0.63	Slope	0.63
Cabba	29	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	0.63	Slope	0.63	Slope	0.63
18E:							
Manning	24	Very limited		Very limited		Somewhat limited	
		Seepage	1.00	Seepage	1.00	Seepage	0.52
		Slope	0.16	Slope	0.16	Slope	0.16
Schaller	22	Very limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Seepage	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
		Too sandy	0.50			Too sandy	0.50
Wabek	22	Very limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Too sandy	1.00
		Too sandy	1.00	Slope	1.00	Seepage	1.00
		Slope	1.00			Slope	1.00
19:							
Sen	56	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
Golva	11	Not limited		Not limited		Not limited	
19B:							
Chama	43	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
Sen	25	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
Cabba	14	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
19C:							
Chama	40	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
Cabba	28	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00

Sanitary Facilities - Part II--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
19C:(cont.)							
Sen	17	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
19D:							
Cabba	38	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	0.63	Slope	0.63	Slope	0.63
Chama	26	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	0.63	Slope	0.63	Slope	0.63
Sen	16	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	0.63	Slope	0.63	Slope	0.63
21B:							
Parshall	67	Very limited		Very limited		Somewhat limited	
		Seepage	1.00	Seepage	1.00	Seepage	0.52
22B:							
Regent	71	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Too clayey	1.00			Too clayey	1.00
Savage	15	Somewhat limited		Not limited		Very limited	
		Too clayey	0.50			Hard to compact	1.00
						Too clayey	0.50
24B:							
Janesburg	51	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Sodium content	1.00			Hard to compact	1.00
						Sodium content	1.00
25B:							
Lefor	78	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
27F:							
Badland, outcrop	42	Not rated		Not rated		Not rated	
Lambert	34	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Flooding	1.00	Slope	0.37
		Slope	0.37	Slope	0.37		
Cabba	12	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
28F:							
Flasher	35	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage	1.00	Slope	1.00	Slope	1.00
		Slope	1.00				
Rock outcrop	22	Not rated		Not rated		Not rated	

Sanitary Facilities - Part II--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
28F:(cont.)							
Vebar----------	13	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Seepage	1.00	Slope	1.00
		Seepage	1.00	Depth to bedrock	1.00	Seepage	0.52
29F:							
Arikara----------	33	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Shambo----------	21	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Cabba----------	18	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
30F:							
Vebar, extremely stony----------	27	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Seepage	1.00	Slope	1.00
		Seepage	1.00	Depth to bedrock	1.00	Seepage	0.52
Amor, extremely stony----------	21	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	0.37	Slope	0.37	Slope	0.37
31B:							
Sen----------	25	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
Janesburg----------	34	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Sodium content	1.00			Hard to compact	1.00
						Sodium content	1.00
31C:							
Sen----------	22	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
Janesburg----------	21	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Sodium content	1.00			Hard to compact	1.00
						Sodium content	1.00
35F:							
Flasher----------	32	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage	1.00	Slope	1.00	Slope	1.00
		Slope	1.00				
Vebar----------	22	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Seepage	1.00	Slope	1.00
		Seepage	1.00	Depth to bedrock	1.00	Seepage	0.52

Sanitary Facilities - Part II--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
35F:(cont.)							
Parshall----------	15	Very limited		Very limited		Somewhat limited	
		Seepage	1.00	Seepage	1.00	Slope	0.63
		Slope	0.63	Slope	0.63	Seepage	0.52
36B:							
Ekalaka----------	32	Very limited		Very limited		Very limited	
		Sodium content	1.00	Seepage	1.00	Sodium content	1.00
		Seepage	1.00			Seepage	0.22
Parshall----------	32	Very limited		Very limited		Somewhat limited	
		Seepage	1.00	Seepage	1.00	Seepage	0.52
Desart----------	15	Very limited		Very limited		Very limited	
		Sodium content	1.00	Seepage	1.00	Sodium content	1.00
		Seepage	1.00			Too sandy	0.50
		Too sandy	0.50			Seepage	0.14
37B:							
Farfeld----------	39	Very limited		Very limited		Very limited	
		Sodium content	1.00	Depth to cemented pan	1.00	Depth to cemented pan	1.00
						Sodium content	1.00
Cedarpan----------	27	Very limited		Very limited		Very limited	
		Sodium content	1.00	Depth to cemented pan	1.00	Depth to cemented pan	1.00
		Too clayey	1.00			Sodium content	1.00
						Too clayey	1.00
						Hard to compact	1.00
37F:							
Cedarpan----------	25	Very limited		Very limited		Very limited	
		Sodium content	1.00	Depth to cemented pan	1.00	Depth to cemented pan	1.00
		Too clayey	1.00			Sodium content	1.00
		Slope	1.00	Slope	1.00	Too clayey	1.00
						Hard to compact	1.00
						Slope	1.00
Slickspots, stony---	24	Not rated		Not rated		Not rated	
Farfeld----------	10	Very limited		Very limited		Very limited	
		Sodium content	1.00	Depth to cemented pan	1.00	Depth to cemented pan	1.00
						Sodium content	1.00
41C:							
Wayden----------	58	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Too clayey	1.00			Too clayey	1.00
						Hard to compact	1.00
Moreau----------	15	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Too clayey	1.00			Too clayey	1.00
						Hard to compact	1.00

Sanitary Facilities - Part II--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
42B:							
Searing----------	60	Very limited		Very limited		Not limited	
		Seepage	1.00	Seepage	1.00		
Ringling----------	19	Very limited		Very limited		Somewhat limited	
		Seepage	1.00	Seepage	1.00	Gravel content	0.56
						Seepage	0.52
43:							
Belfield----------	49	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Hard to compact	1.00
						Sodium content	1.00
		Sodium content	1.00			Too clayey	0.50
		Too clayey	0.50				
Grail----------	26	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	0.50
		Too clayey	0.50				
44:							
Shambo----------	48	Not limited		Not limited		Not limited	
44B:							
Shambo----------	59	Not limited		Not limited		Not limited	
47:							
Stady----------	41	Very limited		Very limited		Not limited	
		Seepage	1.00	Seepage	1.00		
48B:							
Manning----------	66	Very limited		Very limited		Somewhat limited	
		Seepage	1.00	Seepage	1.00	Seepage	0.52
49B:							
Lihen----------	38	Very limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Too sandy	1.00
		Too sandy	1.00			Seepage	1.00
Parshall----------	15	Very limited		Very limited		Somewhat limited	
		Seepage	1.00	Seepage	1.00	Seepage	0.52
51B:							
Janesburg----------	40	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Sodium content	1.00			Hard to compact	1.00
						Sodium content	1.00
Dogtooth----------	29	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Sodium content	1.00			Hard to compact	1.00
						Sodium content	1.00

Sanitary Facilities - Part II--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
52:							
Heil	84	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Too clayey	1.00	Ponding	1.00	Too clayey	1.00
		Sodium content	1.00			Hard to compact	1.00
		Ponding	1.00			Sodium content	1.00
						Ponding	1.00
53B:							
Savage	25	Somewhat limited		Not limited		Very limited	
		Too clayey	0.50			Hard to compact	1.00
						Too clayey	0.50
Daglum	24	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Hard to compact	1.00
		Sodium content	1.00			Sodium content	1.00
		Too clayey	0.50			Too clayey	0.50
54:							
Channel	40	Not rated		Not rated		Not rated	
Straw	40	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Flooding	1.00	Too clayey	0.50
		Depth to saturated zone	1.00	Depth to saturated zone	1.00		
		Too clayey	0.50				
55:							
Pits, gravel and sand	85	Not rated		Not rated		Not rated	
57:							
Straw	28	Somewhat limited		Somewhat limited		Somewhat limited	
		Too clayey	0.50	Flooding	0.40	Too clayey	0.50
		Flooding	0.40				
Rhoades	21	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	1.00
		Too clayey	1.00			Sodium content	1.00
		Sodium content	1.00				
Daglum	12	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Hard to compact	1.00
		Sodium content	1.00			Sodium content	1.00
		Too clayey	0.50			Too clayey	0.50
58:							
Straw	67	Somewhat limited		Somewhat limited		Somewhat limited	
		Too clayey	0.50	Flooding	0.40	Too clayey	0.50
		Flooding	0.40				

Sanitary Facilities - Part II--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
60:							
Korell	75	Somewhat limited		Somewhat limited		Not limited	
		Flooding	0.40	Flooding	0.40		
62F:							
Dogtooth	23	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Hard to compact	1.00
		Sodium content	1.00			Slope	1.00
						Sodium content	1.00
Janesburg	23	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Hard to compact	1.00
		Sodium content	1.00			Slope	1.00
						Sodium content	1.00
Brandenburg	18	Very limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Seepage	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
		Content of large stones	0.09			Gravel content	0.11
						Content of large stones	0.09
63F:							
Dogtooth	33	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Hard to compact	1.00
		Sodium content	1.00			Slope	1.00
						Sodium content	1.00
Janesburg	22	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Hard to compact	1.00
		Sodium content	1.00			Slope	1.00
						Sodium content	1.00
Cabba	20	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
65:							
Channel	40	Not rated		Not rated		Not rated	
Banks	29	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Seepage	1.00
		Seepage	1.00	Seepage	1.00	Too sandy	0.50
		Too sandy	0.50				
Trembles	18	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Flooding	1.00	Seepage	0.21
		Seepage	1.00	Seepage	1.00		
66B:							
Stady	50	Very limited		Very limited		Not limited	
		Seepage	1.00	Seepage	1.00		

Sanitary Facilities - Part II--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
67B:							
Evridge----------	28	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Sodium content	1.00	Seepage	1.00	Sodium content	1.00
Desart----------	18	Very limited		Very limited		Very limited	
		Sodium content	1.00	Seepage	1.00	Sodium content	1.00
		Seepage	1.00			Too sandy	0.50
		Too sandy	0.50			Seepage	0.14
Telfer----------	13	Very limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Too sandy	1.00
		Too sandy	1.00			Seepage	1.00
68F:							
Cabbart----------	41	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Slope	1.00	Depth to bedrock	1.00
		Slope	1.00			Slope	1.00
Badland, outcrop----	27	Not rated		Not rated		Not rated	
69F:							
Patent----------	33	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Flooding	1.00	Slope	0.37
		Slope	0.37	Slope	0.37		
Badland, outcrop----	21	Not rated		Not rated		Not rated	
Cabbart----------	21	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Slope	1.00	Depth to bedrock	1.00
		Slope	1.00			Slope	1.00
70B:							
Maltese----------	39	Very limited		Very limited		Very limited	
		Sodium content	1.00	Seepage	1.00	Sodium content	1.00
		Seepage	1.00			Too clayey	0.50
		Too clayey	0.50			Seepage	0.16
Gerda----------	30	Very limited		Not limited		Very limited	
		Sodium content	1.00			Sodium content	1.00
		Seepage	1.00			Too clayey	1.00
						Seepage	0.15
71B:							
Chinook----------	42	Not limited		Not limited		Very limited	
						Seepage	1.00
Rhame----------	28	Very limited		Not limited		Very limited	
		Depth to bedrock	1.00			Depth to bedrock	1.00
						Seepage	0.52
71D:							
Rhame----------	42	Very limited		Somewhat limited		Very limited	
		Depth to bedrock	1.00	Slope	0.37	Depth to bedrock	1.00
		Slope	0.37			Seepage	0.52
						Slope	0.37

Sanitary Facilities - Part II--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
71D:(cont.)							
Chinook----------	32	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.37	Slope	0.37	Seepage	1.00
						Slope	0.37
72F:							
Rhame----------	29	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00			Slope	1.00
						Seepage	0.52
Fleak----------	27	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00			Slope	1.00
		Too sandy	0.50			Seepage	1.00
						Too sandy	0.50
73D:							
Gerda----------	16	Very limited		Not limited		Very limited	
		Sodium content	1.00			Sodium content	1.00
		Seepage	1.00			Too clayey	1.00
						Seepage	0.15
Kirby----------	23	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.37	Slope	0.37	Seepage	1.00
		Content of large stones	0.03			Gravel content	1.00
						Slope	0.37
						Content of large stones	0.03
74:							
Channel----------	40	Not rated		Not rated		Not rated	
Glendive----------	35	Somewhat limited		Somewhat limited		Somewhat limited	
		Too sandy	0.50	Flooding	0.40	Seepage	0.52
		Flooding	0.40			Too sandy	0.50
Havre----------	18	Somewhat limited		Somewhat limited		Not limited	
		Flooding	0.40	Flooding	0.40		
75:							
Havre----------	77	Very limited		Very limited		Not limited	
		Flooding	1.00	Flooding	1.00		
76B:							
Lonna----------	87	Not limited		Not limited		Not limited	
76C:							
Lonna----------	64	Not limited		Not limited		Not limited	
77:							
Glendive----------	70	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Flooding	1.00	Seepage	0.52
		Too sandy	0.50			Too sandy	0.50
78B:							
Hanly----------	81	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Seepage	1.00

Sanitary Facilities - Part II--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
79C:							
Zeona	76	Very limited		Not limited		Very limited	
		Too sandy	1.00			Too sandy	1.00
						Seepage	1.00
80:							
Ethridge	64	Not limited		Not limited		Not limited	
81B:							
Vebar	46	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00	Depth to bedrock	1.00
		Seepage	1.00	Depth to bedrock	1.00	Seepage	0.52
Parshall	19	Very limited		Very limited		Somewhat limited	
		Seepage	1.00	Seepage	1.00	Seepage	0.52
81C:							
Vebar	34	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00	Depth to bedrock	1.00
		Seepage	1.00	Depth to bedrock	1.00	Seepage	0.52
Tally	32	Very limited		Very limited		Somewhat limited	
		Seepage	1.00	Seepage	1.00	Seepage	0.50
81D:							
Vebar	32	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00	Depth to bedrock	1.00
		Seepage	1.00	Depth to bedrock	1.00	Slope	0.63
		Slope	0.63	Slope	0.63	Seepage	0.52
Flasher	16	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage	1.00	Slope	0.63	Slope	0.63
		Slope	0.63				
Tally	15	Very limited		Very limited		Somewhat limited	
		Seepage	1.00	Seepage	1.00	Slope	0.63
		Slope	0.63	Slope	0.63	Seepage	0.50
82E:							
Badland, outcrop	54	Not rated		Not rated		Not rated	
Patent	25	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Flooding	1.00	Slope	0.37
		Slope	0.37	Slope	0.37		
83:							
Badland	88	Not rated		Not rated		Not rated	
85F:							
Lonna	34	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.37	Slope	0.37	Slope	0.37
Cabbart	33	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Slope	1.00	Depth to bedrock	1.00
		Slope	1.00			Slope	1.00

Sanitary Facilities - Part II--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
86F:							
Kirby----------	39	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Seepage	1.00
		Content of large stones	0.03			Slope	1.00
						Gravel content	1.00
						Content of large stones	0.03
Badland, outcrop----	23	Not rated		Not rated		Not rated	
Patent----------	13	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Slope	1.00
		Slope	1.00	Slope	1.00		
88:							
Littlemo----------	58	Not limited		Not limited		Very limited	
						Seepage	1.00
						Gravel content	0.25
Chanta----------	20	Not limited		Not limited		Not limited	
89B:							
Patent----------	80	Very limited		Very limited		Not limited	
		Flooding	1.00	Flooding	1.00		
91F:							
Lonna----------	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Kirby----------	34	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Seepage	1.00
		Content of large stones	0.03			Slope	1.00
						Gravel content	1.00
						Content of large stones	0.03
Cabbart----------	16	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Slope	1.00	Depth to bedrock	1.00
		Slope	1.00			Slope	1.00
92B:							
Kremlin----------	26	Not limited		Not limited		Not limited	
Ethridge----------	22	Not limited		Not limited		Not limited	
Gerda----------	19	Very limited		Not limited		Very limited	
		Sodium content	1.00			Sodium content	1.00
		Seepage	1.00			Too clayey	1.00
						Seepage	0.15
94F:							
Kirby----------	42	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Content of large stones	0.03			Seepage	1.00
						Gravel content	1.00
						Content of large stones	0.03

Sanitary Facilities - Part II--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
94F:(cont.)							
Arikara----------	27	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Badland, outcrop----	16	Not rated		Not rated		Not rated	
95F:							
Tinsley----------	53	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
						Seepage	0.52
						Gravel content	0.11
Chanta----------	17	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.37	Slope	0.37	Slope	0.37
97:							
Kremlin----------	77	Not limited		Not limited		Not limited	
98:							
Wolf Point----------	85	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Too clayey	1.00
		Too clayey	1.00			Hard to compact	1.00
99F:							
Badland, outcrop----	63	Not rated		Not rated		Not rated	
Cabbart----------	30	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Slope	1.00	Depth to bedrock	1.00
		Slope	1.00			Slope	1.00
100C:							
Patent----------	32	Very limited		Very limited		Not limited	
		Flooding	1.00	Flooding	1.00		
Gullied land--------	19	Not rated		Not rated		Not rated	
Glendive----------	13	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Flooding	1.00	Seepage	0.52
		Too sandy	0.50			Too sandy	0.50
101F:							
Boxwell----------	34	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Slope	1.00	Depth to bedrock	1.00
		Slope	1.00			Slope	1.00
Cabbart----------	32	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Slope	1.00	Depth to bedrock	1.00
		Slope	1.00			Slope	1.00
Arikara----------	16	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
102B:							
Boxwell----------	46	Very limited		Not limited		Very limited	
		Depth to bedrock	1.00			Depth to bedrock	1.00
Kremlin----------	43	Not limited		Not limited		Not limited	

Sanitary Facilities - Part II--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
102D:							
Boxwell	38	Very limited		Somewhat limited		Very limited	
		Depth to bedrock	1.00	Slope	0.37	Depth to bedrock	1.00
		Slope	0.37			Slope	0.37
Kremlin	28	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.37	Slope	0.37	Slope	0.37
103F:							
Badland, outcrop	30	Not rated		Not rated		Not rated	
Arikara	28	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Cabbart	16	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00			Slope	1.00
105:							
Harriet	80	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Sodium content	1.00
		Sodium content	1.00				
106:							
Riverwash	85	Not rated		Not rated		Not rated	
107D:							
Rhame	23	Very limited		Somewhat limited		Very limited	
		Depth to bedrock	1.00	Slope	0.04	Depth to bedrock	1.00
		Slope	0.04			Seepage	0.52
						Slope	0.04
Kremlin	16	Not limited		Not limited		Not limited	
Maltese	15	Very limited		Very limited		Very limited	
		Sodium content	1.00	Seepage	1.00	Sodium content	1.00
		Seepage	1.00			Too clayey	0.50
		Too clayey	0.50			Seepage	0.16
108D:							
Boxwell	27	Very limited		Somewhat limited		Very limited	
		Depth to bedrock	1.00	Slope	0.37	Depth to bedrock	1.00
		Slope	0.37			Slope	0.37
Scairt	18	Very limited		Somewhat limited		Very limited	
		Depth to bedrock	1.00	Slope	0.37	Depth to bedrock	1.00
		Slope	0.37			Slope	0.37
Maltese	14	Very limited		Very limited		Very limited	
		Sodium content	1.00	Seepage	1.00	Sodium content	1.00
		Seepage	1.00	Slope	0.37	Too clayey	0.50
		Too clayey	0.50			Slope	0.37
		Slope	0.37			Seepage	0.16

Sanitary Facilities - Part II--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
109F:							
Rhame	24	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00			Slope	1.00
						Seepage	0.52
Arikara	23	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Fleak	16	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00			Slope	1.00
		Too sandy	0.50			Seepage	1.00
						Too sandy	0.50
110C:							
Patent	38	Very limited		Very limited		Not limited	
		Flooding	1.00	Flooding	1.00		
Gerda	27	Very limited		Not limited		Very limited	
		Sodium content	1.00			Sodium content	1.00
		Seepage	1.00			Too clayey	1.00
						Seepage	0.15
Slickspots	10	Not rated		Not rated		Not rated	
111F:							
Lonna	37	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Arikara	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Cabbart	18	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Slope	1.00	Depth to bedrock	1.00
		Slope	1.00			Slope	1.00
112:							
Wolf Point, wooded	78	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Too clayey	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Hard to compact	1.00
		Too clayey	1.00				
113:							
Havre, wooded	80	Very limited		Very limited		Not limited	
		Flooding	1.00	Flooding	1.00		
		Depth to saturated zone	1.00	Depth to saturated zone	1.00		
114B:							
Haplustolls	51	Very limited		Very limited		Somewhat limited	
		Seepage	1.00	Seepage	1.00	Seepage	0.50
Ustorthents	45	Very limited		Very limited		Somewhat limited	
		Seepage	1.00	Seepage	1.00	Seepage	0.50

Sanitary Facilities - Part II--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
115B:							
Cozberg	39	Not limited		Not limited		Somewhat limited	
						Seepage	0.52
Chanta	35	Not limited		Not limited		Not limited	
116F:							
Kremlin	21	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Shibah	20	Very limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Seepage	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
						Gravel content	0.22
117B:							
Kremlin	43	Not limited		Not limited		Not limited	
Chanta	42	Not limited		Not limited		Not limited	
118F:							
Shibah	39	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage	1.00	Seepage	1.00	Seepage	1.00
						Gravel content	0.22
Rubbleland	29	Not rated		Not rated		Not rated	
Arikara	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
119:							
Glendive, wooded	74	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Flooding	1.00	Seepage	0.52
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too sandy	0.50
		Too sandy	0.50				
120B:							
Hanly, wooded	61	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Seepage	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00		
121F:							
Maltese	25	Very limited		Very limited		Very limited	
		Sodium content	1.00	Seepage	1.00	Sodium content	1.00
		Seepage	1.00	Slope	0.04	Too clayey	0.50
		Too clayey	0.50			Seepage	0.16
		Slope	0.04			Slope	0.04
Lonna	24	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Arikara	22	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00

Sanitary Facilities - Part II--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
122C:							
Bulltop----------	59	Not limited		Not limited		Very limited	
						Seepage	1.00
						Gravel content	0.43
Shibah----------	25	Very limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Seepage	1.00
						Gravel content	0.22
123E:							
Scairt----------	31	Very limited		Somewhat limited		Very limited	
		Depth to bedrock	1.00	Slope	0.37	Depth to bedrock	1.00
		Slope	0.37			Slope	0.37
Maltese----------	22	Very limited		Very limited		Very limited	
		Sodium content	1.00	Seepage	1.00	Sodium content	1.00
		Seepage	1.00	Slope	0.96	Slope	0.96
		Slope	0.96			Too clayey	0.50
		Too clayey	0.50			Seepage	0.16
Boxwell----------	10	Very limited		Somewhat limited		Very limited	
		Depth to bedrock	1.00	Slope	0.37	Depth to bedrock	1.00
		Slope	0.37			Slope	0.37
152:							
Heil----------	94	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Too clayey	1.00	Ponding	1.00	Too clayey	1.00
		Sodium content	1.00			Hard to compact	1.00
		Ponding	1.00			Sodium content	1.00
						Ponding	1.00
155:							
Dumps and pits, mine	90	Not rated		Not rated		Not rated	
159:							
Channel----------	40	Not rated		Not rated		Not rated	
Straw----------	28	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Flooding	1.00	Too clayey	0.50
		Depth to saturated zone	1.00	Depth to saturated zone	1.00		
		Too clayey	0.50				
Daglum----------	18	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Hard to compact	1.00
		Sodium content	1.00			Sodium content	1.00
		Too clayey	0.50			Too clayey	0.50
175:							
Havre, rarely flooded----------	89	Somewhat limited		Somewhat limited		Not limited	
		Flooding	0.40	Flooding	0.40		

Sanitary Facilities - Part II--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
177:							
Glendive, rarely flooded	84	Somewhat limited		Somewhat limited		Somewhat limited	
		Too sandy	0.50	Flooding	0.40	Seepage	0.52
		Flooding	0.40			Too sandy	0.50
183:							
Badland, high precipitation	90	Not rated		Not rated		Not rated	
205:							
Harriet, low precipitation	85	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Sodium content	1.00
		Sodium content	1.00		1.00		
210C:							
Lambert	41	Very limited		Very limited		Not limited	
		Flooding	1.00	Flooding	1.00		
Slickspots	21	Not rated		Not rated		Not rated	
Rhoades	15	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	1.00
		Too clayey	1.00			Sodium content	1.00
		Sodium content	1.00				
255:							
Pits, gravel and sand, low precipitation	90	Not rated		Not rated		Not rated	
M-W:							
Miscellaneous water	100	Not rated		Not rated		Not rated	
W:							
Water	100	Not rated		Not rated		Not rated	

Construction Materials

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.00 to 0.99. The smaller the value, the greater the potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
3:								
Peta	Improbable		Poor		Fair		Fair	
	Source		Bottom layer	0.00	Depth to saturated zone	0.91	Depth to saturated zone	0.91
	Bottom layer not a source	0.00	Thickest layer	0.00				
	Thickest layer not a source	0.00						
5:								
Savage	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Too clayey	0.00	Low strength	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00			Shrink-swell	0.12
	Thickest layer not a source	0.00						
5B:								
Savage	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Too clayey	0.00	Low strength	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00			Shrink-swell	0.12
	Thickest layer not a source	0.00						
6:								
Regan	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Depth to saturated zone	0.00	Depth to saturated zone	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Carbonate content	0.68	Low strength	0.00
	Thickest layer not a source	0.00					Shrink-swell	0.87
7:								
Arnegard	Improbable		Poor		Good		Good	
	Source		Bottom layer	0.00				
	Bottom layer not a source	0.00	Thickest layer	0.00				
	Thickest layer not a source	0.00						

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
9F:								
Cabba	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Slope	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Depth to bedrock	0.00	Slope	0.00
	Thickest layer not a source	0.00					Low strength	0.22
Sen	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Slope	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Depth to bedrock	0.54	Low strength	0.00
	Thickest layer not a source	0.00			Carbonate content	0.92	Slope	0.50
Chama	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Slope	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Depth to bedrock	0.54	Slope	0.00
	Thickest layer not a source	0.00			Carbonate content	0.92	Low strength	0.00
12B:								
Rhoades	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Salinity	0.00	Low strength	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Sodium content	0.00	Shrink-swell	0.12
	Thickest layer not a source	0.00			Too clayey	0.00		
Daglum	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Sodium content	0.00	Low strength	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Too clayey	0.00	Shrink-swell	0.28
	Thickest layer not a source	0.00			Salinity	0.00		
13B:								
Dogtooth	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Sodium content	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Salinity	0.00		
	Thickest layer not a source	0.00			Too clayey	0.00		
					Depth to bedrock	0.54		

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
13B:(cont.)								
Janesburg	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Salinity	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Too clayey	0.00		
	Thickest layer not a source	0.00			Depth to bedrock	0.54		
					Sodium content	0.78		
13D:								
Dogtooth	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Sodium content	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Salinity	0.00		
	Thickest layer not a source	0.00			Too clayey	0.00		
					Depth to bedrock	0.54		
					Slope	0.63		
Janesburg	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Salinity	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Too clayey	0.00		
	Thickest layer not a source	0.00			Depth to bedrock	0.54		
					Slope	0.63		
					Sodium content	0.78		
14E:								
Amor	Improbable		Poor		Fair		Poor	
	Source		Bottom layer	0.00	Depth to bedrock	0.54	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Slope	0.96	Low strength	0.78
	Thickest layer not a source	0.00						
Brandenburg	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Rock fragments	0.00	Cobble content	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Slope	0.04		
	Thickest layer not a source	0.00						
15B:								
Daglum	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Sodium content	0.00	Low strength	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Too clayey	0.00	Shrink-swell	0.28
	Thickest layer not a source	0.00			Salinity	0.00		

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
15B:(cont.)								
Rhoades	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Salinity	0.00	Low strength	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Sodium content	0.00	Shrink-swell	0.12
	Thickest layer not a source	0.00			Too clayey	0.00		
17:								
Amor	Improbable		Poor		Fair		Poor	
	Source		Bottom layer	0.00	Depth to bedrock	0.54	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00			Low strength	0.78
	Thickest layer not a source	0.00						
Arnegard	Improbable		Poor		Good		Good	
	Source		Bottom layer	0.00				
	Bottom layer not a source	0.00	Thickest layer	0.00				
	Thickest layer not a source	0.00						
17B:								
Amor	Improbable		Poor		Fair		Poor	
	Source		Bottom layer	0.00	Depth to bedrock	0.54	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00			Low strength	0.78
	Thickest layer not a source	0.00						
Shambo	Improbable		Poor		Good		Good	
	Source		Bottom layer	0.00				
	Bottom layer not a source	0.00	Thickest layer	0.00				
	Thickest layer not a source	0.00						
17C:								
Amor	Improbable		Poor		Fair		Poor	
	Source		Bottom layer	0.00	Depth to bedrock	0.54	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00			Low strength	0.78
	Thickest layer not a source	0.00						

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
17C:(cont.)								
Cabba	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Depth to bedrock	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00			Low strength	0.22
	Thickest layer not a source	0.00						
17D:								
Amor	Improbable		Poor		Fair		Poor	
	Source		Bottom layer	0.00	Slope	0.37	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Depth to bedrock	0.54	Low strength	0.78
	Thickest layer not a source	0.00						
Cabba	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Depth to bedrock	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Slope	0.37	Low strength	0.22
	Thickest layer not a source	0.00						
18E:								
Manning	Possible		Fair		Fair		Good	
	Source		Bottom layer	0.00	Slope	0.84		
	Thickest layer not a source	0.00	Thickest layer	0.01				
	Bottom layer	0.38						
Schaller	Possible		Fair		Poor		Fair	
	Source		Thickest layer	0.03	Slope	0.00	Slope	0.98
	Thickest layer not a source	0.00	Bottom layer	0.14	Rock fragments	0.00		
	Bottom layer	0.04			Too sandy	0.01		
					Hard to reclaim, rock fragments	0.92		
Wabek	Possible		Fair		Poor		Fair	
	Source		Thickest layer	0.00	Slope	0.00	Slope	0.92
	Thickest layer not a source	0.00	Bottom layer	0.61				
	Bottom layer	0.27						

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
19:								
Sen	Improbable		Poor		Fair		Poor	
	Source		Bottom layer	0.00	Depth to bedrock	0.54	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Carbonate content	0.92	Low strength	0.00
	Thickest layer not a source	0.00						
Golva	Improbable		Poor		Good		Poor	
	Source		Bottom layer	0.00			Low strength	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00			Shrink-swell	0.87
	Thickest layer not a source	0.00						
19B:								
Chama	Improbable		Poor		Fair		Poor	
	Source		Bottom layer	0.00	Depth to bedrock	0.54	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Carbonate content	0.92	Low strength	0.00
	Thickest layer not a source	0.00						
Sen	Improbable		Poor		Fair		Poor	
	Source		Bottom layer	0.00	Depth to bedrock	0.54	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Carbonate content	0.92	Low strength	0.00
	Thickest layer not a source	0.00						
Cabba	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Depth to bedrock	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00			Low strength	0.22
	Thickest layer not a source	0.00						
19C:								
Chama	Improbable		Poor		Fair		Poor	
	Source		Bottom layer	0.00	Depth to bedrock	0.54	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Carbonate content	0.92	Low strength	0.00
	Thickest layer not a source	0.00						

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
19C:(cont.)								
Cabba	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Depth to bedrock	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00			Low strength	0.22
	Thickest layer not a source	0.00						
Sen	Improbable		Poor		Fair		Poor	
	Source		Bottom layer	0.00	Depth to bedrock	0.54	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Carbonate content	0.92	Low strength	0.00
	Thickest layer not a source	0.00						
19D:								
Cabba	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Depth to bedrock	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Slope	0.37	Low strength	0.22
	Thickest layer not a source	0.00						
Chama	Improbable		Poor		Fair		Poor	
	Source		Bottom layer	0.00	Slope	0.37	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Depth to bedrock	0.54	Low strength	0.00
	Thickest layer not a source	0.00			Carbonate content	0.92		
Sen	Improbable		Poor		Fair		Poor	
	Source		Bottom layer	0.00	Slope	0.37	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Depth to bedrock	0.54	Low strength	0.00
	Thickest layer not a source	0.00			Carbonate content	0.92		
21B:								
Parshall	Improbable		Fair		Good		Good	
	Source		Thickest layer	0.00				
	Bottom layer not a source	0.00	Bottom layer	0.07				
	Thickest layer not a source	0.00						

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
22B:								
Regent	Improbable Gravel		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Too clayey	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Depth to bedrock	0.54	Low strength	0.00
	Thickest layer not a source	0.00					Shrink-swell	0.12
Savage	Improbable Gravel		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Too clayey	0.00	Low strength	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00			Shrink-swell	0.12
	Thickest layer not a source	0.00						
24B:								
Janesburg	Improbable Gravel		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Salinity	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Too clayey	0.00		
	Thickest layer not a source	0.00			Depth to bedrock	0.54		
					Sodium content	0.78		
25B:								
Lefor	Improbable Gravel		Poor		Fair		Poor	
	Source		Bottom layer	0.00	Depth to bedrock	0.54	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00				
	Thickest layer not a source	0.00						
27F:								
Badland, outcrop	Not rated		Not rated		Not rated		Not rated	
Lambert	Improbable Gravel		Poor		Fair		Fair	
	Source		Bottom layer	0.00	Slope	0.63	Low strength	0.22
	Bottom layer not a source	0.00	Thickest layer	0.00	Carbonate content	0.99		
	Thickest layer not a source	0.00						

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
27F:(cont.)								
Cabba	Improbable Gravel		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Depth to bedrock	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Slope	0.00	Slope	0.00
	Thickest layer not a source	0.00					Low strength	0.22
28F:								
Flasher	Improbable Gravel		Fair		Poor		Poor	
	Source		Thickest layer	0.00	Depth to bedrock	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Bottom layer	0.02	Slope	0.00	Slope	0.00
	Thickest layer not a source	0.00			Too sandy	0.02		
Rock outcrop	Not rated		Not rated		Not rated		Not rated	
Vebar	Improbable Gravel		Fair		Poor		Poor	
	Source		Bottom layer	0.01	Slope	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.01	Depth to bedrock	0.71	Slope	0.00
	Thickest layer not a source	0.00						
29F:								
Arikara	Improbable Gravel		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Slope	0.00	Slope	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00			Low strength	0.22
	Thickest layer not a source	0.00						
Shambo	Improbable Gravel		Poor		Poor		Fair	
	Source		Bottom layer	0.00	Slope	0.00	Slope	0.18
	Bottom layer not a source	0.00	Thickest layer	0.00				
	Thickest layer not a source	0.00						

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
29F:(cont.)								
Cabba----------	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Depth to bedrock	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Slope	0.00	Low strength	0.00
	Thickest layer not a source	0.00					Slope	0.00
							Shrink-swell	0.87
30F:								
Vebar, extremely stony----------	Improbable		Fair		Poor		Poor	
	Source		Bottom layer	0.01	Slope	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.01	Depth to bedrock	0.54	Slope	0.00
	Thickest layer not a source	0.00						
Amor, extremely stony----------	Improbable		Poor		Fair		Poor	
	Source		Bottom layer	0.00	Depth to bedrock	0.54	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Slope	0.63	Low strength	0.78
	Thickest layer not a source	0.00						
31B:								
Sen----------	Improbable		Poor		Fair		Poor	
	Source		Bottom layer	0.00	Depth to bedrock	0.54	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Carbonate content	0.92	Low strength	0.00
	Thickest layer not a source	0.00						
Janesburg----------	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Salinity	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Too clayey	0.00		
	Thickest layer not a source	0.00			Depth to bedrock	0.54		
					Sodium content	0.78		
31C:								
Sen----------	Improbable		Poor		Fair		Poor	
	Source		Bottom layer	0.00	Depth to bedrock	0.54	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Carbonate content	0.92	Low strength	0.00
	Thickest layer not a source	0.00						

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
31C:(cont.)								
Janesburg	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Salinity	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Too clayey	0.00		
	Thickest layer not a source	0.00			Depth to bedrock	0.54		
					Sodium content	0.78		
35F:								
Flasher	Improbable		Fair		Poor		Poor	
	Source		Thickest layer	0.00	Too sandy	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Bottom layer	0.02	Depth to bedrock	0.00	Slope	0.18
	Thickest layer not a source	0.00			Slope	0.00		
Vebar	Improbable		Fair		Poor		Poor	
	Source		Bottom layer	0.01	Slope	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.01	Depth to bedrock	0.54	Slope	0.00
	Thickest layer not a source	0.00						
Parshall	Improbable		Fair		Fair		Good	
	Source		Thickest layer	0.00	Slope	0.37		
	Bottom layer not a source	0.00	Bottom layer	0.07				
	Thickest layer not a source	0.00						
36B:								
Ekalaka	Improbable		Fair		Poor		Good	
	Source		Thickest layer	0.00	Sodium content	0.00		
	Bottom layer not a source	0.00	Bottom layer	0.08	Salinity	0.50		
	Thickest layer not a source	0.00						
Parshall	Improbable		Fair		Good		Good	
	Source		Thickest layer	0.00				
	Bottom layer not a source	0.00	Bottom layer	0.07				
	Thickest layer not a source	0.00						

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
36B:(cont.)								
Desart----------	Improbable Gravel		Fair		Good		Good	
	Source		Thickest layer	0.00				
	Bottom layer not a source	0.00	Bottom layer	0.07				
	Thickest layer not a source	0.00						
37B:								
Farfeld----------	Improbable Gravel		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Hard to reclaim, dense layer	0.00	Depth to cemented pan	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Depth to cemented pan	0.00		
	Thickest layer not a source	0.00			Rock fragments	0.88		
Cedarpan----------	Improbable Gravel		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Hard to reclaim, dense layer	0.00	Depth to cemented pan	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Depth to cemented pan	0.00	Low strength	0.00
	Thickest layer not a source	0.00			Sodium content	0.00	Shrink-swell	0.56
					Too clayey	0.00		
					Salinity	0.00		
37F:								
Cedarpan----------	Improbable Gravel		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Hard to reclaim, dense layer	0.00	Depth to cemented pan	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Depth to cemented pan	0.00	Low strength	0.00
	Thickest layer not a source	0.00			Sodium content	0.00	Shrink-swell	0.56
					Too clayey	0.00	Slope	0.68
					Slope	0.00		
					Salinity	0.00		
Slickspots, stony---	Not rated		Not rated		Not rated		Not rated	
Farfeld----------	Improbable Gravel		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Hard to reclaim, dense layer	0.00	Depth to cemented pan	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Depth to cemented pan	0.00		
	Thickest layer not a source	0.00			Rock fragments	0.88		

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
41C:								
Wayden	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Depth to bedrock	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Too clayey	0.00	Low strength	0.00
	Thickest layer not a source	0.00			Salinity	0.00	Shrink-swell	0.12
Moreau	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Too clayey	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Salinity	0.00	Low strength	0.00
	Thickest layer not a source	0.00			Depth to bedrock	0.54	Shrink-swell	0.12
42B:								
Searing	Possible		Poor		Good		Poor	
	Source		Bottom layer	0.00			Low strength	0.00
	Thickest layer not a source	0.00	Thickest layer	0.00				
	Bottom layer	0.14						
Ringling	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Rock fragments	0.00	Cobble content	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00				
	Thickest layer not a source	0.00						
43:								
Belfield	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Sodium content	0.00	Low strength	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Salinity	0.00	Shrink-swell	0.15
	Thickest layer not a source	0.00			Too clayey	0.19		
Grail	Improbable		Poor		Fair		Poor	
	Source		Bottom layer	0.00	Too clayey	0.25	Low strength	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00			Shrink-swell	0.21
	Thickest layer not a source	0.00						

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
44:								
Shambo	Improbable		Poor		Good		Good	
	Source		Bottom layer	0.00				
	Bottom layer not a source	0.00	Thickest layer	0.00				
	Thickest layer not a source	0.00						
44B:								
Shambo	Improbable		Poor		Good		Good	
	Source		Bottom layer	0.00				
	Bottom layer not a source	0.00	Thickest layer	0.00				
	Thickest layer not a source	0.00						
47:								
Stady	Possible		Fair		Good		Good	
	Source							
	Thickest layer not a source	0.00	Thickest layer	0.00				
			Bottom layer	0.61				
	Bottom layer	0.23						
48B:								
Manning	Possible		Fair		Good		Good	
	Source		Bottom layer	0.00				
	Thickest layer not a source	0.00	Thickest layer	0.01				
	Bottom layer	0.38						
49B:								
Lihen	Improbable		Fair		Fair		Good	
	Source		Thickest layer	0.07	Too sandy	0.38		
	Bottom layer not a source	0.00	Bottom layer	0.64				
	Thickest layer not a source	0.00						
Parshall	Improbable		Fair		Good		Good	
	Source		Thickest layer	0.01				
	Bottom layer not a source	0.00	Bottom layer	0.05				
	Thickest layer not a source	0.00						

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
51B:								
Janesburg	Improbable Gravel		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Salinity	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Too clayey	0.00		
	Thickest layer not a source	0.00			Depth to bedrock	0.54		
					Sodium content	0.78		
Dogtooth	Improbable Gravel		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Sodium content	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Salinity	0.00		
	Thickest layer not a source	0.00			Too clayey	0.00		
					Depth to bedrock	0.54		
52:								
Heil	Improbable Gravel		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Too clayey	0.00	Depth to saturated zone	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Depth to saturated zone	0.00	Low strength	0.00
	Thickest layer not a source	0.00			Sodium content	0.00	Shrink-swell	0.12
					Salinity	0.00		
					Sodium content	0.00		
					Salinity	0.00		
53B:								
Savage	Improbable Gravel		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Too clayey	0.00	Low strength	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00			Shrink-swell	0.12
	Thickest layer not a source	0.00						
Daglum	Improbable Gravel		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Sodium content	0.00	Low strength	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Too clayey	0.00	Shrink-swell	0.28
	Thickest layer not a source	0.00			Salinity	0.00		
54:								
Channel	Not rated		Not rated		Not rated		Not rated	

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
54:(cont.)								
Straw	Improbable		Poor		Good		Fair	
	Source		Bottom layer	0.00			Low strength	0.78
	Bottom layer not a source	0.00	Thickest layer	0.00			Shrink-swell	0.97
	Thickest layer not a source	0.00						
55:								
Pits, gravel and sand	Not rated		Not rated		Not rated		Not rated	
57:								
Straw	Improbable		Poor		Good		Fair	
	Source		Bottom layer	0.00			Low strength	0.78
	Bottom layer not a source	0.00	Thickest layer	0.00			Shrink-swell	0.97
	Thickest layer not a source	0.00						
Rhoades	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Salinity	0.00	Low strength	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Sodium content	0.00	Shrink-swell	0.12
	Thickest layer not a source	0.00			Too clayey	0.00		
Daglum	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Sodium content	0.00	Low strength	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Too clayey	0.00	Shrink-swell	0.28
	Thickest layer not a source	0.00			Salinity	0.00		
58:								
Straw	Improbable		Poor		Good		Fair	
	Source		Bottom layer	0.00			Low strength	0.78
	Bottom layer not a source	0.00	Thickest layer	0.00			Shrink-swell	0.97
	Thickest layer not a source	0.00						

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
60:								
Korell	Improbable		Poor		Good		Good	
	Source		Bottom layer	0.00				
	Bottom layer not a source	0.00	Thickest layer	0.00				
	Thickest layer not a source	0.00						
62F:								
Dogtooth	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Sodium content	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Salinity	0.00	Slope	0.92
	Thickest layer not a source	0.00			Slope	0.00		
					Too clayey	0.00		
					Depth to bedrock	0.54		
Janesburg	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Salinity	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Slope	0.00	Slope	0.92
	Thickest layer not a source	0.00			Too clayey	0.00		
					Depth to bedrock	0.54		
					Sodium content	0.78		
Brandenburg	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Rock fragments	0.00	Cobble content	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Slope	0.00	Slope	0.18
	Thickest layer not a source	0.00						
63F:								
Dogtooth	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Sodium content	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Salinity	0.00	Slope	0.98
	Thickest layer not a source	0.00			Slope	0.00		
					Too clayey	0.00		
					Depth to bedrock	0.54		
Janesburg	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Salinity	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Slope	0.00	Slope	0.98
	Thickest layer not a source	0.00			Too clayey	0.00		
					Depth to bedrock	0.54		
					Sodium content	0.78		

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
63F:(cont.)								
Cabba	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Depth to bedrock	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Slope	0.00	Low strength	0.22
	Thickest layer not a source	0.00					Slope	0.50
65:								
Channel	Not rated		Not rated		Not rated		Not rated	
Banks	Improbable		Fair		Poor		Good	
	Source		Bottom layer	0.02	Too sandy	0.00		
	Bottom layer not a source	0.00	Thickest layer	0.25				
	Thickest layer not a source	0.00						
Trembles	Improbable		Fair		Fair		Good	
	Source		Thickest layer	0.01	Carbonate content	0.99		
	Bottom layer not a source	0.00	Bottom layer	0.12				
	Thickest layer not a source	0.00						
66B:								
Stady	Possible		Fair		Good		Good	
	Source		Thickest layer	0.00				
	Thickest layer not a source	0.00	Bottom layer	0.61				
	Bottom layer	0.23						
67B:								
Evridge	Not rated		Not rated		Fair		Poor	
	Bottom layer not a source	0.00	Bottom layer	0.00	Depth to bedrock	0.54	Depth to bedrock	0.00
Desart	Improbable		Fair		Good		Good	
	Source		Thickest layer	0.00				
	Bottom layer not a source	0.00	Bottom layer	0.07				
	Thickest layer not a source	0.00						

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
67B:(cont.)								
Telfer	Improbable Gravel		Fair		Fair		Good	
	Source		Thickest layer	0.00	Too sandy	0.36		
	Bottom layer not a source	0.00	Bottom layer	0.02				
	Thickest layer not a source	0.00						
68F:								
Cabbart	Improbable Gravel		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Depth to bedrock	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Slope	0.00	Slope	0.00
	Thickest layer not a source	0.00			Carbonate content	0.99	Low strength	0.00
							Shrink-swell	0.87
Badland, outcrop	Not rated		Not rated		Not rated		Not rated	
69F:								
Patent	Improbable Gravel		Poor		Fair		Fair	
	Source		Bottom layer	0.00	Slope	0.63	Low strength	0.22
	Bottom layer not a source	0.00	Thickest layer	0.00	Sodium content	0.98	Shrink-swell	0.87
	Thickest layer not a source	0.00			Carbonate content	0.99		
Badland, outcrop	Not rated		Not rated		Not rated		Not rated	
Cabbart	Improbable Gravel		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Slope	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Depth to bedrock	0.00	Slope	0.00
	Thickest layer not a source	0.00			Carbonate content	0.99	Low strength	0.00
							Shrink-swell	0.87
70B:								
Maltese	Improbable Gravel		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Sodium content	0.00	Low strength	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Salinity	0.00	Shrink-swell	0.53
	Thickest layer not a source	0.00			Too clayey	0.07		

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
70B:(cont.)								
Gerda	Improbable		Poor		Poor		Fair	
	Source		Bottom layer	0.00	Salinity	0.00	Shrink-swell	0.60
	Bottom layer not a source	0.00	Thickest layer	0.00	Sodium content	0.00		
	Thickest layer not a source	0.00			Too clayey	0.00		
71B:								
Chinook	Improbable		Fair		Good		Good	
	Source		Thickest layer	0.01				
	Bottom layer not a source	0.00	Bottom layer	0.02				
	Thickest layer not a source	0.00						
Rhame	Improbable		Fair		Fair		Poor	
	Source		Bottom layer	0.01	Depth to bedrock	0.54	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.01				
	Thickest layer not a source	0.00						
71D:								
Rhame	Improbable		Fair		Fair		Poor	
	Source		Bottom layer	0.01	Depth to bedrock	0.54	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.01	Slope	0.63		
	Thickest layer not a source	0.00						
Chinook	Improbable		Fair		Fair		Good	
	Source		Thickest layer	0.01	Slope	0.63		
	Bottom layer not a source	0.00	Bottom layer	0.02				
	Thickest layer not a source	0.00						
72F:								
Rhame	Improbable		Fair		Poor		Poor	
	Source		Bottom layer	0.01	Slope	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.01	Depth to bedrock	0.54	Slope	0.00
	Thickest layer not a source	0.00						

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
72F:(cont.)								
Fleak----------	Improbable		Fair		Poor		Poor	
	Source		Thickest layer	0.00	Slope	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Bottom layer	0.06	Depth to bedrock	0.00	Slope	0.00
	Thickest layer not a source	0.00			Too sandy	0.36		
73D:								
Gerda----------	Improbable		Poor		Poor		Fair	
	Source		Bottom layer	0.00	Salinity	0.00	Shrink-swell	0.60
	Bottom layer not a source	0.00	Thickest layer	0.00	Sodium content	0.00		
	Thickest layer not a source	0.00			Too clayey	0.00		
Kirby----------	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Rock fragments	0.00	Cobble content	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Slope	0.63		
	Thickest layer not a source	0.00						
74:								
Channel----------	Not rated		Not rated		Not rated		Not rated	
Glendive----------	Improbable		Fair		Fair		Good	
	Source		Thickest layer	0.00	Too sandy	0.98		
	Bottom layer not a source	0.00	Bottom layer	0.02	Carbonate content	0.99		
	Thickest layer not a source	0.00						
Havre----------	Improbable		Poor		Good		Good	
	Source		Bottom layer	0.00				
	Bottom layer not a source	0.00	Thickest layer	0.00				
	Thickest layer not a source	0.00						

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
75:								
Havre	Improbable		Poor		Good		Good	
	Source		Bottom layer	0.00				
	Bottom layer not a source	0.00	Thickest layer	0.00				
	Thickest layer not a source	0.00						
76B:								
Lonna	Improbable		Poor		Fair		Fair	
	Source		Bottom layer	0.00	Salinity	0.88	Low strength	0.22
	Bottom layer not a source	0.00	Thickest layer	0.00			Shrink-swell	0.87
	Thickest layer not a source	0.00						
76C:								
Lonna	Improbable		Poor		Fair		Fair	
	Source		Bottom layer	0.00	Salinity	0.88	Low strength	0.22
	Bottom layer not a source	0.00	Thickest layer	0.00			Shrink-swell	0.87
	Thickest layer not a source	0.00						
77:								
Glendive	Improbable		Fair		Fair		Good	
	Source		Thickest layer	0.00	Too sandy	0.98		
	Bottom layer not a source	0.00	Bottom layer	0.02	Carbonate content	0.99		
	Thickest layer not a source	0.00						
78B:								
Hanly	Improbable		Fair		Fair		Good	
	Source		Thickest layer	0.01	Too sandy	0.50		
	Bottom layer not a source	0.00	Bottom layer	0.16				
	Thickest layer not a source	0.00						
79C:								
Zeona	Improbable		Fair		Poor		Good	
	Source		Thickest layer	0.02	Too sandy	0.00		
	Bottom layer not a source	0.00	Bottom layer	0.25				
	Thickest layer not a source	0.00						

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
80:								
Ethridge	Improbable		Poor		Fair		Poor	
	Source		Bottom layer	0.00	Too clayey	0.36	Low strength	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00			Shrink-swell	0.43
	Thickest layer not a source	0.00						
81B:								
Vebar	Improbable		Fair		Fair		Poor	
	Source		Bottom layer	0.01	Depth to bedrock	0.54	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.01				
	Thickest layer not a source	0.00						
Parshall	Improbable		Fair		Good		Good	
	Source		Thickest layer	0.00				
	Bottom layer not a source	0.00	Bottom layer	0.07				
	Thickest layer not a source	0.00						
81C:								
Vebar	Improbable		Fair		Fair		Poor	
	Source		Bottom layer	0.01	Depth to bedrock	0.54	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.01				
	Thickest layer not a source	0.00						
Tally	Improbable		Poor		Good		Good	
	Source		Thickest layer	0.00				
	Bottom layer not a source	0.00	Bottom layer	0.00				
	Thickest layer not a source	0.00						
81D:								
Vebar	Improbable		Fair		Fair		Poor	
	Source		Bottom layer	0.01	Slope	0.37	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.01	Depth to bedrock	0.54		
	Thickest layer not a source	0.00						

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
81D:(cont.)								
Flasher	Improbable Gravel		Fair		Poor		Poor	
	Source		Thickest layer	0.00	Depth to bedrock	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Bottom layer	0.02	Too sandy	0.02		
	Thickest layer not a source	0.00			Slope	0.37		
Tally	Improbable Gravel		Fair		Fair		Good	
	Source		Thickest layer	0.01	Slope	0.37		
	Bottom layer not a source	0.00	Bottom layer	0.02				
	Thickest layer not a source	0.00						
82E:								
Badland, outcrop	Not rated		Not rated		Not rated		Not rated	
Patent	Improbable Gravel		Poor		Fair		Fair	
	Source		Bottom layer	0.00	Slope	0.63	Low strength	0.22
	Bottom layer not a source	0.00	Thickest layer	0.00	Sodium content	0.98	Shrink-swell	0.87
	Thickest layer not a source	0.00			Carbonate content	0.99		
83:								
Badland	Not rated		Not rated		Not rated		Not rated	
85F:								
Lonna	Improbable Gravel		Poor		Fair		Fair	
	Source		Bottom layer	0.00	Slope	0.63	Low strength	0.22
	Bottom layer not a source	0.00	Thickest layer	0.00	Salinity	0.88	Shrink-swell	0.87
	Thickest layer not a source	0.00						
Cabbart	Improbable Gravel		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Depth to bedrock	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Slope	0.00	Low strength	0.00
	Thickest layer not a source	0.00			Carbonate content	0.99	Slope	0.32
							Shrink-swell	0.87

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
86F:								
Kirby	Improbable Gravel		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Rock fragments	0.00	Cobble content	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Slope	0.00	Slope	0.00
	Thickest layer not a source	0.00						
Badland, outcrop	Not rated		Not rated		Not rated		Not rated	
Patent	Improbable Gravel		Poor		Poor		Fair	
	Source		Bottom layer	0.00	Slope	0.00	Low strength	0.22
	Bottom layer not a source	0.00	Thickest layer	0.00	Sodium content	0.98	Slope	0.50
	Thickest layer not a source	0.00			Carbonate content	0.99	Shrink-swell	0.87
88:								
Littlemo	Possible Gravel		Fair		Poor		Good	
	Source		Thickest layer	0.00	Rock fragments	0.00		
	Thickest layer not a source	0.00	Bottom layer	0.06	Hard to reclaim, rock fragments	0.00		
	Bottom layer	0.38			Carbonate content	0.97		
Chanta	Possible Gravel		Fair		Fair		Poor	
	Source		Thickest layer	0.00	Rock fragments	0.97	Low strength	0.00
	Thickest layer not a source	0.00	Bottom layer	0.63			Shrink-swell	1.00
	Bottom layer	0.08						
89B:								
Patent	Improbable Gravel		Poor		Fair		Fair	
	Source		Bottom layer	0.00	Sodium content	0.98	Low strength	0.22
	Bottom layer not a source	0.00	Thickest layer	0.00	Carbonate content	0.99	Shrink-swell	0.87
	Thickest layer not a source	0.00						
91F:								
Lonna	Improbable Gravel		Poor		Poor		Fair	
	Source		Bottom layer	0.00	Slope	0.00	Low strength	0.22
	Bottom layer not a source	0.00	Thickest layer	0.00	Salinity	0.88	Shrink-swell	0.87
	Thickest layer not a source	0.00						

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
91F:(cont.)								
Kirby	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Rock fragments	0.00	Cobble content	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Slope	0.00	Slope	0.00
	Thickest layer not a source	0.00						
Cabbart	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Depth to bedrock	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Slope	0.00	Slope	0.00
	Thickest layer not a source	0.00			Carbonate content	0.99	Low strength	0.00
							Shrink-swell	0.87
92B:								
Kremlin	Improbable		Poor		Fair		Fair	
	Source		Bottom layer	0.00	Carbonate content	0.97	Low strength	0.22
	Bottom layer not a source	0.00	Thickest layer	0.00			Shrink-swell	0.89
	Thickest layer not a source	0.00						
Ethridge	Improbable		Poor		Fair		Poor	
	Source		Bottom layer	0.00	Too clayey	0.36	Low strength	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00			Shrink-swell	0.43
	Thickest layer not a source	0.00						
Gerda	Improbable		Poor		Poor		Fair	
	Source		Bottom layer	0.00	Salinity	0.00	Shrink-swell	0.60
	Bottom layer not a source	0.00	Thickest layer	0.00	Sodium content	0.00		
	Thickest layer not a source	0.00			Too clayey	0.00		
94F:								
Kirby	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Slope	0.00	Cobble content	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Rock fragments	0.00	Slope	0.00
	Thickest layer not a source	0.00						

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
94F:(cont.)								
Arikara	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Slope	0.00	Slope	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00			Low strength	0.22
	Thickest layer not a source	0.00					Shrink-swell	1.00
Badland, outcrop	Not rated		Not rated		Not rated		Not rated	
95F:								
Tinsley	Possible		Fair		Poor		Fair	
	Source		Thickest layer	0.00	Rock fragments	0.00	Slope	0.32
	Thickest layer not a source	0.00	Bottom layer	0.07	Slope	0.00	Cobble content	0.79
	Bottom layer	0.34						
Chanta	Possible		Fair		Fair		Poor	
	Source		Thickest layer	0.00	Slope	0.63	Low strength	0.00
	Thickest layer not a source	0.00	Bottom layer	0.63	Rock fragments	0.97	Shrink-swell	1.00
	Bottom layer	0.08						
97:								
Kremlin	Improbable		Poor		Fair		Fair	
	Source		Bottom layer	0.00	Carbonate content	0.97	Low strength	0.22
	Bottom layer not a source	0.00	Thickest layer	0.00			Shrink-swell	0.89
	Thickest layer not a source	0.00						
98:								
Wolf Point	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Too clayey	0.00	Low strength	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Salinity	0.88	Shrink-swell	0.12
	Thickest layer not a source	0.00						

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
99F:								
Badland, outcrop----	Not rated		Not rated		Not rated		Not rated	
Cabbart----------	Improbable Gravel		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Depth to bedrock	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Slope	0.00	Slope	0.00
	Thickest layer not a source	0.00			Carbonate content	0.99	Low strength	0.00
							Shrink-swell	0.87
100C:								
Patent----------	Improbable Gravel		Poor		Fair		Fair	
	Source		Bottom layer	0.00	Sodium content	0.98	Low strength	0.22
	Bottom layer not a source	0.00	Thickest layer	0.00	Carbonate content	0.99	Shrink-swell	0.87
	Thickest layer not a source	0.00						
Gullied land--------	Not rated		Not rated		Not rated		Not rated	
Glendive----------	Improbable Gravel		Fair		Fair		Good	
	Source		Thickest layer	0.00	Too sandy	0.98		
	Bottom layer not a source	0.00	Bottom layer	0.02	Carbonate content	0.99		
	Thickest layer not a source	0.00						
101F:								
Boxwell----------	Improbable Gravel		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Slope	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Depth to bedrock	0.54	Slope	0.00
	Thickest layer not a source	0.00			Carbonate content	0.80		
Cabbart----------	Improbable Gravel		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Depth to bedrock	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Slope	0.00	Slope	0.00
	Thickest layer not a source	0.00			Carbonate content	0.99	Low strength	0.00
							Slope	0.00
							Shrink-swell	0.87

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
101F:(cont.)								
Arikara----------	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Slope	0.00	Slope	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00			Low strength	0.22
	Thickest layer not a source	0.00					Shrink-swell	1.00
102B:								
Boxwell----------	Improbable		Poor		Fair		Poor	
	Source		Bottom layer	0.00	Depth to bedrock	0.54	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Carbonate content	0.80		
	Thickest layer not a source	0.00						
Kremlin----------	Improbable		Poor		Fair		Fair	
	Source		Bottom layer	0.00	Carbonate content	0.97	Low strength	0.22
	Bottom layer not a source	0.00	Thickest layer	0.00			Shrink-swell	0.89
	Thickest layer not a source	0.00						
102D:								
Boxwell----------	Improbable		Poor		Fair		Poor	
	Source		Bottom layer	0.00	Depth to bedrock	0.54	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Slope	0.63		
	Thickest layer not a source	0.00			Carbonate content	0.80		
Kremlin----------	Improbable		Poor		Fair		Fair	
	Source		Bottom layer	0.00	Slope	0.63	Low strength	0.22
	Bottom layer not a source	0.00	Thickest layer	0.00	Carbonate content	0.97	Shrink-swell	0.89
	Thickest layer not a source	0.00						
103F:								
Badland, outcrop----	Not rated		Not rated		Not rated		Not rated	

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
103F:(cont.)								
Arikara	Improbable Gravel		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Slope	0.00	Slope	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00			Low strength	0.22
	Thickest layer not a source	0.00					Shrink-swell	1.00
Cabbart	Improbable Gravel		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Slope	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Depth to bedrock	0.00	Slope	0.00
	Thickest layer not a source	0.00			Carbonate content	0.99	Low strength	0.00
							Shrink-swell	0.87
105:								
Harriet	Improbable Gravel		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Depth to saturated zone	0.00	Depth to saturated zone	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Sodium content	0.00	Low strength	0.00
	Thickest layer not a source	0.00			Salinity	0.00	Shrink-swell	0.89
					Too clayey	0.17		
106:								
Riverwash	Not rated		Not rated		Not rated		Not rated	
107D:								
Rhame	Improbable Gravel		Fair		Fair		Poor	
	Source		Bottom layer	0.01	Depth to bedrock	0.54	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.01	Slope	0.96		
	Thickest layer not a source	0.00						
Kremlin	Improbable Gravel		Poor		Fair		Fair	
	Source		Bottom layer	0.00	Carbonate content	0.97	Low strength	0.22
	Bottom layer not a source	0.00	Thickest layer	0.00			Shrink-swell	0.89
	Thickest layer not a source	0.00						

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
107D:(cont.)								
Maltese	Improbable		Poor		Poor		Fair	
	Source		Bottom layer	0.00	Sodium content	0.00	Shrink-swell	0.53
	Bottom layer not a source	0.00	Thickest layer	0.00	Salinity	0.00		
	Thickest layer not a source	0.00			Too clayey	0.07		
108D:								
Boxwell	Improbable		Poor		Fair		Poor	
	Source		Bottom layer	0.00	Depth to bedrock	0.54	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Slope	0.63		
	Thickest layer not a source	0.00			Carbonate content	0.80		
Scairt	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Sodium content	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Salinity	0.00		
	Thickest layer not a source	0.00			Too clayey	0.00		
					Depth to bedrock	0.54		
					Slope	0.63		
Maltese	Improbable		Poor		Poor		Fair	
	Source		Bottom layer	0.00	Sodium content	0.00	Shrink-swell	0.53
	Bottom layer not a source	0.00	Thickest layer	0.00	Salinity	0.00		
	Thickest layer not a source	0.00			Too clayey	0.07		
					Slope	0.63		
109F:								
Rhame	Improbable		Fair		Poor		Poor	
	Source		Bottom layer	0.01	Slope	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.01	Depth to bedrock	0.54	Slope	0.00
	Thickest layer not a source	0.00						
Arikara	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Slope	0.00	Slope	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00			Low strength	0.22
	Thickest layer not a source	0.00					Shrink-swell	1.00

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
109F:(cont.)								
Fleak	Improbable		Fair		Poor		Poor	
	Source		Thickest layer	0.00	Slope	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Bottom layer	0.06	Depth to bedrock	0.00	Slope	0.00
	Thickest layer not a source	0.00			Too sandy	0.36		
110C:								
Patent	Improbable		Poor		Fair		Fair	
	Source		Bottom layer	0.00	Sodium content	0.98	Low strength	0.22
	Bottom layer not a source	0.00	Thickest layer	0.00	Carbonate content	0.99	Shrink-swell	0.87
	Thickest layer not a source	0.00						
Gerda	Improbable		Poor		Poor		Fair	
	Source		Bottom layer	0.00	Salinity	0.00	Shrink-swell	0.60
	Bottom layer not a source	0.00	Thickest layer	0.00	Sodium content	0.00		
	Thickest layer not a source	0.00			Too clayey	0.00		
Slickspots	Not rated		Not rated		Not rated		Not rated	
111F:								
Lonna	Improbable		Poor		Poor		Fair	
	Source		Bottom layer	0.00	Slope	0.00	Low strength	0.22
	Bottom layer not a source	0.00	Thickest layer	0.00	Salinity	0.88	Shrink-swell	0.87
	Thickest layer not a source	0.00					Slope	0.92
Arikara	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Slope	0.00	Slope	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00			Low strength	0.22
	Thickest layer not a source	0.00					Shrink-swell	1.00
Cabbart	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Depth to bedrock	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Slope	0.00	Slope	0.00
					Sodium content	0.98	Low strength	0.00
	Thickest layer not a source	0.00			Carbonate content	0.99	Shrink-swell	0.87

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
112:								
Wolf Point, wooded--	Improbable Gravel		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Too clayey	0.00	Low strength	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Salinity	0.88	Shrink-swell	0.12
	Thickest layer not a source	0.00						
113:								
Havre, wooded-------	Improbable Gravel		Poor		Good		Good	
	Source		Bottom layer	0.00				
	Bottom layer not a source	0.00	Thickest layer	0.00				
	Thickest layer not a source	0.00						
114B:								
Haplustolls---------	Possible Gravel		Poor		Good		Poor	
	Source		Bottom layer	0.00			Low strength	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00				
	Thickest layer	0.08						
Ustorthents---------	Improbable Gravel		Poor		Good		Poor	
	Source		Bottom layer	0.00			Low strength	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00				
	Thickest layer not a source	0.00						
115B:								
Cozberg----------	Improbable Gravel		Fair		Good		Good	
	Source		Thickest layer	0.00				
	Bottom layer not a source	0.00	Bottom layer	0.08				
	Thickest layer not a source	0.00						
Chanta----------	Possible Gravel		Fair		Fair		Poor	
	Source		Thickest layer	0.00	Rock fragments	0.97	Low strength	0.00
	Thickest layer not a source	0.00	Bottom layer	0.63			Shrink-swell	1.00
	Bottom layer	0.08						

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
116F:								
Kremlin	Improbable Gravel		Poor		Poor		Fair	
	Source		Bottom layer	0.00	Slope	0.00	Low strength	0.22
	Bottom layer not a source	0.00	Thickest layer	0.00	Carbonate content	0.97	Slope	0.50
	Thickest layer not a source	0.00					Shrink-swell	0.89
Shibah	Possible Gravel		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Hard to reclaim, dense layer	0.00	Slope	0.00
	Thickest layer not a source	0.00	Thickest layer	0.00	Rock fragments	0.00	Cobble content	0.95
	Bottom layer	0.08			Slope	0.00		
					Hard to reclaim, rock fragments	0.08		
117B:								
Kremlin	Improbable Gravel		Poor		Fair		Fair	
	Source		Bottom layer	0.00	Carbonate content	0.97	Low strength	0.22
	Bottom layer not a source	0.00	Thickest layer	0.00			Shrink-swell	0.89
	Thickest layer not a source	0.00						
Chanta	Possible Gravel		Fair		Fair		Poor	
	Source		Thickest layer	0.00	Rock fragments	0.97	Low strength	0.00
	Thickest layer not a source	0.00	Bottom layer	0.63			Shrink-swell	0.00
	Bottom layer	0.08						
118F:								
Shibah	Possible Gravel		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Slope	0.00	Slope	0.00
	Thickest layer not a source	0.00	Thickest layer	0.00	Hard to reclaim, dense layer	0.00	Cobble content	0.95
	Bottom layer	0.08			Rock fragments	0.00		
					Hard to reclaim, rock fragments	0.08		
Rubbleland	Not rated		Not rated		Not rated		Not rated	

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
118F:(cont.)								
Arikara	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Slope	0.00	Slope	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00			Low strength	0.22
	Thickest layer not a source	0.00					Shrink-swell	1.00
119:								
Glendive, wooded	Improbable		Fair		Fair		Good	
	Source		Thickest layer	0.00	Too sandy	0.98		
	Bottom layer not a source	0.00	Bottom layer	0.02	Carbonate content	0.99		
	Thickest layer not a source	0.00						
120B:								
Hanly, wooded	Improbable		Fair		Fair		Good	
	Source		Thickest layer	0.01	Too sandy	0.50		
	Bottom layer not a source	0.00	Bottom layer	0.16				
	Thickest layer not a source	0.00						
121F:								
Maltese	Improbable		Poor		Poor		Fair	
	Source		Bottom layer	0.00	Sodium content	0.00	Shrink-swell	0.53
	Bottom layer not a source	0.00	Thickest layer	0.00	Salinity	0.00		
	Thickest layer not a source	0.00			Too clayey	0.07		
					Slope	0.96		
Lonna	Improbable		Poor		Poor		Fair	
	Source		Bottom layer	0.00	Slope	0.00	Low strength	0.22
	Bottom layer not a source	0.00	Thickest layer	0.00	Salinity	0.88	Shrink-swell	0.87
	Thickest layer not a source	0.00						
Arikara	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Slope	0.00	Slope	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00			Low strength	0.22
	Thickest layer not a source	0.00					Shrink-swell	1.00

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
122C:								
Bulltop	Possible Gravel		Poor		Poor		Good	
	Source		Bottom layer	0.00	Hard to reclaim, dense layer	0.00		
	Thickest layer not a source	0.00	Thickest layer	0.00	Rock fragments	0.00		
	Bottom layer	0.23			Hard to reclaim, rock fragments	0.00		
Shibah	Possible Gravel		Poor		Poor		Fair	
	Source		Bottom layer	0.00	Hard to reclaim, dense layer	0.00	Cobble content	0.95
	Thickest layer not a source	0.00	Thickest layer	0.00	Rock fragments	0.00		
	Bottom layer	0.08			Hard to reclaim, rock fragments	0.08		
123E:								
Scairt	Improbable Gravel		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Sodium content	0.00	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Salinity	0.00		
	Thickest layer not a source	0.00			Too clayey	0.00		
					Depth to bedrock	0.54		
					Slope	0.63		
Maltese	Improbable Gravel		Poor		Poor		Fair	
	Source		Bottom layer	0.00	Sodium content	0.00	Shrink-swell	0.53
	Bottom layer not a source	0.00	Thickest layer	0.00	Salinity	0.00		
	Thickest layer not a source	0.00			Slope	0.04		
					Too clayey	0.07		
Boxwell	Improbable Gravel		Poor		Fair		Poor	
	Source		Bottom layer	0.00	Depth to bedrock	0.54	Depth to bedrock	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Slope	0.63		
	Thickest layer not a source	0.00			Carbonate content	0.80		
152:								
Heil	Improbable Gravel		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Too clayey	0.00	Depth to saturated zone	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Depth to saturated zone	0.00	Low strength	0.00
	Thickest layer not a source	0.00			Sodium content	0.00	Shrink-swell	0.12
					Salinity	0.00		

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
155:								
Dumps and pits, mine	Not rated		Not rated		Not rated		Not rated	
159:								
Channel	Not rated		Not rated		Not rated		Not rated	
Straw	Improbable		Poor		Good		Fair	
	Source		Bottom layer	0.00			Low strength	0.78
	Bottom layer not a source	0.00	Thickest layer	0.00			Shrink-swell	0.97
	Thickest layer not a source	0.00						
Daglum	Improbable		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Sodium content	0.00	Low strength	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Too clayey	0.00	Shrink-swell	0.28
	Thickest layer not a source	0.00			Salinity	0.00		
175:								
Havre, rarely flooded	Improbable		Poor		Good		Good	
	Source		Bottom layer	0.00				
	Bottom layer not a source	0.00	Thickest layer	0.00				
	Thickest layer not a source	0.00						
177:								
Glendive, rarely flooded	Improbable		Fair		Fair		Good	
	Source		Thickest layer	0.00	Too sandy	0.98		
	Bottom layer not a source	0.00	Bottom layer	0.02	Carbonate content	0.99		
	Thickest layer not a source	0.00						
183:								
Badland, high precipitation	Not rated		Not rated		Not rated		Not rated	

Construction Materials--Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand		Potential source of topsoil		Potential source of roadfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
205:								
Harriet, low precipitation------	Improbable Gravel		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Depth to saturated zone	0.00	Depth to saturated zone	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Sodium content	0.00	Low strength	0.00
	Thickest layer not a source	0.00			Salinity	0.00	Shrink-swell	0.89
					Too clayey	0.17		
210C:								
Lambert----------	Improbable Gravel		Poor		Fair		Fair	
	Source		Bottom layer	0.00	Carbonate content	0.99	Low strength	0.22
	Bottom layer not a source	0.00	Thickest layer	0.00				
	Thickest layer not a source	0.00						
Slickspots----------	Not rated		Not rated		Not rated		Not rated	
Rhoades----------	Improbable Gravel		Poor		Poor		Poor	
	Source		Bottom layer	0.00	Salinity	0.00	Low strength	0.00
	Bottom layer not a source	0.00	Thickest layer	0.00	Sodium content	0.00	Shrink-swell	0.12
	Thickest layer not a source	0.00			Too clayey	0.00		
255:								
Pits, gravel and sand, low precipitation------	Not rated		Not rated		Not rated		Not rated	
M-W:								
Miscellaneous water-	Not rated		Not rated		Not rated		Not rated	
W:								
Water----------	Not rated		Not rated		Not rated		Not rated	

Water Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
3:							
Peta	68	Very limited		Very limited		Somewhat limited	
		Seepage	1.00	Piping	1.00	Cutbanks cave	0.10
				Depth to saturated zone	0.84	Depth to water	0.07
5:							
Savage	61	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.02	Hard to pack	0.10	Depth to water	1.00
5B:							
Savage	67	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.02	Hard to pack	0.10	Depth to water	1.00
6:							
Regan	64	Somewhat limited		Very limited		Somewhat limited	
		Seepage	0.54	Depth to saturated zone	1.00	Slow refill	0.46
						Cutbanks cave	0.10
				Piping	0.36		
7:							
Arnegard	68	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Piping	0.65	Depth to water	1.00
9F:							
Cabba	45	Somewhat limited		Very limited		Very limited	
		Slope	0.94	Thin layer	1.00	Depth to water	1.00
		Depth to bedrock	0.66	Piping	0.58		
		Seepage	0.02				
Sen	18	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Thin layer	0.86	Depth to water	1.00
		Slope	0.12	Piping	0.58		
		Depth to bedrock	0.11				
Chama	15	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Thin layer	0.86	Depth to water	1.00
		Slope	0.50	Piping	0.58		
		Depth to bedrock	0.11				
12B:							
Rhoades	55	Somewhat limited		Very limited		Somewhat limited	
		Seepage	0.04	Hard to pack	1.00	Slow refill	0.96
				Salinity	0.12	Depth to water	0.90
						Salty water	0.50
						Cutbanks cave	0.10
Daglum	33	Somewhat limited		Very limited		Very limited	
		Seepage	0.54	Hard to pack	1.00	Slow refill	1.00
				Salinity	0.12	Depth to water	0.90
						Salty water	0.50

Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
13B:							
Dogtooth	59	Somewhat limited		Very limited		Very limited	
		Depth to bedrock	0.11	Hard to pack	1.00	Depth to water	1.00
		Seepage	0.01	Salinity	0.12		
Janesburg	27	Somewhat limited		Very limited		Very limited	
		Seepage	0.47	Hard to pack	1.00	Depth to water	1.00
		Depth to bedrock	0.11	Salinity	0.12		
13D:							
Dogtooth	37	Somewhat limited		Very limited		Very limited	
		Depth to bedrock	0.11	Hard to pack	1.00	Depth to water	1.00
		Seepage	0.01	Salinity	0.12		
		Slope	0.01				
Janesburg	37	Somewhat limited		Very limited		Very limited	
		Seepage	0.47	Hard to pack	1.00	Depth to water	1.00
		Depth to bedrock	0.11	Salinity	0.12		
		Slope	0.01				
14E:							
Amor	20	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Thin layer	0.86	Depth to water	1.00
		Depth to bedrock	0.11	Piping	0.65		
Brandenburg	39	Very limited		Very limited		Very limited	
		Seepage	1.00	Thin layer	1.00	Depth to water	1.00
		Slope	0.02	Seepage	0.75		
				Content of large stones	0.09		
15B:							
Daglum	50	Somewhat limited		Very limited		Very limited	
		Seepage	0.54	Hard to pack	1.00	Slow refill	1.00
				Salinity	0.12	Depth to water	0.90
						Salty water	0.50
						Cutbanks cave	0.10
Rhoades	25	Somewhat limited		Very limited		Somewhat limited	
		Seepage	0.04	Hard to pack	1.00	Slow refill	0.96
				Salinity	0.12	Depth to water	0.90
						Salty water	0.50
						Cutbanks cave	0.10
17:							
Amor	58	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Thin layer	0.86	Depth to water	1.00
		Depth to bedrock	0.11	Piping	0.65		
Arnegard	10	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Piping	0.65	Depth to water	1.00
17B:							
Amor	67	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Thin layer	0.86	Depth to water	1.00
		Depth to bedrock	0.11	Piping	0.65		
Shambo	15	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Piping	0.56	Depth to water	1.00

Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
17C:							
Amor	39	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Thin layer	0.86	Depth to water	1.00
		Depth to bedrock	0.11	Piping	0.65		
Cabba	29	Somewhat limited		Very limited		Very limited	
		Depth to bedrock	0.66	Thin layer	1.00	Depth to water	1.00
		Seepage	0.02	Piping	0.58		
17D:							
Amor	42	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Thin layer	0.86	Depth to water	1.00
		Depth to bedrock	0.11	Piping	0.65		
		Slope	0.01				
Cabba	29	Somewhat limited		Very limited		Very limited	
		Depth to bedrock	0.66	Thin layer	1.00	Depth to water	1.00
		Seepage	0.02	Piping	0.58		
		Slope	0.01				
18E:							
Manning	24	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.79	Depth to water	1.00
Schaller	22	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.14	Depth to water	1.00
		Slope	0.04				
Wabek	22	Very limited		Very limited		Very limited	
		Seepage	1.00	Thin layer	1.00	Depth to water	1.00
		Slope	0.06	Seepage	0.61		
19:							
Sen	56	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Thin layer	0.86	Depth to water	1.00
		Depth to bedrock	0.11	Piping	0.58		
Golva	11	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Piping	0.53	Depth to water	1.00
19B:							
Chama	43	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Thin layer	0.86	Depth to water	1.00
		Depth to bedrock	0.11	Piping	0.58		
Sen	25	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Thin layer	0.86	Depth to water	1.00
		Depth to bedrock	0.11	Piping	0.58		
Cabba	14	Somewhat limited		Very limited		Very limited	
		Depth to bedrock	0.66	Thin layer	1.00	Depth to water	1.00
		Seepage	0.02	Piping	0.58		
19C:							
Chama	40	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Thin layer	0.86	Depth to water	1.00
		Depth to bedrock	0.11	Piping	0.58		
Cabba	28	Somewhat limited		Very limited		Very limited	
		Depth to bedrock	0.66	Thin layer	1.00	Depth to water	1.00
		Seepage	0.02	Piping	0.58		

Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
19C:(cont.)							
Sen	17	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Thin layer	0.86	Depth to water	1.00
		Depth to bedrock	0.11	Piping	0.58		
19D:							
Cabba	38	Somewhat limited		Very limited		Very limited	
		Depth to bedrock	0.66	Thin layer	1.00	Depth to water	1.00
		Seepage	0.02	Piping	0.58		
		Slope	0.01				
Chama	26	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Thin layer	0.86	Depth to water	1.00
		Depth to bedrock	0.11	Piping	0.58		
		Slope	0.01				
Sen	16	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Thin layer	0.86	Depth to water	1.00
		Depth to bedrock	0.11	Piping	0.58		
		Slope	0.01				
21B:							
Parshall	67	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.07	Depth to water	1.00
22B:							
Regent	71	Somewhat limited		Somewhat limited		Very limited	
		Depth to bedrock	0.11	Thin layer	0.86	Depth to water	1.00
		Seepage	0.01	Hard to pack	0.06		
Savage	15	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.02	Hard to pack	0.10	Depth to water	1.00
24B:							
Janesburg	51	Somewhat limited		Very limited		Very limited	
		Seepage	0.47	Hard to pack	1.00	Depth to water	1.00
		Depth to bedrock	0.11	Salinity	0.12		
25B:							
Lefor	78	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Thin layer	0.86	Depth to water	1.00
		Depth to bedrock	0.11				
27F:							
Badland, outcrop	42	Not rated		Not rated		Not rated	
Lambert	34	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Piping	0.63	Depth to water	1.00
		Slope	0.01				
Cabba	12	Somewhat limited		Very limited		Very limited	
		Depth to bedrock	0.66	Thin layer	1.00	Depth to water	1.00
		Slope	0.50	Piping	0.58		
		Seepage	0.02				
28F:							
Flasher	35	Somewhat limited		Very limited		Very limited	
		Slope	0.88	Thin layer	1.00	Depth to water	1.00
		Depth to bedrock	0.72	Seepage	0.07		
		Seepage	0.43				

Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
28F:(cont.)							
Rock outcrop--------	22	Not rated		Not rated		Not rated	
Vebar----------	13	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.81	Depth to water	1.00
		Slope	0.64	Seepage	0.01		
		Depth to bedrock	0.08				
29F:							
Arikara----------	33	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.94	Piping	0.69	Depth to water	1.00
		Seepage	0.72				
Shambo----------	21	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Piping	0.56	Depth to water	1.00
		Slope	0.18				
Cabba----------	18	Somewhat limited		Very limited		Very limited	
		Slope	0.88	Thin layer	1.00	Depth to water	1.00
		Depth to bedrock	0.66	Piping	0.58		
		Seepage	0.02				
30F:							
Vebar, extremely stony----------	27	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.86	Depth to water	1.00
		Slope	0.28	Seepage	0.01		
		Depth to bedrock	0.11				
Amor, extremely stony----------	21	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Thin layer	0.86	Depth to water	1.00
		Depth to bedrock	0.11	Piping	0.65		
		Slope	0.01				
31B:							
Sen----------	25	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Thin layer	0.86	Depth to water	1.00
		Depth to bedrock	0.11	Piping	0.58		
Janesburg----------	34	Somewhat limited		Very limited		Very limited	
		Seepage	0.47	Hard to pack	1.00	Depth to water	1.00
		Depth to bedrock	0.11	Salinity	0.12		
31C:							
Sen----------	22	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Thin layer	0.86	Depth to water	1.00
		Depth to bedrock	0.11	Piping	0.58		
Janesburg----------	21	Somewhat limited		Very limited		Very limited	
		Seepage	0.47	Hard to pack	1.00	Depth to water	1.00
		Depth to bedrock	0.11	Salinity	0.12		
35F:							
Flasher----------	32	Somewhat limited		Very limited		Very limited	
		Depth to bedrock	0.72	Thin layer	1.00	Depth to water	1.00
		Seepage	0.43	Seepage	0.07		
		Slope	0.18				

Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
35F:(cont.)							
Vebar	22	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.86	Depth to water	1.00
		Slope	0.28	Seepage	0.01		
		Depth to bedrock	0.11				
Parshall	15	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.07	Depth to water	1.00
		Slope	0.01				
36B:							
Ekalaka	32	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	1.00	Depth to water	1.00
				Salinity	0.50		
				Seepage	0.08		
Parshall	32	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.07	Depth to water	1.00
Desart	15	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	1.00	Depth to water	1.00
				Salinity	0.12		
				Seepage	0.07		
37B:							
Farfeld	39	Very limited		Very limited		Very limited	
		Depth to cemented pan	1.00	Piping	1.00	Depth to water	1.00
				Thin layer	1.00	Slow refill	1.00
				Salinity	0.50		
Cedarpan	27	Very limited		Very limited		Very limited	
		Depth to cemented pan	1.00	Hard to pack	1.00	Depth to water	1.00
				Salinity	0.12		
37F:							
Cedarpan	25	Very limited		Very limited		Very limited	
		Depth to cemented pan	1.00	Hard to pack	1.00	Depth to water	1.00
				Salinity	0.12		
		Slope	0.10				
Slickspots, stony	24	Not rated		Not rated		Not rated	
Farfeld	10	Very limited		Very limited		Very limited	
		Depth to cemented pan	1.00	Piping	1.00	Depth to water	1.00
				Thin layer	1.00	Slow refill	1.00
				Salinity	0.50		
41C:							
Wayden	58	Somewhat limited		Very limited		Very limited	
		Depth to bedrock	0.66	Thin layer	1.00	Depth to water	1.00
				Hard to pack	0.78		
				Salinity	0.03		
Moreau	15	Somewhat limited		Somewhat limited		Very limited	
		Depth to bedrock	0.11	Hard to pack	0.90	Depth to water	1.00
				Thin layer	0.86		
				Salinity	0.03		

Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
42B:							
Searing----------	60	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.85	Depth to water	1.00
				Piping	0.82		
				Seepage	0.05		
Ringling----------	19	Very limited		Very limited		Very limited	
		Seepage	1.00	Thin layer	1.00	Depth to water	1.00
				Seepage	0.75		
43:							
Belfield----------	49	Not limited		Very limited		Very limited	
				Hard to pack	1.00	Slow refill	1.00
				Salinity	0.12	Depth to water	0.90
						Salty water	0.50
						Cutbanks cave	0.10
Grail----------	26	Somewhat limited		Not limited		Somewhat limited	
		Seepage	0.01			Slow refill	0.99
						Depth to water	0.90
						Cutbanks cave	0.10
44:							
Shambo----------	48	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Piping	0.56	Depth to water	1.00
44B:							
Shambo----------	59	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Piping	0.56	Depth to water	1.00
47:							
Stady----------	41	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Piping	0.87	Depth to water	1.00
				Thin layer	0.85		
				Seepage	0.61		
48B:							
Manning----------	66	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.79	Depth to water	1.00
49B:							
Lihen----------	38	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.64	Depth to water	1.00
Parshall----------	15	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.07	Depth to water	1.00
51B:							
Janesburg----------	40	Somewhat limited		Very limited		Very limited	
		Seepage	0.47	Hard to pack	1.00	Depth to water	1.00
		Depth to bedrock	0.11	Salinity	0.12		
Dogtooth----------	29	Somewhat limited		Very limited		Very limited	
		Depth to bedrock	0.11	Hard to pack	1.00	Depth to water	1.00
		Seepage	0.01	Salinity	0.12		

Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
52:							
Heil	84	Somewhat limited		Very limited		Somewhat limited	
		Seepage	0.43	Depth to saturated zone	1.00	Slow refill	0.57
						Salty water	0.50
				Hard to pack	1.00	Cutbanks cave	0.10
				Ponding	1.00		
				Salinity	0.12		
53B:							
Savage	25	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.02	Hard to pack	0.57	Depth to water	1.00
Daglum	24	Somewhat limited		Very limited		Very limited	
		Seepage	0.54	Hard to pack	1.00	Slow refill	1.00
				Salinity	0.12	Depth to water	0.90
						Salty water	0.50
						Cutbanks cave	0.10
54:							
Channel	40	Not rated		Not rated		Not rated	
Straw	40	Somewhat limited		Somewhat limited		Somewhat limited	
		Seepage	0.72	Piping	0.63	Depth to water	0.90
						Slow refill	0.30
						Cutbanks cave	0.10
55:							
Pits, gravel and sand	85	Not rated		Not rated		Not rated	
57:							
Straw	28	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Piping	0.63	Depth to water	1.00
Rhoades	21	Somewhat limited		Very limited		Somewhat limited	
		Seepage	0.04	Hard to pack	1.00	Slow refill	0.96
				Salinity	0.12	Depth to water	0.90
						Salty water	0.50
						Cutbanks cave	0.10
Daglum	12	Somewhat limited		Very limited		Very limited	
		Seepage	0.54	Hard to pack	1.00	Slow refill	1.00
				Salinity	0.12	Depth to water	0.90
						Salty water	0.50
						Cutbanks cave	0.10
58:							
Straw	67	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Piping	0.63	Depth to water	1.00
60:							
Korell	75	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Piping	0.82	Depth to water	1.00
62F:							
Dogtooth	23	Somewhat limited		Very limited		Very limited	
		Depth to bedrock	0.11	Hard to pack	1.00	Depth to water	1.00
		Slope	0.06	Salinity	0.12		
		Seepage	0.01				

Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
62F:(cont.)							
Janesburg----------	23	Somewhat limited		Very limited		Very limited	
		Seepage	0.47	Hard to pack	1.00	Depth to water	1.00
		Depth to bedrock	0.11	Salinity	0.12		
		Slope	0.06				
Brandenburg---------	18	Very limited		Very limited		Very limited	
		Seepage	1.00	Thin layer	1.00	Depth to water	1.00
		Slope	0.18	Seepage	0.75		
				Content of large stones	0.09		
63F:							
Dogtooth----------	33	Somewhat limited		Very limited		Very limited	
		Depth to bedrock	0.11	Hard to pack	1.00	Depth to water	1.00
		Slope	0.04	Salinity	0.12		
		Seepage	0.01				
Janesburg----------	22	Somewhat limited		Very limited		Very limited	
		Seepage	0.47	Hard to pack	1.00	Depth to water	1.00
		Depth to bedrock	0.11	Salinity	0.12		
		Slope	0.04				
Cabba----------	20	Somewhat limited		Very limited		Very limited	
		Depth to bedrock	0.66	Thin layer	1.00	Depth to water	1.00
		Slope	0.12	Piping	0.58		
		Seepage	0.02				
65:							
Channel----------	40	Not rated		Not rated		Not rated	
Banks----------	29	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.25	Depth to water	1.00
Trembles----------	18	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.12	Depth to water	1.00
66B:							
Stady----------	50	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Piping	0.87	Depth to water	1.00
				Thin layer	0.85		
				Seepage	0.61		
67B:							
Evridge----------	28	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	1.00	Depth to water	1.00
		Depth to bedrock	0.11	Salinity	0.50		
				Seepage	0.01		
Desart----------	18	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	1.00	Depth to water	1.00
				Salinity	0.12		
				Seepage	0.07		
Telfer----------	13	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.02	Depth to water	1.00

Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
68F:							
Cabbart	41	Somewhat limited		Very limited		Very limited	
		Slope	0.82	Thin layer	1.00	Depth to water	1.00
		Depth to bedrock	0.66	Piping	0.63		
		Seepage	0.02				
Badland, outcrop	27	Not rated		Not rated		Not rated	
69F:							
Patent	33	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Piping	0.72	Depth to water	1.00
		Slope	0.01				
Badland, outcrop	21	Not rated		Not rated		Not rated	
Cabbart	21	Somewhat limited		Very limited		Very limited	
		Depth to bedrock	0.66	Thin layer	1.00	Depth to water	1.00
		Slope	0.50	Piping	0.63		
		Seepage	0.02				
70B:							
Maltese	39	Very limited		Very limited		Very limited	
		Seepage	1.00	Hard to pack	1.00	Depth to water	1.00
				Salinity	0.12		
Gerda	30	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	1.00	Depth to water	1.00
				Salinity	0.12		
71B:							
Chinook	42	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
Rhame	28	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.86	Depth to water	1.00
		Depth to bedrock	0.11	Seepage	0.01		
71D:							
Rhame	42	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.86	Depth to water	1.00
		Depth to bedrock	0.11	Seepage	0.01		
		Slope	0.01				
Chinook	32	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
		Slope	0.01				
72F:							
Rhame	29	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.86	Depth to water	1.00
		Slope	0.64	Seepage	0.01		
		Depth to bedrock	0.11				
Fleak	27	Somewhat limited		Very limited		Very limited	
		Depth to bedrock	0.72	Thin layer	1.00	Depth to water	1.00
		Slope	0.64	Seepage	0.07		
		Seepage	0.46				

Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73D:							
Gerda	16	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	1.00	Depth to water	1.00
				Salinity	0.12		
Kirby	23	Very limited		Very limited		Very limited	
		Seepage	1.00	Thin layer	1.00	Depth to water	1.00
		Slope	0.01	Seepage	1.00		
				Content of large stones	0.03		
74:							
Channel	40	Not rated		Not rated		Not rated	
Glendive	35	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.06	Depth to water	1.00
Havre	18	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Piping	0.56	Depth to water	1.00
75:							
Havre	77	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Piping	0.56	Depth to water	1.00
76B:							
Lonna	87	Somewhat limited		Very limited		Very limited	
		Seepage	0.72	Piping	1.00	Depth to water	1.00
76C:							
Lonna	64	Somewhat limited		Very limited		Very limited	
		Seepage	0.72	Piping	1.00	Depth to water	1.00
77:							
Glendive	70	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.06	Depth to water	1.00
78B:							
Hanly	81	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.16	Depth to water	1.00
79C:							
Zeona	76	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.25	Depth to water	1.00
80:							
Ethridge	64	Not limited		Not limited		Very limited	
						Depth to water	1.00
81B:							
Vebar	46	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.86	Depth to water	1.00
		Depth to bedrock	0.11	Seepage	0.01		
Parshall	19	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.07	Depth to water	1.00
81C:							
Vebar	34	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.86	Depth to water	1.00
		Depth to bedrock	0.11	Seepage	0.01		

Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
81C:(cont.)							
Tally	32	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.01	Depth to water	1.00
81D:							
Vebar	32	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.86	Depth to water	1.00
		Depth to bedrock	0.11	Seepage	0.01		
		Slope	0.01				
Flasher	16	Somewhat limited		Very limited		Very limited	
		Depth to bedrock	0.72	Thin layer	1.00	Depth to water	1.00
		Seepage	0.43	Seepage	0.07		
		Slope	0.01				
Tally	15	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.01	Depth to water	1.00
		Slope	0.01				
82E:							
Badland, outcrop	54	Not rated		Not rated		Not rated	
Patent	25	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Piping	0.72	Depth to water	1.00
		Slope	0.01				
83:							
Badland	88	Not rated		Not rated		Not rated	
85F:							
Lonna	34	Somewhat limited		Very limited		Very limited	
		Seepage	0.72	Piping	1.00	Depth to water	1.00
		Slope	0.01				
Cabbart	33	Somewhat limited		Very limited		Very limited	
		Depth to bedrock	0.66	Thin layer	1.00	Depth to water	1.00
		Slope	0.15	Piping	0.63		
		Seepage	0.02				
86F:							
Kirby	39	Very limited		Very limited		Very limited	
		Seepage	1.00	Thin layer	1.00	Depth to water	1.00
		Slope	0.88	Seepage	1.00		
				Content of large stones	0.03		
Badland, outcrop	23	Not rated		Not rated		Not rated	
Patent	13	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Piping	0.72	Depth to water	1.00
		Slope	0.12				
88:							
Littlemo	58	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.06	Depth to water	1.00
Chanta	20	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Piping	0.94	Depth to water	1.00
				Thin layer	0.85		
				Seepage	0.82		

Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
89B:							
Patent	80	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Piping	0.72	Depth to water	1.00
91F:							
Lonna	35	Somewhat limited		Very limited		Very limited	
		Seepage	0.72	Piping	1.00	Depth to water	1.00
		Slope	0.03				
Kirby	34	Very limited		Very limited		Very limited	
		Seepage	1.00	Thin layer	1.00	Depth to water	1.00
		Slope	0.41	Seepage	1.00		
				Content of large stones	0.03		
Cabbart	16	Somewhat limited		Very limited		Very limited	
		Depth to bedrock	0.66	Thin layer	1.00	Depth to water	1.00
		Slope	0.41	Piping	0.63		
		Seepage	0.02				
92B:							
Kremlin	26	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Piping	0.57	Depth to water	1.00
Ethridge	22	Not limited		Not limited		Very limited	
						Depth to water	1.00
Gerda	19	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	1.00	Depth to water	1.00
				Salinity	0.12		
94F:							
Kirby	42	Very limited		Very limited		Very limited	
		Seepage	1.00	Thin layer	1.00	Depth to water	1.00
		Slope	0.94	Seepage	1.00		
				Content of large stones	0.03		
Arikara	27	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.94	Piping	0.69	Depth to water	1.00
		Seepage	0.72				
Badland, outcrop	16	Not rated		Not rated		Not rated	
95F:							
Tinsley	53	Very limited		Very limited		Very limited	
		Seepage	1.00	Thin layer	1.00	Depth to water	1.00
		Slope	0.15	Seepage	0.07		
Chanta	17	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Piping	0.94	Depth to water	1.00
		Slope	0.01	Thin layer	0.85		
				Seepage	0.82		
97:							
Kremlin	77	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Piping	0.57	Depth to water	1.00

Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
98:							
Wolf Point----------	85	Not limited		Somewhat limited		Very limited	
				Hard to pack	0.96	Depth to water	1.00
99F:							
Badland, outcrop----	63	Not rated		Not rated		Not rated	
Cabbart----------	30	Somewhat limited		Very limited		Very limited	
		Slope	0.82	Thin layer	1.00	Depth to water	1.00
		Depth to bedrock	0.66	Piping	0.63		
		Seepage	0.02				
100C:							
Patent----------	32	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Piping	0.72	Depth to water	1.00
Gullied land--------	19	Not rated		Not rated		Not rated	
Glendive----------	13	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.06	Depth to water	1.00
101F:							
Boxwell----------	34	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Thin layer	0.86	Depth to water	1.00
		Slope	0.50	Piping	0.76		
		Depth to bedrock	0.11				
Cabbart----------	32	Somewhat limited		Very limited		Very limited	
		Depth to bedrock	0.66	Thin layer	1.00	Depth to water	1.00
		Slope	0.50	Piping	0.63		
		Seepage	0.02				
Arikara----------	16	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Piping	0.69	Depth to water	1.00
		Slope	0.64				
102B:							
Boxwell----------	46	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Thin layer	0.86	Depth to water	1.00
		Depth to bedrock	0.11	Piping	0.76		
Kremlin----------	43	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Piping	0.57	Depth to water	1.00
102D:							
Boxwell----------	38	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Thin layer	0.86	Depth to water	1.00
		Depth to bedrock	0.11	Piping	0.76		
		Slope	0.01				
Kremlin----------	28	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Piping	0.57	Depth to water	1.00
		Slope	0.01				
103F:							
Badland, outcrop----	30	Not rated		Not rated		Not rated	
Arikara----------	28	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.94	Piping	0.69	Depth to water	1.00
		Seepage	0.72				

Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
103F:(cont.)							
Cabbart	16	Somewhat limited		Very limited		Very limited	
		Slope	0.92	Thin layer	1.00	Depth to water	1.00
		Depth to bedrock	0.66	Piping	0.63		
		Seepage	0.02				
105:							
Harriet	80	Somewhat limited		Very limited		Somewhat limited	
		Seepage	0.72	Depth to saturated zone	1.00	Salty water	0.78
						Slow refill	0.28
				Piping	1.00	Cutbanks cave	0.10
				Salinity	0.50		
106:							
Riverwash	85	Not rated		Not rated		Not rated	
107D:							
Rhame	23	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.86	Depth to water	1.00
		Depth to bedrock	0.11	Seepage	0.01		
Kremlin	16	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Piping	0.57	Depth to water	1.00
Maltese	15	Very limited		Very limited		Very limited	
		Seepage	1.00	Hard to pack	1.00	Depth to water	1.00
				Salinity	0.12		
108D:							
Boxwell	27	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Thin layer	0.86	Depth to water	1.00
		Depth to bedrock	0.11	Piping	0.76		
		Slope	0.01				
Scairt	18	Somewhat limited		Very limited		Very limited	
		Depth to bedrock	0.11	Hard to pack	1.00	Depth to water	1.00
		Seepage	0.04	Salinity	0.12		
		Slope	0.01				
Maltese	14	Very limited		Very limited		Very limited	
		Seepage	1.00	Hard to pack	1.00	Depth to water	1.00
		Slope	0.01	Salinity	0.12		
109F:							
Rhame	24	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.86	Depth to water	1.00
		Slope	0.64	Seepage	0.01		
		Depth to bedrock	0.11				
Arikara	23	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Piping	0.69	Depth to water	1.00
		Slope	0.64				
Fleak	16	Somewhat limited		Very limited		Very limited	
		Depth to bedrock	0.72	Thin layer	1.00	Depth to water	1.00
		Slope	0.64	Seepage	0.07		
		Seepage	0.46				

Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
110C:							
Patent	38	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Piping	0.72	Depth to water	1.00
Gerda	27	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	1.00	Depth to water	1.00
				Salinity	0.12		
Slickspots	10	Not rated		Not rated		Not rated	
111F:							
Lonna	37	Somewhat limited		Very limited		Very limited	
		Seepage	0.72	Piping	1.00	Depth to water	1.00
		Slope	0.06				
Arikara	30	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.94	Piping	0.69	Depth to water	1.00
		Seepage	0.72				
Cabbart	18	Somewhat limited		Very limited		Very limited	
		Slope	0.88	Thin layer	1.00	Depth to water	1.00
		Depth to bedrock	0.66	Piping	0.63		
		Seepage	0.02				
112:							
Wolf Point, wooded	78	Not limited		Somewhat limited		Very limited	
				Hard to pack	0.96	Depth to water	1.00
113:							
Havre, wooded	80	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Piping	0.56	Depth to water	1.00
114B:							
Haplustolls	51	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
Ustorthents	45	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	1.00	Depth to water	1.00
115B:							
Cozberg	39	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.86	Depth to water	1.00
				Seepage	0.08		
Chanta	35	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Piping	0.94	Depth to water	1.00
				Thin layer	0.85		
				Seepage	0.82		
116F:							
Kremlin	21	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Piping	0.57	Depth to water	1.00
		Slope	0.12				
Shibah	20	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
		Slope	0.72				

Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
117B:							
Kremlin----------	43	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Piping	0.57	Depth to water	1.00
Chanta----------	42	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Piping	0.94	Depth to water	1.00
				Thin layer	0.85		
				Seepage	0.82		
118F:							
Shibah----------	39	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
		Slope	0.50				
Rubbleland----------	29	Not rated		Not rated		Not rated	
Arikara----------	25	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.94	Piping	0.69	Depth to water	1.00
		Seepage	0.72				
119:							
Glendive, wooded----	74	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.06	Depth to water	1.00
120B:							
Hanly, wooded-------	61	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.16	Depth to water	1.00
121F:							
Maltese----------	25	Very limited		Very limited		Very limited	
		Seepage	1.00	Hard to pack	1.00	Depth to water	1.00
				Salinity	0.12		
Lonna----------	24	Somewhat limited		Very limited		Very limited	
		Seepage	0.72	Piping	1.00	Depth to water	1.00
		Slope	0.03				
Arikara----------	22	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Piping	0.69	Depth to water	1.00
		Slope	0.64				
122C:							
Bulltop----------	59	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
Shibah----------	25	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
123E:							
Scairt----------	31	Somewhat limited		Very limited		Very limited	
		Depth to bedrock	0.11	Hard to pack	1.00	Depth to water	1.00
		Seepage	0.04	Salinity	0.12		
		Slope	0.01				
Maltese----------	22	Very limited		Very limited		Very limited	
		Seepage	1.00	Hard to pack	1.00	Depth to water	1.00
		Slope	0.02	Salinity	0.12		

Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
123E:(cont.)							
Boxwell----------	10	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Thin layer	0.86	Depth to water	1.00
		Depth to bedrock	0.11	Piping	0.76		
		Slope	0.01				
152:							
Heil----------	94	Somewhat limited		Very limited		Somewhat limited	
		Seepage	0.43	Depth to saturated zone	1.00	Slow refill	0.57
						Salty water	0.50
				Hard to pack	1.00	Cutbanks cave	0.10
				Ponding	1.00		
				Salinity	0.12		
155:							
Dumps and pits, mine	90	Not rated		Not rated		Not rated	
159:							
Channel----------	40	Not rated		Not rated		Not rated	
Straw----------	28	Somewhat limited		Somewhat limited		Somewhat limited	
		Seepage	0.72	Piping	0.63	Depth to water	0.90
						Slow refill	0.30
						Cutbanks cave	0.10
Daglum----------	18	Somewhat limited		Very limited		Very limited	
		Seepage	0.54	Hard to pack	1.00	Slow refill	1.00
				Salinity	0.12	Depth to water	0.90
						Salty water	0.50
						Cutbanks cave	0.10
175:							
Havre, rarely flooded----------	89	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Piping	0.56	Depth to water	1.00
177:							
Glendive, rarely flooded----------	84	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.06	Depth to water	1.00
183:							
Badland, high precipitation------	90	Not rated		Not rated		Not rated	
205:							
Harriet, low precipitation------	85	Somewhat limited		Very limited		Somewhat limited	
		Seepage	0.72	Depth to saturated zone	1.00	Salty water	0.78
						Slow refill	0.28
				Piping	1.00	Cutbanks cave	0.10
				Salinity	0.50		
210C:							
Lambert----------	41	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Piping	0.63	Depth to water	1.00
Slickspots----------	21	Not rated		Not rated		Not rated	

Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
210C:(cont.)							
Rhoades----------	15	Somewhat limited		Very limited		Very limited	
		Seepage	0.04	Hard to pack	1.00	Depth to water	1.00
				Salinity	0.12		
255:							
Pits, gravel and sand, low precipitation------	90	Not rated		Not rated		Not rated	
M-W:							
Miscellaneous water-	100	Not rated		Not rated		Not rated	
W:							
Water----------	100	Not rated		Not rated		Not rated	

Soil Properties

Data relating to soil properties are collected during the course of the soil survey.

Soil properties are determined by or estimated from the field examination of the soils and by laboratory testing. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine physical and chemical soil properties. Standard laboratory procedures are followed. Information from the laboratory and results from samples from similar soils in nearby areas are used to verify field observations and properties that cannot be estimated accurately in the field. The laboratory analyses also help to characterize key soils.

Estimates of soil properties shown in tables include the range of soil texture, Atterberg limits, engineering classifications, and other physical and chemical properties of the major layers of each soil. Pertinent soil and water features are also given.

Each soil map unit was documented by at least one pedon description for each soil series identified in its name. Pedons were sampled for engineering properties. The analyses were made by the North Dakota State Department of Transportation.

Engineering Index Properties

The "Engineering Index Properties" table gives the engineering classifications and the range of index properties for major layers of each named map unit component in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given in the series descriptions in this publication, under the heading "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the "Glossary."

Classification of the soils is determined according to the Unified soil classification system (American Society for Testing and Materials [ASTM], 1993) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 1986).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil

that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and **plasticity index** (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

Estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical Properties

The “Physical Properties of the Soils” table shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the major layers of each named map unit component in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given in the series descriptions in this publication, under the heading “Soil Series and Their Morphology.”

Clay consists of mineral soil particles that are less than 0.002 millimeter in diameter. The estimated clay content of each soil layer is given as a percentage, by weight, of the soil material less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. Clay determines the ability of the soil to adsorb cations and retain moisture. Clay influences shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated range in moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. Moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Ksat (permeability/saturated hydraulic conductivity) refers to the ability of a soil to transmit water or air. The estimates indicate the rate of water movement when the

soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The range in the capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect retention of water and depth of the root zone. The most important soil properties are organic matter content, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain of moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The magnitude of the load on the soil and magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design features are often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are **low**, a change of less than 3 percent; **moderate**, 3 to 6 percent; and **high**, more than 6 percent. **Very high**, more than 9 percent, is sometimes used.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In the “Physical Properties of the Soils” table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects available water capacity, infiltration rates, and tilth. It is a source of nitrogen and other nutrients for crops.

Erosion factor Kw indicates the susceptibility of a soil to sheet and rill erosion by water. Soil properties that influence erodibility are those that affect the infiltration rate, movement of water through the soil, water storage capacity of the soil, and those that allow the soil to resist dispersion, splashing, abrasion, and the transporting forces of rainfall and runoff. The most important soil properties are the content of silt, sand, and organic matter, soil structure, and permeability. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are modified by the presence of rock fragments. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion.

Erosion factor Kf is similar to the erosion factor Kw, except it indicates the erodibility of only the fine-earth fraction, or the material less than 2 millimeters in size.

Soil loss tolerance factor T is an estimate of the maximum annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is expressed in tons per acre per year. Ratings of 1 to 5 are used depending on soil properties and prior erosion. The criteria used in assigning a T factor to a soil include maintenance of an adequate rooting depth for crop production, potential reduction of crop yields, maintenance of water-control structures affected by sedimentation, prevention of gullying, and the value of nutrients lost through erosion.

Wind erodibility groups (WEG) are made up of soils that have similar properties affecting their resistance to wind erosion in cultivated areas. The groups indicate the susceptibility of soil to wind erosion. Soils are grouped according to the following distinctions:

WEG 1. Coarse sands, sands, fine sands, and very fine sands. These soils generally are not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.

WEG 2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, and sapric soil material. These soils are very highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

WEG 3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

WEG 4L. Calcareous loams, silt loams, clay loams, and silty clay loams. These soils are highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

WEG 4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay. These soils are highly erodible. Crops can be grown if measures to control wind erosion are used.

WEG 5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material. These soils are moderately erodible. Crops can be grown if measures to control wind erosion are used.

WEG 6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay. These soils are slightly erodible. Crops can be grown if ordinary measures to control wind erosion are used.

WEG 7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material. These soils are very slightly erodible. Crops can be grown if ordinary measures to control wind erosion are used.

WEG 8. Soils that are not subject to wind erosion because of rock fragments on the surface or because of surface wetness.

Wind erodibility index (I) is a numerical value indicating the potential annual soil loss due to wind erosion for a soil under a well defined set of climatic and management conditions. This factor is expressed as the average annual soil loss in tons per acre per year.

Chemical Properties

The “Chemical Properties of the Soils” table shows estimates of some soil chemical properties that affect soil behavior. These estimates are given for the major layers of each named map unit component in the survey area. The estimates are based on test data for these and similar soils. These features are described in the following paragraphs.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given in the series descriptions in this publication, under the heading “Soil Series and Their Morphology.”

Clay consists of mineral soil particles that are less than 0.002 millimeter in diameter. The estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material less than 2 millimeters in diameter.

Cation-exchange capacity is the total amount of exchangeable cation that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of

fertilizer than soils having a high cation-exchange capacity. The ability to retain cations helps to prevent pollution of ground water.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Calcium carbonate equivalent is the percent of carbonates, by weight, in the soil. The availability of plant nutrients is influenced by the amount of carbonates in the soil. Incorporating nitrogen fertilizer into calcareous soils helps to prevent nitrite accumulation and ammonium-N volatilization. Calcium carbonate also affects susceptibility of a soil to wind erosion.

Gypsum is given as the percent, by weight, of hydrated calcium sulfates in the soil. Gypsum is partially soluble in water and can be dissolved and removed by water. Soils that have a high content of gypsum (more than 10 percent) may collapse if the gypsum is removed by percolating water.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity (EC) of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Sodium adsorption ratio (SAR) is a measure of the amount of sodium relative to calcium and magnesium in the water extract from a saturated soil paste. Soils having a sodium adsorption ratio of 13 or more may be characterized by an increased dispersion of organic matter and clay particles, reduced permeability and aeration, and a general degradation of soil structure.

Water Features

The “Water Features” table gives estimates of several important water features used in land use planning that involves engineering considerations. These features are described in the following paragraphs.

Hydrologic soil groups are groups of soils that have the same runoff potential under similar storm and ground cover conditions. Soil properties that affect the runoff potential are those that influence the rate of infiltration in a bare soil after prolonged wetting and when the soil is not frozen. These properties include the depth to a seasonal high water table, the intake rate, permeability after prolonged wetting, and the depth to a very slowly permeable layer. The influences of ground cover and slope are treated independently and are not taken into account in hydrologic soil groups.

In the definitions of the hydrologic soil groups, the infiltration rate is the rate at which water enters the soil at the surface and is controlled by surface conditions. The transmission rate is the rate at which water moves through the soil and is controlled by properties of the soil layers.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of very deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist mainly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist mainly of soils having a layer that impedes the downward movement of water or soils of moderately fine or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist mainly of clayey soils that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to two hydrologic groups, the first letter is for drained areas and the second is for undrained areas.

Months in the table indicate the portion of the year in which the feature is most likely to be a concern.

Water table (seasonal) refers to a zone in the soil that is at saturation in most years. It is at least 6 inches thick, persists in the soil for more than a few weeks, and is within 6 feet of the surface. Estimates of water table depths are based mainly on the evidence of a saturated zone that exists in a soil, namely a combination of grayish colors or redoximorphic features. Water tables may either be apparent or perched. An apparent water table is indicated by the level at which water stands in a freshly dug, unlined borehole after adequate time is allowed for adjustment in the surrounding soil. A perched water table is water standing above an unsaturated zone in the soil. A perched water table may be separated from a lower water table by an unsaturated zone. Water tables usually are perched by textural discontinuities in the soil profile. A perched water table may be confirmed if the water level in a borehole falls when the borehole is extended.

Indicated in the “Water Features” table are the **upper limit** and **lower limit** in the depth of the water table found in the soil in most years. These depth ranges are given to the nearest tenth of a foot and are listed by month. If no water table exists in the soil, no information is given.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. Ponding of soils is classified according to the depth, duration, frequency, and the beginning and ending months in which water is observed.

Surface water depth is the maximum depth of surface water that is ponded on the soil.

Ponding duration is the average length of time of the ponding occurrence. Ponding duration classes are **very brief** (less than 2 days), **brief** (2 to 7 days), **long** (7 to 30 days), and **very long** (more than 30 days).

Ponding frequency is the number of times ponding occurs over a period of time. Ponding frequency classes are **none** (no reasonable possibility of ponding), **rare** (ponding unlikely but possible under unusual weather conditions; 0 to 5 percent chance of ponding in any year); **occasional** (ponding is expected infrequently under usual weather conditions; 5 to 50 percent chance of ponding in any year); and **frequent** (ponding is likely to occur under usual weather conditions; more than 50 percent chance in any year).

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflow from streams or by runoff from adjacent slopes. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in marshes and swamps or in closed depressions is considered to be ponding.

The table gives the **duration** and **frequency** of flooding and the time of year when flooding is most likely to occur. Flooding frequency classes are identical to ponding frequency classes. Flooding duration classes are **extremely brief** (0.1 to 4 hours), **very brief** (4 hours to 48 hours), **brief** (2 to 7 days), **long** (7 to 30 days), and **very long** (more than 30 days). Frequency, duration, and probable dates of occurrence are estimated.

The information on flooding is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered in making flooding estimates are local information about the extent and level of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

Soil Features

The “Soil Features” table gives estimates of several important soil features used in land use planning that involves engineering considerations. These features are described in the following paragraphs.

Restrictive layers are nearly continuous soil layers that significantly reduce the movement of water and air through the soil or that otherwise provide an unfavorable root environment. Restriction **kind** is the type of restriction. Examples of restrictions include bedrock, cemented layers, and dense layers. Restriction **thickness** is the distance from the top to the bottom of a restrictive layer. Restriction **hardness** refers to the rupture resistance or strength of the layer.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, organic matter content, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly-structured clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

A **low** potential for frost action indicates that the soil is rarely susceptible to the formation of ice lenses; a **moderate** potential indicates that the soil is susceptible to formation of ice lenses, resulting in frost heave and the subsequent loss of soil strength; and a **high** potential indicates that the soil is highly susceptible to formation of ice lenses, resulting in frost heave and the subsequent loss of soil strength.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil.

Special site examination and design features may be needed if the combination of factors results in a severe hazard of corrosion. Steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel in installations that are entirely within one kind of soil or within one soil layer.

For **uncoated steel**, the risk of corrosion, expressed as **low, moderate,** or **high,** is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For **concrete,** the risk of corrosion also is expressed as **low, moderate,** or **high**. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Hydric Soils

The “Hydric Soils List” shows which map units have components that meet the definition of hydric soils in Billings County. This table can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council, 1995; USDA-NRCS, 1998). Map units that are made up of hydric soils may have small areas or inclusions of nonhydric soils in the higher positions on the landform, and map units made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin et al., 1979; Environmental Laboratory, 1987; National Research Council, 1995; Tiner, 1985). Criteria for each of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). These soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria which identify those estimated soil properties unique to hydric soils have been established (Federal Register, 1995). These criteria are used to identify a phase of a soil series that normally is associated with wetlands. The criteria used are selected estimated soil properties that are described in “Soil Taxonomy” (Soil Survey Staff, 1999) and “Keys to Soil Taxonomy” (Soil Survey Staff, 1998) and in the “Soil Survey Manual” (Soil Survey Staff, 1993).

If soils are wet enough for a long enough period to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators that can be used to make onsite determinations of hydric soils in this survey area are specified in “Field Indicators of Hydric Soils in the United States” (USDA-NRCS, 1998).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described as deep as necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare soil features required by each hydric soil indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if one or more of the approved indicators is present.

This survey can be used to locate probable areas of hydric soils. The hydric soil may have been artificially drained or otherwise altered such that it no longer supports a predominance of hydrophytic vegetation. The soil map does not identify drained areas.

Engineering Index Properties

(The symbol < means less than; > means greater than. Dashes (--) indicate that an assignment has not been made.)

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
3:												
Peta----------	0-10	Loam	CL	A-6	0	0	100	100	85-95	60-75	25-35	10-15
	10-26	Clay loam, loam, sandy clay loam	CL, CL-ML	A-6, A-4	0	0	100	100	85-100	60-80	30-40	10-20
	26-48	Fine sandy loam, sandy loam, sandy clay loam	SC, CL	A-6	0	0	100	100	70-85	40-55	20-35	4-15
	48-53	Loam	CL	A-6	0	0	100	100	85-95	60-75	25-35	10-15
	53-80	Fine sandy loam, sandy loam, loamy sand	SC, SC-SM, CL, CL-ML	A-2-6, A-4, A-2-4	0	0	100	100	70-85	30-55	15-30	NP-10
5:												
Savage----------	0-7	Silty clay loam, clay loam	CL	A-6, A-7-6	0	0	100	95-100	90-100	85-95	40-50	15-25
	7-25	Silty clay, clay, silty clay loam	MH	A-7	0	0	100	100	95-100	85-95	50-65	20-30
	25-51	Silty clay, clay, silty clay loam	CH, MH	A-7-6	0	0	100	100	95-100	85-95	50-60	20-30
	51-80	Silty clay loam, silty clay, clay	CH, MH	A-7-6	0	0	100	100	95-100	85-95	50-60	20-30
5B:												
Savage----------	0-7	Silty clay loam, clay loam	CL	A-6, A-7-6	0	0	100	100	95-100	85-95	40-50	15-25
	7-25	Silty clay, clay, silty clay loam	MH	A-7	0	0	100	100	95-100	85-95	50-65	20-30
	25-51	Silty clay, clay, silty clay loam	CH, MH	A-7-6	0	0	100	100	95-100	85-95	50-60	20-30
	51-80	Silty clay loam, silty clay, clay	CH, MH	A-7-6	0	0	100	100	95-100	85-95	50-60	20-30

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
6:												
Regan----------	0-9	Silt loam, loam	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	70-95	25-35	4-15
	9-28	Silty clay loam, silt loam	CL	A-6	0	0	100	100	90-100	70-95	20-40	10-20
	28-60	Stratified sandy loam to silty clay loam	SC, CL	A-7-6, A-6	0	0	100	100	65-100	35-95	20-45	10-20
7:												
Arnegard--------	0-13	Loam	CL	A-6	0	0	100	100	85-95	60-85	25-35	10-15
	13-36	Loam, silt loam, clay loam	CL	A-6	0	0	100	100	85-100	50-85	30-40	10-20
	36-60	Loam, clay loam, fine sandy loam	CL, SC	A-4, A-6	0	0	100	100	70-100	40-80	25-40	8-20
9F:												
Cabba----------	0-3	Silt loam, loam	CL	A-6	0	0-5	90-100	85-100	70-90	60-80	25-35	10-15
	3-15	Silt loam, loam, silty clay loam, clay loam	CL	A-6, A-7-6	0	0-5	95-100	90-100	85-100	80-95	30-45	10-20
	15-60	Bedrock			---	---	---	---	---	---	20-45	4-20
Sen----------	0-6	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	25-35	10-15
	6-17	Silt loam, silty clay loam, loam	CL	A-6, A-7-6	0	0	100	100	85-100	60-95	30-45	10-20
	17-34	Silt loam, silty clay loam	CL	A-6	0	0	100	100	85-100	60-95	25-40	10-20
	34-60	Bedrock			---	---	---	---	---	---	25-45	4-20
Chama----------	0-4	Silt loam, loam	CL	A-4, A-6	0	0	100	100	90-100	70-90	25-35	8-15
	4-8	Silt loam, silty clay loam	CL	A-7-6, A-6	0	0	100	100	90-100	80-100	30-45	10-20
	8-34	Silt loam, silty clay loam	CL	A-6, A-7-6	0	0	100	100	90-100	80-100	30-45	10-20
	34-60	Bedrock			---	---	---	---	---	---	20-45	4-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				*Pct*	*Pct*					*Pct*	
12B:												
Rhoades---------	0-3	Silt loam, loam	CL	A-6, A-7-6	0	0	100	100	85-100	60-95	30-45	10-25
	3-8	Silty clay, clay loam, clay, silty clay loam	CH	A-7-6	0	0	100	100	90-100	80-95	50-65	25-35
	8-14	Silty clay, clay, clay loam, silty clay loam	CH	A-7-6	0	0	100	100	90-100	75-95	50-65	25-35
	14-46	Silty clay, clay, silty clay loam, clay loam, loam	CH, CL, ML, MH	A-6, A-7-6	0	0	100	100	90-100	70-95	35-60	10-30
	46-60	Stratified silt loam to silty clay loam, silt loam, loam, clay loam, silty clay	CH, CL, ML	A-6, A-7-6	0	0	100	100	85-100	75-95	35-60	10-30
Daglum----------	0-7	Loam, silt loam	CL	A-6	0	0	100	100	85-100	60-90	20-40	10-25
	7-8	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	20-40	10-25
	8-18	Clay, silty clay, silty clay loam, clay loam	CH, CL	A-6, A-7	0	0	100	100	90-100	70-95	35-75	15-45
	18-32	Clay loam, clay, silty clay	CH, CL	A-7, A-6	0	0	100	100	90-100	70-95	35-75	15-45
	32-47	Clay, silty clay loam, clay loam	CH	A-7-6	0	0	100	100	90-100	70-95	35-75	15-40
	47-60	Clay, clay loam, silty clay loam, silty clay, loam	CL, CH	A-6, A-7	0	0	100	100	85-100	60-95	35-60	15-40

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
13B:												
Dogtooth--------	0-2	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	30-40	10-15
	2-8	Silty clay, silty clay loam, clay loam	CH	A-7-6	0	0	100	100	70-100	60-95	50-60	20-30
	8-13	Silty clay, silty clay loam, clay loam	CH	A-7-6	0	0	100	100	70-100	60-95	50-60	20-30
	13-21	Silty clay, silty clay loam, loam	CH, CL	A-6, A-7-6	0	0	100	100	70-100	60-95	30-60	10-30
	21-60	Bedrock			---	---	---	---	---	---	25-100	4-60
Janesburg-------	0-8	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	30-40	10-15
	8-10	Silt loam, loam	SC, CL	A-2-4, A-2-6, A-4, A-6	0	0	100	100	70-100	30-90	25-40	8-15
	10-21	Silty clay, silty clay loam, clay	CH, CL	A-7-6	0	0	100	100	70-100	60-95	45-60	20-30
	21-26	Silt loam, loam, clay loam, silty clay loam, silty clay	CH, CL	A-6, A-7-6	0	0	100	100	70-100	60-95	30-55	10-30
	26-60	Bedrock			---	---	---	---	---	---	25-100	4-60
13D:												
Dogtooth--------	0-2	Silty clay loam	CL	A-7, A-6	0	0	100	100	90-100	70-85	40-50	15-25
	2-8	Silty clay, silty clay loam, clay loam	CH	A-7-6	0	0	100	100	70-100	60-95	50-60	20-30
	8-13	Silty clay, silty clay loam, clay loam	CH	A-7-6	0	0	100	100	70-100	60-95	50-60	20-30
	13-21	Silty clay, silty clay loam, loam	CH, CL	A-6, A-7-6	0	0	100	100	70-100	60-95	30-60	10-30
	21-60	Bedrock			---	---	---	---	---	---	25-100	4-60

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
13D:(cont.)												
Janesburg-------	0-8	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	30-40	10-15
	8-10	Silt loam, loam	SC, CL	A-2-4, A-2-6, A-4, A-6	0	0	100	100	70-100	30-90	25-40	8-15
	10-21	Silty clay, silty clay loam, clay	CH, CL	A-7-6	0	0	100	100	70-100	60-95	45-60	20-30
	21-26	Silt loam, loam, clay loam, silty clay loam, silty clay	CH, CL	A-6, A-7-6	0	0	100	100	70-100	60-95	30-55	10-30
	26-60	Bedrock			---	---	---	---	---	---	25-100	4-60
14E:												
Amor----------	0-8	Loam	CL	A-4, A-6	0	0	100	95-100	85-90	60-70	25-35	8-15
	8-19	Loam, clay loam	CL	A-6	0	0	100	95-100	90-100	65-85	30-40	10-20
	19-31	Loam, clay loam, fine sandy loam	CL	A-6	0	0	100	95-100	75-100	50-80	30-40	10-20
	31-60	Bedrock			---	---	---	---	---	---	15-45	1-20
Brandenburg-----	0-4	Channery loam	CL, CL-ML, GC-GM, SC	A-2-4, A-4, A-6, A-2-6	0	0-5	60-100	40-80	35-75	30-65	20-35	4-15
	4-10	Very channery loam, extremely channery loam, very channery sandy loam	CL, GM, ML, SM, CL-ML	A-2-6, A-4, A-6, A-2-4	0	0-5	45-100	40-80	35-75	30-65	15-35	1-15
	10-60	Channers	GW	A-1-a	0	80-85	15-25	5-10	0-5	0	15-20	NP-1

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
15B:												
Daglum----------	0-7	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	20-40	10-25
	7-8	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	20-40	10-25
	8-18	Clay, silty clay, silty clay loam, clay loam	CH, CL	A-6, A-7	0	0	100	100	90-100	70-95	35-75	15-45
	18-32	Clay loam, clay, silty clay	CH, CL	A-7, A-6	0	0	100	100	90-100	70-95	35-75	15-45
	32-47	Clay loam, silty clay loam, clay	CH	A-7-6	0	0	100	100	90-100	70-95	35-75	15-40
	47-60	Clay, clay loam, silty clay loam, silty clay, loam	CL, CH	A-6, A-7	0	0	100	100	85-100	60-95	35-60	15-40
Rhoades---------	0-3	Silt loam, loam	CL	A-6, A-7-6	0	0	100	100	85-100	60-95	30-45	10-15
	3-8	Silty clay, clay loam, clay, silty clay loam	CH	A-7-6	0	0	100	100	90-100	80-95	50-65	25-35
	8-14	Silty clay, clay, clay loam, silty clay loam	CH	A-7-6	0	0	100	100	90-100	75-95	50-65	25-35
	14-46	Silty clay, clay, silty clay loam, clay loam, loam	CH, CL, ML, MH	A-7-6, A-6	0	0	100	100	90-100	70-95	35-60	10-30
	46-60	Stratified silt loam to silty clay loam, silt loam, loam, clay loam, silty clay	CH, CL, ML	A-6, A-7-6	0	0	100	100	85-100	75-95	35-60	10-30

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				*Pct*	*Pct*					*Pct*	
17:												
Amor----------	0-8	Loam	CL	A-4, A-6	0	0	100	95-100	85-90	60-70	25-35	8-15
	8-19	Loam, clay loam	CL	A-6	0	0	100	95-100	90-100	65-85	30-40	10-20
	19-31	Loam, clay loam, fine sandy loam	CL	A-6	0	0	100	95-100	75-100	50-80	30-40	10-20
	31-60	Bedrock			---	---	---	---	---	---	15-45	1-20
Arnegard--------	0-13	Loam	CL	A-6	0	0	100	100	85-95	60-85	25-35	10-15
	13-36	Loam, silt loam, clay loam	CL	A-6	0	0	100	100	85-100	50-85	30-40	10-20
	36-60	Loam, clay loam, fine sandy loam	CL, SC	A-4, A-6	0	0	100	100	70-100	40-80	25-40	8-20
17B:												
Amor----------	0-8	Loam	CL	A-4, A-6	0	0	100	95-100	85-90	60-70	25-35	8-15
	8-19	Loam, clay loam	CL	A-6, A-4	0	0	100	95-100	90-100	65-85	30-40	10-20
	19-31	Loam, clay loam, fine sandy loam	CL	A-6, A-4	0	0	100	95-100	75-100	50-80	30-40	10-20
	31-60	Bedrock			---	---	---	---	---	---	15-45	1-20
Shambo----------	0-9	Loam, silt loam	CL	A-6	0	0	100	100	85-95	60-75	25-35	10-15
	9-13	Loam, silt loam, clay loam	CL	A-6	0	0	100	100	85-95	60-75	25-40	10-20
	13-29	Loam, silt loam, clay loam	CL	A-6	0	0	100	100	85-95	60-75	25-40	10-20
	29-48	Loam, silt loam, clay loam	CL	A-6	0	0	100	100	85-95	60-75	25-40	10-20
	48-60	Loam, silty clay loam, clay loam	CL	A-7-6, A-6	0	0	100	100	85-95	60-75	30-45	10-20
17C:												
Amor----------	0-8	Loam	CL	A-4, A-6	0	0	100	95-100	85-90	60-70	25-35	8-15
	8-19	Loam, clay loam	CL	A-6	0	0	100	95-100	90-100	65-85	30-40	10-20
	19-31	Loam, clay loam, fine sandy loam	CL	A-6	0	0	100	95-100	75-100	50-80	30-40	10-20
	31-60	Bedrock			---	---	---	---	---	---	15-45	1-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
17C:(cont.)												
Cabba----------	0-3	Loam, silt loam	CL	A-6	0	0-5	90-100	85-100	70-90	60-80	25-35	10-15
	3-15	Silt loam, loam, silty clay loam, clay loam	CL	A-6, A-7-6	0	0-5	95-100	90-100	85-100	80-95	30-45	10-20
	15-60	Bedrock			---	---	---	---	---	---	20-45	4-20
17D:												
Amor----------	0-8	Loam	CL	A-4, A-6	0	0	100	95-100	85-90	60-70	25-35	8-15
	8-19	Loam, clay loam	CL	A-6	0	0	100	95-100	90-100	65-85	30-40	10-20
	19-31	Loam, clay loam, fine sandy loam	CL	A-6	0	0	100	95-100	75-100	50-80	30-40	10-20
	31-60	Bedrock			---	---	---	---	---	---	15-45	1-20
Cabba----------	0-3	Loam, silt loam	CL	A-6	0	0-5	90-100	85-100	70-90	60-80	25-35	10-15
	3-15	Silt loam, loam, silty clay loam, clay loam	CL	A-6, A-7-6	0	0-5	95-100	90-100	85-100	80-95	30-45	10-20
	15-60	Bedrock			---	---	---	---	---	---	20-45	4-20
18E:												
Manning---------	0-5	Fine sandy loam	CL, CL-ML	A-4	0	0	95-100	95-100	85-95	55-70	20-30	4-10
	5-18	Fine sandy loam, loam	CL, CL-ML	A-4	0	0	90-100	80-100	80-90	50-65	20-30	4-10
	18-25	Fine sandy loam, gravelly fine sandy loam, loam	SC, SC-SM	A-4	0	0-3	55-85	50-80	30-80	25-50	20-30	4-10
	25-60	Stratified loamy sand to extremely gravelly loamy coarse sand	GC-GM, GM, SM, SP-SM	A-1-a	0	0-5	25-75	15-65	10-40	5-35	10-20	NP-4

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
18E:(cont.)												
Schaller--------	0-9	Sandy loam, fine sandy loam	CL-ML, SC-SM, SM, ML	A-2-4, A-4	0	0	95-100	95-100	55-85	25-55	10-25	NP-7
	9-15	Fine sandy loam, loamy fine sand, gravelly coarse sandy loam	GM, GP-GM, SM, SP-SM	A-1-b, A-2-4, A-3, A-4	0	0-5	55-100	50-100	40-85	5-55	0-20	NP-5
	15-60	Gravelly loamy coarse sand, gravelly sand, sand	GM, GC-GM, SM, SP-SM	A-1-b, A-2-4, A-3	0	0-5	55-90	50-90	40-70	5-15	0-20	NP-5
Wabek----------	0-5	Loam	CL	A-6, A-4	0	0-1	90-100	90-100	75-90	50-70	25-35	8-15
	5-9	Gravelly sandy loam, gravelly loam, gravelly coarse sandy loam	SC-SM, SC, GC-GM, GC	A-1-b, A-2-4, A-4, A-6, A-2-6	0	0-1	50-80	50-80	30-60	20-40	20-35	4-15
	9-60	Extremely gravelly loamy coarse sand, very gravelly loamy sand, very gravelly sand, very gravelly coarse sand	SP-SM, SM, SP, SW, SC-SM, SW-SM, GC-GM, GM, GW-GM, GP-GM, GW, GP	A-1-b, A-1-a, A-2-4	0	0-1	25-90	10-65	5-35	0-25	15-20	NP-4
19:												
Sen----------	0-6	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	25-35	10-15
	6-17	Silt loam, silty clay loam, loam	CL	A-6, A-7-6	0	0	100	100	85-100	60-95	30-45	10-20
	17-34	Silt loam, silty clay loam	CL	A-6	0	0	100	100	85-100	60-95	25-40	10-20
	34-60	Bedrock			---	---	---	---	---	---	25-40	10-25

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
19:(cont.)												
Golva----------	0-5	Silt loam, loam	CL	A-6	0	0	100	100	90-100	70-85	25-35	10-15
	5-15	Silt loam, silty clay loam	CL	A-6	0	0	100	100	90-100	70-95	30-45	10-20
	15-21	Silt loam, silty clay loam	CL	A-6	0	0	100	100	90-100	70-95	30-45	10-20
	21-40	Silt loam, silty clay loam	CL	A-6	0	0	100	100	90-100	70-95	30-40	10-20
	40-60	Silt loam, silty clay loam, loam	CL	A-6	0	0	100	100	85-100	60-90	30-45	10-20
19B:												
Chama----------	0-4	Silt loam, loam	CL	A-4, A-6	0	0	100	100	90-100	70-90	25-35	8-15
	4-8	Silt loam, silty clay loam	CL	A-7-6, A-6	0	0	100	100	90-100	80-100	30-45	10-20
	8-34	Silt loam, silty clay loam	CL	A-6, A-7-6	0	0	100	100	90-100	80-100	30-45	10-20
	34-60	Bedrock			---	---	---	---	---	---	20-45	4-20
Sen----------	0-6	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	25-35	10-15
	6-17	Silt loam, silty clay loam, loam	CL	A-6, A-7-6	0	0	100	100	85-100	60-95	30-45	10-20
	17-34	Silt loam, silty clay loam	CL	A-6	0	0	100	100	85-100	60-95	25-40	10-20
	34-60	Bedrock			---	---	---	---	---	---	25-40	10-25
Cabba----------	0-3	Silt loam, loam	CL	A-6	0	0-5	90-100	85-100	70-90	60-80	25-35	10-15
	3-15	Silt loam, loam, silty clay loam, clay loam	CL	A-6, A-7-6	0	0-5	95-100	90-100	85-100	80-95	30-45	10-20
	15-60	Bedrock			---	---	---	---	---	---	20-45	4-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				*Pct*	*Pct*					*Pct*	
19C:												
Chama----------	0-4	Silt loam, loam	CL	A-4, A-6	0	0	100	100	90-100	70-90	25-35	8-15
	4-8	Silt loam, silty clay loam	CL	A-7-6, A-6	0	0	100	100	90-100	80-100	30-45	10-20
	8-34	Silt loam, silty clay loam	CL	A-6, A-7-6	0	0	100	100	90-100	80-100	30-45	10-20
	34-60	Bedrock			---	---	---	---	---	---	20-45	4-20
Cabba----------	0-3	Silt loam, loam	CL	A-6	0	0-5	90-100	85-100	70-90	60-80	25-35	10-15
	3-15	Silt loam, loam, silty clay loam, clay loam	CL	A-6, A-7-6	0	0-5	95-100	90-100	85-100	80-95	30-45	10-20
	15-60	Bedrock			---	---	---	---	---	---	20-45	4-20
Sen----------	0-6	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	25-35	10-15
	6-17	Silt loam, silty clay loam, loam	CL	A-6, A-7-6	0	0	100	100	85-100	60-95	30-45	10-20
	17-34	Silt loam, silty clay loam	CL	A-6	0	0	100	100	85-100	60-95	25-40	10-20
	34-60	Bedrock			---	---	---	---	---	---	25-40	10-25
19D:												
Cabba----------	0-3	Silt loam, loam	CL	A-6	0	0-5	90-100	85-100	70-90	60-80	25-35	10-15
	3-15	Silt loam, loam, silty clay loam, clay loam	CL	A-6, A-7-6	0	0-5	95-100	90-100	85-100	80-95	30-45	10-20
	15-60	Bedrock			---	---	---	---	---	---	20-45	4-20
Chama----------	0-4	Silt loam, loam	CL	A-4, A-6	0	0	100	100	90-100	70-90	25-35	8-15
	4-8	Silt loam, silty clay loam	CL	A-7-6, A-6	0	0	100	100	90-100	80-100	30-45	10-20
	8-34	Silt loam, silty clay loam	CL	A-6, A-7-6	0	0	100	100	90-100	80-100	30-45	10-20
	34-60	Bedrock			---	---	---	---	---	---	20-45	4-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
19D:(cont.)												
Sen----------	0-6	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	25-35	10-15
	6-17	Silt loam, silty clay loam, loam	CL	A-6, A-7-6	0	0	100	100	85-100	60-95	30-45	10-20
	17-34	Silt loam, silty clay loam	CL	A-6	0	0	100	100	85-100	60-95	25-40	10-20
	34-60	Bedrock			---	---	---	---	---	---	25-40	10-25
21B:												
Parshall--------	0-12	Fine sandy loam, sandy loam	CL-ML, CL, SC, SC-SM	A-2-4, A-4	0	0	100	100	60-85	30-55	20-30	4-10
	12-29	Fine sandy loam	CL-ML, CL, SC, SC-SM	A-2-4, A-4	0	0	100	100	60-85	30-55	20-30	4-10
	29-48	Fine sandy loam, loamy sand, sandy loam	CL-ML, ML, SC, SM, SC-SM, CL	A-2-4, A-4	0	0	100	100	60-85	25-55	15-30	1-10
	48-60	Loamy fine sand, fine sandy loam, sandy loam, loamy sand	CL-ML, ML, SC, SM, SC-SM, CL	A-2-4, A-4	0	0	100	100	60-85	25-55	15-30	1-10
22B:												
Regent----------	0-10	Silty clay loam	CH, CL	A-7-6, A-6	0	0	100	100	90-100	80-100	40-55	15-25
	10-26	Silty clay, silty clay loam	CH, CL	A-7-6	0	0	100	100	90-100	80-100	45-60	20-30
	26-39	Silty clay loam, silty clay, clay	CL, CH	A-7-6	0	0	100	100	90-100	80-100	45-60	20-30
	39-60	Bedrock			---	---	---	---	---	---	---	---

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				*Pct*	*Pct*					*Pct*	
22B:(cont.)												
Savage----------	0-7	Silty clay loam, clay loam	CL	A-6, A-7-6	0	0	100	100	95-100	85-95	40-50	15-25
	7-25	Silty clay, clay, silty clay loam	MH	A-7	0	0	100	100	95-100	85-95	50-65	20-30
	25-51	Silty clay, clay, silty clay loam	CH, MH	A-7-6	0	0	100	100	95-100	85-95	50-60	20-30
	51-60	Silty clay loam, silty clay, clay	CH, MH	A-7-6	0	0	100	100	95-100	85-95	50-60	20-30
24B:												
Janesburg-------	0-8	Fine sandy loam	CL, SC-SM, SC, CL-ML	A-4, A-2-4	0	0	100	100	70-85	30-60	20-30	4-10
	8-10	Fine sandy loam	CL-ML, CL, SC, SC-SM, ML, SM	A-2-4, A-4	0	0	100	100	70-100	30-90	20-30	3-10
	10-21	Silty clay, silty clay loam, clay	CH, CL	A-7	0	0	100	100	70-100	60-95	45-70	20-35
	21-26	Silt loam, loam, clay loam, silty clay loam, silty clay	CH, CL	A-6, A-7	0	0	100	100	70-100	60-95	30-60	10-30
	26-60	Bedrock			---	---	---	---	---	---	25-100	4-60
25B:												
Lefor----------	0-7	Fine sandy loam, sandy loam, loam	CL-ML, ML, SC, SM	A-4	0	0	100	100	70-85	40-55	15-30	3-10
	7-15	Fine sandy loam, loam, sandy loam	SC, CL-ML, SM	A-4	0	0	100	100	70-85	40-55	15-30	3-10
	15-30	Sandy clay loam, loam	CL-ML, SC	A-4	0	0	100	100	80-100	35-55	20-30	7-10
	30-36	Fine sandy loam, sandy loam, loam	SC, SC-SM, SM	A-4	0	0	100	100	70-85	30-55	15-30	3-10
	36-60	Bedrock			---	---	---	---	---	---	8-15	NP-3

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
27F:												
Badland, outcrop	0-60	Bedrock	CH, CL-ML, SC, SC-SM	A-4, A-6, A-7	0	0	90-100	85-100	75-100	35-95	15-75	5-50
Lambert---------	0-5	Silt loam	CL	A-6	0	0	100	100	90-100	75-90	25-35	10-15
	5-36	Silt loam, silty clay loam	CL	A-7-6, A-6	0	0	100	100	90-100	80-90	30-45	10-20
	36-60	Very fine sandy loam, stratified very fine sandy loam to silty clay loam	CL	A-4, A-6, A-7-6, A-5	0	0	100	100	85-95	55-70	25-45	8-20
Cabba----------	0-3	Silt loam, loam	CL	A-6	0	0-5	90-100	85-100	70-90	60-80	25-35	10-15
	3-15	Silt loam, loam, silty clay loam, clay loam	CL	A-6, A-7-6	0	0-5	95-100	90-100	85-100	80-95	30-45	10-20
	15-60	Bedrock			---	---	---	---	---	---	20-45	4-20
28F:												
Flasher---------	0-6	Loamy fine sand, loamy sand	SM	A-2-4	0	0	85-100	85-100	50-100	15-35	15-20	NP-4
	6-10	Loamy fine sand, loamy sand, fine sand	SM	A-2-4	0	0	85-100	85-100	50-100	15-35	10-20	NP-4
	10-60	Bedrock			---	---	---	---	---	---	10-20	NP-4
Rock outcrop----	---	---	---	---	---	---	---	---	---	---	---	---
Vebar----------	0-5	Fine sandy loam, sandy loam	CL, SC-SM, CL-ML, SC	A-2-4, A-4	0	0	95-100	90-100	60-100	30-55	20-30	4-10
	5-26	Fine sandy loam, sandy loam	CL, SC-SM, SC, CL-ML	A-2-4, A-4	0	0	95-100	90-100	60-100	30-55	20-30	4-10
	26-32	Fine sandy loam, loamy fine sand, sandy loam	CL, SC-SM, SC, CL-ML	A-4, A-2-4	0	0	95-100	90-100	60-100	30-55	20-30	4-10
	32-60	Bedrock			---	---	---	---	---	---	10-20	NP-4

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
29F:												
Arikara---------	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	---	---	---	---
	1-2	Loam, clay loam	CL	A-6, A-7-6, A-5	0	0	100	100	85-100	70-80	30-45	10-20
	2-14	Loam, clay loam, silt loam, silty clay loam	CL	A-7-6, A-6, A-5	0	0	85-100	80-100	70-100	50-85	30-45	10-20
	14-39	Loam, fine sandy loam, silty clay loam, clay loam	SC-SM, CL	A-6, A-4, A-7-6, A-5	0	0	85-100	80-100	70-100	50-90	25-45	8-20
	39-60	Loam, clay loam, fine sandy loam, silt loam	CL, SC, SC-SM	A-4, A-6, A-7-6, A-5	0	0	85-100	80-100	70-100	40-90	25-45	8-20
Shambo----------	0-9	Loam, silt loam	CL	A-6	0	0	100	100	85-95	60-75	25-35	10-15
	9-13	Loam, silt loam, clay loam	CL	A-6	0	0	100	100	85-95	60-75	25-40	10-20
	13-29	Loam, silt loam, clay loam	CL	A-6	0	0	100	100	85-95	60-75	25-40	10-20
	29-48	Loam, silt loam, clay loam	CL	A-6	0	0	100	100	85-95	60-75	25-40	10-20
	48-60	Loam, silty clay loam, clay loam	CL	A-7-6, A-6	0	0	100	100	85-95	60-75	30-45	10-20
Cabba----------	0-3	Loam, silt loam	CL	A-6	0	0-5	90-100	85-100	70-90	60-80	25-35	10-15
	3-15	Silt loam, loam, silty clay loam, clay loam	CL	A-6, A-7-6	0	0-5	95-100	90-100	85-100	80-95	30-45	10-20
	15-60	Bedrock			---	---	---	---	---	---	20-45	4-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
30F:												
Vebar, extremely stony----------	0-5	Extremely stony fine sandy loam, extremely stony sandy loam	CL, CL-ML, SC, SC-SM	A-2-4, A-4	0-5	3-25	95-100	90-100	60-100	30-55	20-30	4-10
	5-26	Fine sandy loam, sandy loam	CL, CL-ML, SC, SC-SM	A-2-4, A-4	0	0	95-100	90-100	60-100	30-55	20-30	4-10
	26-32	Fine sandy loam, loamy fine sand, sandy loam	CL, CL-ML, SC, SC-SM	A-4, A-2-4	0	0	95-100	90-100	60-100	30-55	20-30	4-10
	32-60	Bedrock			---	---	---	---	---	---	10-20	NP-4
Amor, extremely stony----------	0-8	Extremely stony loam	CL	A-4, A-6	0-5	3-25	100	95-100	90-100	65-85	25-35	8-15
	8-19	Loam, clay loam	CL	A-6	0	0	100	95-100	90-100	65-85	30-40	10-20
	19-31	Loam, clay loam, fine sandy loam	CL	A-6	0	0	100	95-100	75-100	50-80	30-40	10-20
	31-60	Bedrock			---	---	---	---	---	---	15-45	1-20
31B:												
Sen----------	0-6	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	25-35	10-15
	6-17	Silt loam, silty clay loam, loam	CL	A-6, A-7-6	0	0	100	100	85-100	60-95	30-45	10-20
	17-34	Silt loam, silty clay loam	CL	A-6	0	0	100	100	85-100	60-95	25-40	10-20
	34-60	Bedrock			---	---	---	---	---	---	25-40	10-25
Janesburg-------	0-8	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	30-40	10-15
	8-10	Silt loam, loam	SC, CL	A-2-6, A-2-4, A-4, A-6	0	0	100	100	70-100	30-90	25-35	8-15
	10-21	Silty clay, silty clay loam, clay	CH, CL	A-7-6	0	0	100	100	70-100	60-95	45-60	20-30
	21-26	Silt loam, loam, clay loam, silty clay loam, silty clay	CH, CL	A-6, A-7-6	0	0	100	100	70-100	60-95	30-55	10-30
	26-60	Bedrock			---	---	---	---	---	---	25-100	4-60

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
31C:												
Sen----------	0-6	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	25-35	10-15
	6-17	Silt loam, silty clay loam, loam	CL	A-6, A-7-6	0	0	100	100	85-100	60-95	30-45	10-20
	17-34	Silt loam, silty clay loam	CL	A-6	0	0	100	100	85-100	60-95	25-40	10-20
	34-60	Bedrock			---	---	---	---	---	---	25-40	10-25
Janesburg-------	0-8	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	30-40	10-15
	8-10	Silt loam, loam	SC, CL	A-2-6, A-2-4, A-4, A-6	0	0	100	100	70-100	30-90	25-35	8-15
	10-21	Silty clay, silty clay loam, clay	CH, CL	A-7-6	0	0	100	100	70-100	60-95	45-60	20-30
	21-26	Silt loam, loam, clay loam, silty clay loam, silty clay	CH, CL	A-6, A-7-6	0	0	100	100	70-100	60-95	30-55	10-30
	26-60	Bedrock			---	---	---	---	---	---	25-100	4-60
35F:												
Flasher---------	0-6	Loamy fine sand, loamy sand	SM	A-2-4	0	0	85-100	85-100	50-100	15-35	15-20	NP-4
	6-10	Loamy fine sand, loamy sand, fine sand	SM	A-2-4	0	0	85-100	85-100	50-100	15-35	10-20	NP-4
	10-60	Bedrock			---	---	---	---	---	---	10-20	NP-4
Vebar----------	0-5	Fine sandy loam, sandy loam	CL, CL-ML, SC, SC-SM	A-2-4, A-4	0	0	95-100	90-100	60-100	30-55	20-30	4-10
	5-26	Fine sandy loam, sandy loam	CL, CL-ML, SC, SC-SM	A-2-4, A-4	0	0	95-100	90-100	60-100	30-55	20-30	4-10
	26-32	Fine sandy loam, loamy fine sand, sandy loam	CL, CL-ML, SC, SC-SM	A-4, A-2-4	0	0	95-100	90-100	60-100	30-55	20-30	4-10
	32-60	Bedrock			---	---	---	---	---	---	10-20	NP-4

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
35F:(cont.)												
Parshall--------	0-12	Fine sandy loam, sandy loam	CL-ML, CL, SC, SC-SM	A-2-4, A-4	0	0	100	100	60-85	30-55	20-30	4-10
	12-29	Fine sandy loam	CL-ML, CL, SC, SC-SM	A-2-4, A-4	0	0	100	100	60-85	30-55	20-30	4-10
	29-48	Fine sandy loam, loamy sand, sandy loam	SC, CL-ML, ML, CL, SC-SM, SM	A-2-4, A-4	0	0	100	100	60-85	25-55	15-30	1-10
	48-60	Loamy fine sand, fine sandy loam, sandy loam, loamy sand	CL-ML, ML, SC, CL, SC-SM, SM	A-2-4, A-4	0	0	100	100	60-85	25-55	15-30	1-10
36B:												
Ekalaka---------	0-6	Fine sandy loam, sandy loam	CL-ML, SC	A-2, A-4	0	0	100	100	60-95	30-65	20-30	5-10
	6-12	Fine sandy loam, very fine sandy loam, loamy fine sand	SM, ML, CL-ML	A-4, A-2	0	0	100	100	65-95	30-65	15-30	NP-10
	12-17	Fine sandy loam, sandy loam, loam	ML, SM	A-4, A-2	0	0	100	100	70-100	30-70	20-35	NP-10
	17-33	Fine sandy loam, loamy fine sand, fine sand, sandy loam	SC-SM, ML, SM	A-2-4, A-4	0	0	100	100	60-85	15-55	20-30	NP-10
	33-60	Stratified sand to fine sandy loam	ML, SC-SM, SM	A-2-4, A-4	0	0	100	100	60-85	15-55	20-30	NP-10

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				*Pct*	*Pct*					*Pct*	
36B:(cont.)												
Parshall--------	0-12	Fine sandy loam, sandy loam	CL-ML, CL, SC, SC-SM	A-2-4, A-4	0	0	100	100	60-85	30-55	20-30	4-10
	12-29	Fine sandy loam	CL-ML, CL, SC, SC-SM	A-2-4, A-4	0	0	100	100	60-85	30-55	20-30	4-10
	29-48	Fine sandy loam, loamy sand, sandy loam	SC, ML, SC-SM, CL-ML, CL, SM	A-2-4, A-4	0	0	100	100	60-85	25-55	15-30	1-10
	48-60	Loamy fine sand, fine sandy loam, sandy loam, loamy sand	CL-ML, ML, SC, CL, SC-SM, SM	A-2-4, A-4	0	0	100	100	60-85	25-55	15-30	1-10
Desart----------	0-20	Fine sandy loam, sandy loam, very fine sandy loam	SM	A-2, A-4	0	0	100	100	60-85	30-50	0-20	NP-10
	20-24	Loamy fine sand, very fine sandy loam, fine sandy loam, sandy loam, loamy sand, fine sand	SM	A-2, A-4	0	0	100	100	50-70	15-50	0-20	NP-10
	24-31	Fine sandy loam, very fine sandy loam, sandy loam, loam	SC-SM	A-2, A-4	0	0	100	100	70-100	30-65	20-30	6-10
	31-60	Loamy fine sand, sandy loam, loam	SM, ML	A-4, A-2	0	0	100	100	50-100	25-65	20-30	NP-10

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
37B:												
Farfeld---------	0-4	Loam, silt loam	CL	A-6	0	0	100	100	85-95	60-75	25-35	10-15
	4-15	Loam, silt loam	CL	A-6	0	0	85-100	80-90	75-85	25-50	25-35	10-15
	15-37	Cemented material			---	---	---	---	---	---	---	---
	37-53	Clay, silty clay loam, gravelly clay	CH, CL	A-7-6	0	0	75-100	60-85	55-70	35-50	40-55	20-30
	53-120	Clay, silty clay, silty clay loam	CH, CL	A-7-6	0	0	100	100	95-100	85-95	40-55	20-30
Cedarpan--------	0-4	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	30-40	10-15
	4-9	Silt loam, loam	CL	A-6	0	0	100	100	85-100	50-100	30-40	10-15
	9-15	Silty clay, clay, silty clay loam, clay loam	CH, MH	A-7-6	0	0	100	100	90-100	70-95	50-70	20-40
	15-26	Cemented material			---	---	---	---	---	---	---	---
	26-45	Silty clay, silty clay loam, clay	MH, CH	A-7-6	0	0	100	100	90-100	75-95	50-70	20-40
	45-80	Silty clay, silty clay loam	MH, CH	A-7-6	0	0	100	100	90-100	85-95	50-70	20-40
37F:												
Cedarpan--------	0-4	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	30-40	10-15
	4-9	Silt loam, loam	CL	A-6	0	0	100	100	85-100	50-100	30-40	10-15
	9-15	Silty clay, clay, silty clay loam, clay loam	CH, MH	A-7-6	0	0	100	100	90-100	70-95	50-70	20-40
	15-26	Cemented material			---	---	---	---	---	---	---	---
	26-45	Silty clay, silty clay loam, clay	MH, CH	A-7-6	0	0	100	100	90-100	75-95	50-70	20-40
	45-80	Silty clay, silty clay loam	MH, CH	A-7-6	0	0	100	100	90-100	85-95	50-70	20-40

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				*Pct*	*Pct*					*Pct*	
37F:(cont.)												
Slickspots, stony----------	0-2	Silty clay	CH	A-7	0	0	100	100	90-100	80-100	40-55	15-25
	2-60	Stratified loam to silty clay	CH	A-7	0	0	100	100	90-100	60-100	50-70	25-40
Farfeld---------	0-4	Loam, silt loam	CL	A-6	0	0	100	100	85-95	60-75	25-35	10-15
	4-15	Loam, silt loam	CL	A-6	0	0	85-100	80-90	75-85	25-50	25-35	10-15
	15-37	Cemented material			---	---	---	---	---	---	---	---
	37-53	Clay, silty clay loam, gravelly clay	CH, CL	A-7-6	0	0	75-100	60-85	55-70	35-50	40-55	20-30
	53-120	Clay, silty clay, silty clay loam	CH, CL	A-7-6	0	0	100	100	95-100	85-95	40-55	20-30
41C:												
Wayden----------	0-3	Silty clay, clay	CH	A-7-6	0	0	100	100	90-100	75-95	55-65	30-40
	3-7	Silty clay, clay, silty clay loam	CH	A-7-6	0	0	100	100	90-100	75-95	50-65	25-40
	7-15	Silty clay, clay, silty clay loam	CH	A-7-6	0	0	100	100	90-100	75-95	50-65	25-40
	15-60	Bedrock			---	---	---	---	---	---	45-100	25-75
Moreau----------	0-6	Silty clay, clay	CH, CL	A-7-6	0	0	100	100	90-100	70-100	45-75	25-50
	6-13	Silty clay, silty clay loam, clay	CH, CL	A-7-6	0	0	100	100	90-100	75-100	45-75	20-50
	13-35	Silty clay, silty clay loam, clay	CH, CL	A-7-6	0	0	100	100	90-100	75-100	45-75	20-50
	35-60	Bedrock			---	---	---	---	---	---	35-80	20-50

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
42B:												
Searing---------	0-8	Loam, silt loam	CL	A-6	0	0	100	100	85-95	65-85	25-35	10-15
	8-23	Loam, clay loam, silt loam	CL	A-6	0	0	100	100	85-100	65-85	25-35	10-15
	23-33	Very channery loam, channery loam	CL, SC	A-6	0	0-5	60-100	40-80	35-75	30-65	25-35	10-15
	33-60	Channers	GP, SP	A-1-a	0	25-35	45-55	5-10	0-5	0	10-15	NP-1
Ringling--------	0-5	Loam	CL	A-6	0	0-10	90-100	75-100	75-90	50-65	25-35	10-15
	5-17	Very channery loam, extremely channery loam	SC-SM, GC, GC-GM, SC	A-2-6	0	10-40	25-60	15-50	15-40	10-35	25-35	10-15
	17-42	Channers	GW	A-1-a	0	80-85	15-25	5-10	0-5	0-5	10-15	NP-1
	42-60	Channers	GW	A-1-a	0	80-85	15-25	5-10	0-5	0-5	10-15	NP-1
43:												
Belfield--------	0-9	Silty clay loam	CL	A-6, A-7-6	0	0	100	100	90-100	70-100	40-50	15-20
	9-12	Silty clay loam	CL	A-6, A-7-6	0	0	100	100	90-100	70-100	40-50	15-20
	12-17	Silty clay, silty clay loam, clay loam	CH, CL	A-7-6	0	0	100	100	90-100	70-100	45-60	20-30
	17-24	Silty clay loam, silty clay, clay loam	CH, CL	A-7-6	0	0	100	100	90-100	70-100	45-60	20-30
	24-43	Silty clay loam, silty clay, clay loam	CH, CL	A-6, A-7-6	0	0	100	100	90-100	70-100	40-60	15-30
	43-60	Clay loam, silty clay loam, silty clay	CH, CL	A-6, A-7-6	0	0	100	100	90-100	70-100	40-60	15-30

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
43:(cont.)												
Grail----------	0-10	Silty clay loam	CL, ML	A-6, A-7-6	0	0	100	95-100	95-100	85-95	40-50	15-20
	10-24	Silty clay, silty clay loam, clay	CL, CH	A-7-6	0	0	100	95-100	95-100	70-95	45-55	20-30
	24-52	Silty clay loam, clay loam, silty clay	CL, CH	A-6, A-7-6	0	0	100	95-100	90-100	65-95	40-55	15-30
	52-60	Silty clay loam, loam, clay	CL, CH	A-6, A-7-6	0	0	100	95-100	85-100	60-95	30-55	10-30
44:												
Shambo----------	0-9	Loam, silt loam	CL	A-6	0	0	100	100	85-95	60-75	25-35	10-15
	9-13	Loam, silt loam, clay loam	CL	A-6	0	0	100	100	85-95	60-75	25-40	10-20
	13-29	Loam, silt loam, clay loam	CL	A-6	0	0	100	100	85-95	60-75	25-40	10-20
	29-48	Loam, silt loam, clay loam	CL	A-6	0	0	100	100	85-95	60-75	25-40	10-20
	48-60	Loam, silty clay loam, clay loam	CL	A-7-6, A-6	0	0	100	100	85-95	60-75	30-45	10-20
44B:												
Shambo----------	0-9	Loam, silt loam	CL	A-6	0	0	100	100	85-95	60-75	25-35	10-15
	9-13	Loam, silt loam, clay loam	CL	A-6	0	0	100	100	85-95	60-75	25-40	10-20
	13-29	Loam, silt loam, clay loam	CL	A-6	0	0	100	100	85-95	60-75	25-40	10-20
	29-48	Loam, silt loam, clay loam	CL	A-6	0	0	100	100	85-95	60-75	25-40	10-20
	48-60	Loam, silty clay loam, clay loam	CL	A-7-6, A-6	0	0	100	100	85-95	60-75	30-45	10-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
47:												
Stady----------	0-6	Loam	CL	A-6	0	0-1	95-100	95-100	85-95	60-75	25-35	10-15
	6-15	Loam	CL	A-6	0	0-1	95-100	95-100	85-95	60-75	25-35	10-15
	15-29	Loam, gravelly loam	CL	A-6	0	0-1	80-100	80-100	75-95	55-75	25-35	10-15
	29-60	Very gravelly coarse sand, extremely gravelly coarse sand, very gravelly loamy sand, extremely gravelly loamy sand, very gravelly sand, extremely gravelly sand	GC-GM, SC-SM, GM, SM, SP, GW, SW, GW-GM, SP-SM, SW-SM	A-1	0	0-1	40-80	25-60	10-30	2-15	10-20	NP-4
48B:												
Manning---------	0-5	Fine sandy loam	CL, CL-ML	A-4	0	0	95-100	95-100	85-95	55-70	20-30	4-10
	5-18	Fine sandy loam, loam	CL, CL-ML	A-4	0	0	90-100	80-100	80-90	50-65	20-30	4-10
	18-25	Fine sandy loam, gravelly fine sandy loam, loam	SC, SC-SM	A-4	0	0-3	55-85	50-80	30-80	25-50	20-30	4-10
	25-60	Stratified loamy sand to extremely gravelly loamy coarse sand	GM, SM, SP-SM, GC-GM	A-1-a	0	0-5	25-75	15-65	10-40	5-35	10-20	NP-4

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				*Pct*	*Pct*					*Pct*	
49B:												
Lihen----------	0-9	Loamy fine sand, loamy sand, sand	SM	A-2-4	0	0	100	100	50-90	15-35	10-20	NP-4
	9-24	Loamy sand, loamy fine sand, sand	SM	A-2-4	0	0	100	100	50-90	15-35	10-20	NP-4
	24-32	Sand, fine sand, loamy sand, loamy fine sand	SM	A-2-4	0	0	100	100	50-90	15-35	10-20	NP-4
	32-60	Sand, fine sand, loamy fine sand, loamy sand	SM	A-2-4	0	0	100	100	50-90	15-35	10-20	NP-4
Parshall--------	0-12	Fine sandy loam, sandy loam	CL-ML, CL, SC, SC-SM	A-2-4, A-4	0	0	100	100	60-85	30-55	20-30	4-10
	12-29	Fine sandy loam	CL, SC-SM, CL-ML, SC	A-2-4, A-4	0	0	100	100	60-85	30-55	20-30	4-10
	29-48	Fine sandy loam, loamy sand, sandy loam	CL-ML, ML, SC, CL, SC-SM, SM	A-2-4, A-4	0	0	100	100	60-85	25-55	15-30	1-10
	48-60	Loamy fine sand, fine sandy loam, sandy loam, loamy sand	CL-ML, ML, SC, CL, SC-SM, SM	A-2-4, A-4	0	0	100	100	60-85	25-55	15-30	1-10
51B:												
Janesburg-------	0-8	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	30-40	10-15
	8-10	Silt loam, loam	CL, SC	A-4, A-6, A-2-6, A-2-4	0	0	100	100	70-100	30-90	25-35	8-15
	10-21	Silty clay, silty clay loam, clay	CH, CL	A-7-6	0	0	100	100	70-100	60-95	45-60	20-30
	21-26	Silt loam, loam, clay loam, silty clay loam, silty clay	CH, CL	A-6, A-7-6	0	0	100	100	70-100	60-95	30-55	10-30
	26-60	Bedrock			---	---	---	---	---	---	25-100	4-60

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
51B:(cont.)												
Dogtooth--------	0-2	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	30-40	10-15
	2-8	Silty clay, silty clay loam, clay loam	CH	A-7-6	0	0	100	100	70-100	60-95	50-60	20-30
	8-13	Silty clay, silty clay loam, clay loam	CH	A-7-6	0	0	100	100	70-100	60-95	50-60	20-30
	13-21	Silty clay, silty clay loam, loam	CH, CL	A-6, A-7-6	0	0	100	100	70-100	60-95	30-60	10-30
	21-60	Bedrock			---	---	---	---	---	---	25-100	4-60
52:												
Heil----------	0-3	Silt loam	CL	A-6	0	0	100	100	90-100	70-100	30-40	10-15
	3-24	Silty clay, clay	CH, MH	A-7-6	0	0	100	100	90-100	75-100	55-70	25-40
	24-38	Silty clay, clay, silty clay loam, clay loam	CH, CL	A-7-6	0	0	100	100	90-100	70-95	40-60	15-30
	38-52	Silty clay, clay, silty clay loam, clay loam	CH, CL	A-7-6	0	0	100	100	90-100	70-95	40-60	15-30
	52-60	Silty clay, silty clay loam, loam, clay, clay loam	CH, ML	A-7-6, A-6	0	0	100	100	85-100	60-95	35-60	10-30

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
53B:												
Savage----------	0-7	Silt loam, silty clay loam, clay loam	MH, ML	A-6, A-7	0	0	100	100	90-100	70-95	35-55	10-25
	7-25	Silty clay, clay, silty clay loam	CH, CL	A-7	0	0	100	100	95-100	85-95	40-70	20-45
	25-51	Silty clay, clay, silty clay loam	CH, CL	A-7	0	0	100	100	95-100	85-95	40-70	20-45
	51-60	Silty clay loam, silty clay, clay	CH, CL	A-7	0	0	100	100	95-100	85-95	40-70	20-45
Daglum----------	0-7	Loam, silt loam	CL	A-6	0	0	100	100	85-100	60-90	20-40	10-25
	7-8	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	20-40	10-25
	8-18	Clay, silty clay, silty clay loam, clay loam	CH, CL	A-6, A-7	0	0	100	100	90-100	70-95	35-75	15-45
	18-32	Clay loam, clay, silty clay	CH, CL	A-7, A-6	0	0	100	100	90-100	70-95	35-75	15-45
	32-47	Silty clay loam, clay loam, clay	CH	A-7-6	0	0	100	100	90-100	70-95	35-75	15-40
	47-60	Clay, clay loam, silty clay loam, silty clay, loam	CL, CH	A-6, A-7	0	0	100	100	85-100	60-95	35-60	15-40
54:												
Channel----------	---	---	---	---	---	---	---	---	---	---	---	---

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
54:(cont.)												
Straw----------	0-5	Loam, silt loam	CL	A-6	0	0	95-100	90-100	85-100	60-90	25-35	10-15
	5-23	Loam, silt loam	CL	A-6	0	0	95-100	90-100	85-100	60-90	25-35	10-15
	23-30	Loam, silt loam, clay loam, silty clay loam	CL	A-6	0	0	95-100	90-100	85-100	60-90	25-40	10-20
	30-36	Clay loam, silt loam, loam	CL	A-6, A-7-6	0	0	95-100	90-100	85-100	60-90	30-45	10-20
	36-40	Silty clay loam, loam, silt loam, clay loam	CL	A-6, A-7-6	0	0	95-100	90-100	85-100	60-90	30-45	10-20
	40-66	Clay loam, silt loam, loam	CL	A-6, A-7-6	0	0	95-100	90-100	85-100	60-90	30-45	10-20
55:												
Pits, gravel and sand-------	0-6	Extremely gravelly sand	GW-GM, SW-SM, GM, SW	A-2-4	0	0-5	25-90	10-65	5-55	0-25	10-20	NP-4
	6-60	Extremely gravelly sand, extremely gravelly coarse sand, gravelly coarse sandy loam	GW-GM, SW-SM, SM, GM	A-2-4	0	0-10	25-90	10-65	5-55	0-25	15-25	NP-8
57:												
Straw----------	0-5	Loam, silt loam	CL	A-6	0	0	95-100	90-100	85-100	60-90	25-35	10-15
	5-23	Loam, silt loam	CL	A-6	0	0	95-100	90-100	85-100	60-90	25-35	10-15
	23-30	Silt loam, clay loam, silty clay loam, loam	CL	A-6	0	0	95-100	90-100	85-100	60-90	25-40	10-20
	30-36	Clay loam, silt loam, loam	CL	A-6, A-7-6	0	0	95-100	90-100	85-100	60-90	30-45	10-20
	36-40	Silty clay loam, loam, silt loam, clay loam	CL	A-6, A-7-6	0	0	95-100	90-100	85-100	60-90	30-45	10-20
	40-66	Silt loam, clay loam, loam	CL	A-6, A-7-6	0	0	95-100	90-100	85-100	60-90	30-45	10-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				*Pct*	*Pct*					*Pct*	
57:(cont.)												
Rhoades---------	0-3	Silt loam, loam	CL	A-6, A-7-6	0	0	100	100	85-100	60-95	30-45	10-25
	3-8	Silty clay, clay loam, clay, silty clay loam	CH	A-7-6	0	0	100	100	90-100	80-95	50-65	25-35
	8-14	Silty clay, clay, clay loam, silty clay loam	CH	A-7-6	0	0	100	100	90-100	75-95	50-65	25-35
	14-46	Silty clay, clay, silty clay loam, clay loam, loam	CH, CL, ML, MH	A-6, A-7-6	0	0	100	100	90-100	70-95	35-60	10-30
	46-60	Stratified silt loam to silty clay loam, silty clay loam, silt loam, loam, clay loam, silty clay	CH, CL, ML	A-6, A-7-6	0	0	100	100	85-100	75-95	35-60	10-30
Daglum----------	0-7	Loam, silt loam	CL	A-6	0	0	100	100	85-100	60-90	20-40	10-25
	7-8	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	20-40	10-25
	8-18	Clay, silty clay, silty clay loam, clay loam	CH, CL	A-6, A-7	0	0	100	100	90-100	70-95	35-75	15-45
	18-32	Clay loam, clay, silty clay	CH, CL	A-7, A-6	0	0	100	100	90-100	70-95	35-75	15-45
	32-47	Clay, silty clay loam, clay loam	CH	A-7-6	0	0	100	100	90-100	70-95	35-75	15-40
	47-60	Clay, clay loam, silty clay loam, silty clay, loam	CL, CH	A-6, A-7	0	0	100	100	85-100	60-95	35-60	15-40

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
58:												
Straw----------	0-5	Loam, silt loam	CL	A-6	0	0	95-100	90-100	85-100	60-90	25-35	10-15
	5-23	Loam, silt loam	CL	A-6	0	0	95-100	90-100	85-100	60-90	25-35	10-15
	23-30	Loam, silt loam, clay loam, silty clay loam	CL	A-6	0	0	95-100	90-100	85-100	60-90	25-40	10-20
	30-36	Loam, silt loam, clay loam	CL	A-6, A-7-6	0	0	95-100	90-100	85-100	60-90	30-45	10-20
	36-40	Silty clay loam, loam, silt loam, clay loam	CL	A-6, A-7-6	0	0	95-100	90-100	85-100	60-90	30-45	10-20
	40-66	Loam, silt loam, clay loam	CL	A-6, A-7-6	0	0	95-100	90-100	85-100	60-90	30-45	10-20
60:												
Korell----------	0-8	Loam, silt loam	CL	A-6	0	0	100	100	85-95	60-75	25-35	10-15
	8-15	Loam, silt loam	CL	A-6	0	0	100	100	85-95	65-85	25-35	10-15
	15-48	Loam, silt loam	CL	A-6	0	0	100	100	85-95	65-85	25-35	10-15
	48-60	Stratified silt loam	CL	A-6	0	0	100	100	85-95	65-85	23-40	10-15
62F:												
Dogtooth--------	0-2	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	30-40	10-15
	2-8	Silty clay, silty clay loam, clay loam	CH	A-7-6	0	0	100	100	70-100	60-95	50-60	20-30
	8-13	Silty clay, silty clay loam, clay loam	CH	A-7-6	0	0	100	100	70-100	60-95	50-60	20-30
	13-21	Silty clay, silty clay loam, loam	CH, CL	A-6, A-7-6	0	0	100	100	70-100	60-95	30-60	10-30
	21-60	Bedrock			---	---	---	---	---	---	25-100	4-60

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
62F:(cont.)												
Janesburg-------	0-8	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	30-40	10-15
	8-10	Silt loam, loam	SC, CL	A-2-6, A-2-4, A-4, A-6	0	0	100	100	70-100	30-90	25-35	8-15
	10-21	Silty clay, silty clay loam, clay	CH, CL	A-7-6	0	0	100	100	70-100	60-95	45-60	20-30
	21-26	Silt loam, loam, clay loam, silty clay loam, silty clay	CH, CL	A-6, A-7-6	0	0	100	100	70-100	60-95	30-55	10-30
	26-60	Bedrock			---	---	---	---	---	---	25-100	4-60
Brandenburg-----	0-4	Channery loam	CL, CL-ML, GC-GM, SC	A-2-4, A-4, A-6, A-2-6	0	0-5	60-100	40-80	35-75	30-65	20-35	4-15
	4-10	Very channery loam, extremely channery loam, very channery sandy loam	CL, GM, ML, SM, CL-ML	A-2-6, A-4, A-6, A-2-4	0	0-5	45-100	40-80	35-75	30-65	15-35	1-15
	10-60	Channers	GW	A-1-a	0	80-85	15-25	5-10	0-5	0	15-20	NP-1
63F:												
Dogtooth--------	0-2	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	30-40	10-15
	2-8	Silty clay, silty clay loam, clay loam	CH	A-7-6	0	0	100	100	70-100	60-95	50-60	20-30
	8-13	Silty clay, silty clay loam, clay loam	CH	A-7-6	0	0	100	100	70-100	60-95	50-60	20-30
	13-21	Silty clay, silty clay loam, loam	CH, CL	A-6, A-7-6	0	0	100	100	70-100	60-95	30-60	10-30
	21-60	Bedrock			---	---	---	---	---	---	25-100	4-60

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
63F:(cont.)												
Janesburg-------	0-8	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	30-40	10-15
	8-10	Silt loam, loam	SC, CL	A-2-4, A-2-6, A-4, A-6	0	0	100	100	70-100	30-90	25-35	8-15
	10-21	Silty clay, silty clay loam, clay	CH, CL	A-7-6	0	0	100	100	70-100	60-95	45-60	20-30
	21-26	Silt loam, loam, clay loam, silty clay loam, silty clay	CH, CL	A-6, A-7-6	0	0	100	100	70-100	60-95	30-55	10-30
	26-60	Bedrock			---	---	---	---	---	---	25-100	4-60
Cabba----------	0-3	Loam, silt loam	CL	A-6	0	0-5	90-100	85-100	70-90	60-80	25-35	10-15
	3-15	Loam, silt loam, silty clay loam, clay loam	CL	A-6, A-7-6	0	0-5	95-100	90-100	85-100	80-95	30-45	10-20
	15-60	Bedrock			---	---	---	---	---	---	20-45	4-20
65:												
Channel---------	---	---	---	---	---	---	---	---	---	---	---	---
Banks----------	0-4	Fine sandy loam, very fine sandy loam	CL-ML, SC	A-4	0	0	100	100	80-95	45-75	20-30	4-10
	4-30	Fine sand, loamy fine sand, sand	SP-SM, SM	A-2	0	0	100	100	50-70	10-25	15-20	NP-4
	30-60	Loamy fine sand, fine sand, sand	SM, SP-SM	A-2	0	0	100	100	50-70	10-25	15-20	NP-4
Trembles--------	0-9	Fine sandy loam	SC-SM, CL, CL-ML, SC	A-4	0	0	100	100	70-85	40-55	20-30	4-10
	9-59	Stratified fine sandy loam to silt loam	SC-SM, CL, CL-ML, SC	A-4	0	0	100	100	65-85	35-60	20-30	4-10
	59-80	Stratified sand	SC-SM, SM, SC	A-2-4, A-4	0	0	100	100	50-70	10-40	15-30	1-10

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				*Pct*	*Pct*					*Pct*	
66B:												
Stady----------	0-6	Loam	CL	A-6	0	0-1	95-100	95-100	85-95	60-75	25-35	10-15
	6-15	Loam	CL	A-6	0	0-1	95-100	95-100	85-95	60-75	25-35	10-15
	15-29	Loam, gravelly loam	CL	A-6	0	0-1	80-100	80-100	75-95	55-75	25-35	10-15
	29-60	Very gravelly coarse sand, extremely gravelly coarse sand, very gravelly loamy sand, extremely gravelly loamy sand, very gravelly sand, extremely gravelly sand	GC-GM, GM, GW, GW-GM, SC-SM, SM, SP, SP-SM, SW, SW-SM	A-1	0	0-1	40-80	25-60	10-30	2-15	10-20	NP-4
67B:												
Evridge---------	0-12	Fine sandy loam, sandy loam	ML, SM	A-2, A-4	0	0	100	100	70-85	30-60	20-35	NP-10
	12-17	Loamy fine sand, fine sandy loam	ML, SC-SM, SM	A-2, A-4	0	0	100	100	70-95	25-75	0-25	NP-10
	17-21	Fine sandy loam, very fine sandy loam, sandy loam, loam	CL-ML	A-2-4, A-4	0	0	100	100	60-95	30-75	20-30	4-10
	21-31	Fine sandy loam, sandy loam	CL-ML	A-2-4, A-4	0	0	100	100	60-95	30-55	20-30	4-10
	31-38	Loamy sand, loamy fine sand	SC-SM, SM	A-2, A-4	0	0	100	100	80-95	25-40	0-25	NP-5
	38-60	Bedrock			---	---	---	---	---	---	5-20	NP-5

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
67B:(cont.)												
Desart----------	0-20	Fine sandy loam, sandy loam, very fine sandy loam	SM	A-2, A-4	0	0	100	100	60-85	30-50	0-20	NP-10
	20-24	Loamy fine sand, very fine sandy loam, fine sandy loam, sandy loam, loamy sand, fine sand	SM	A-2, A-4	0	0	100	100	50-70	15-50	0-20	NP-10
	24-31	Fine sandy loam, very fine sandy loam, sandy loam, loam	SC-SM	A-2, A-4	0	0	100	100	70-100	30-65	20-30	6-10
	31-60	Loamy fine sand, sandy loam, loam	SM, ML	A-4, A-2	0	0	100	100	50-100	25-65	20-30	NP-10
Telfer----------	0-6	Fine sandy loam, sandy loam	SC-SM, CL, CL-ML, SC	A-4, A-2-4	0	0	100	100	60-85	30-55	20-30	4-10
	6-60	Fine sand, loamy sand	SM, SC-SM	A-2-4	0	0	100	100	50-80	15-35	15-20	NP-4
68F:												
Cabbart---------	0-3	Loam, silt loam	CL	A-6	0	0	90-100	85-100	75-95	55-80	25-35	10-15
	3-18	Loam, silt loam, clay loam, silty clay loam	CL	A-6	0	0	90-100	85-100	75-95	60-85	30-45	10-20
	18-60	Bedrock			---	---	---	---	---	---	20-45	4-20
Badland, outcrop	0-60	Bedrock			0	0	90-100	85-100	75-100	35-95	15-75	5-50
69F:												
Patent----------	0-7	Loam, silt loam	CL	A-6	0	0	100	100	70-100	50-85	25-35	10-15
	7-60	Stratified fine sandy loam to clay loam	CL	A-4, A-6, A-7-6, A-5	0	0	100	100	70-100	50-90	25-45	8-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				*Pct*	*Pct*					*Pct*	
69F:(cont.)												
Badland, outcrop	0-60	Bedrock			0	0	90-100	85-100	75-100	35-95	15-75	5-50
Cabbart---------	0-3	Loam, silt loam	CL	A-6	0	0	90-100	85-100	75-95	55-80	25-35	10-15
	3-18	Loam, silt loam, clay loam, silty clay loam	CL	A-6	0	0	90-100	85-100	75-95	60-85	30-45	10-20
	18-60	Bedrock			---	---	---	---	---	---	20-45	4-20
70B:												
Maltese---------	0-7	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	30-40	10-15
	7-10	Silt loam	CL	A-6	0	0	100	100	90-100	60-90	30-40	10-15
	10-16	Silty clay, clay	CH	A-7	0	0	100	100	90-100	85-95	50-75	25-40
	16-20	Silty clay, silty clay loam, clay, clay loam	MH	A-7	0	0	100	100	90-100	70-90	50-65	20-30
	20-33	Silty clay loam, clay, clay loam, silty clay	MH	A-7	0	0	100	100	70-95	55-95	50-65	20-30
	33-60	Silty clay loam, fine sandy loam, loam, silt loam	CL, SC	A-6, A-4	0	0	100	100	70-100	45-95	30-55	8-25

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
70B:(cont.)												
Gerda----------	0-2	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-95	30-40	10-15
	2-11	Silty clay, clay, clay loam, silty clay loam	MH	A-7	0	0	100	100	90-100	80-95	50-70	20-35
	11-19	Silty clay loam, clay loam, clay, silty clay	MH	A-7	0	0	100	100	90-100	70-95	50-70	20-35
	19-29	Silty clay, clay loam, silty clay loam	CL, CH	A-7-6	0	0	100	100	90-100	70-95	40-60	20-30
	29-44	Silty clay, silty clay loam, clay loam	MH	A-7	0	0	100	100	90-100	70-95	50-65	20-30
	44-80	Sandy loam, silt loam, loam	CL	A-6, A-4	0	0	100	100	60-90	30-90	30-40	8-15
71B:												
Chinook---------	0-6	Fine sandy loam, sandy loam	CL-ML, SC-SM	A-4, A-2-4	0	0	100	100	85-95	30-55	20-30	4-10
	6-15	Fine sandy loam, sandy loam	SC-SM	A-4, A-2-4	0	0	100	100	85-95	30-45	20-30	4-10
	15-40	Fine sandy loam, sandy loam	CL-ML, CL, SC-SM, SC	A-4, A-2-4	0	0	100	100	60-95	30-60	20-30	4-10
	40-66	Fine sandy loam, sandy loam, loamy fine sand	SC-SM, SM	A-2-4, A-4	0	0	100	100	70-95	25-40	15-30	1-10
Rhame----------	0-8	Fine sandy loam, sandy loam	CL-ML, CL, SC-SM, SC	A-4	0	0	100	100	70-85	40-55	20-30	4-10
	8-26	Fine sandy loam, sandy loam	CL-ML, CL, SC-SM, SC	A-4	0	0	100	100	70-85	40-55	20-30	4-10
	26-34	Fine sandy loam, sandy loam	CL-ML, CL, SC-SM, SC	A-4	0	0	100	100	70-85	40-55	20-30	4-10
	34-60	Bedrock			---	---	---	---	---	---	5-20	NP-5

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
71D:												
Rhame----------	0-8	Fine sandy loam, sandy loam	CL-ML, ML, SC-SM, SM	A-4	0	0	100	100	70-85	40-55	20-30	3-10
	8-26	Fine sandy loam, sandy loam	CL-ML, ML, SC-SM, SM	A-4	0	0	100	100	70-85	40-55	20-30	3-10
	26-34	Fine sandy loam, sandy loam	CL-ML, ML, SC-SM, SM	A-4	0	0	100	100	70-85	40-55	20-30	3-10
	34-60	Bedrock			---	---	---	---	---	---	5-20	NP-5
Chinook---------	0-6	Fine sandy loam, sandy loam	CL-ML, SC-SM	A-4, A-2-4	0	0	100	100	85-95	30-55	20-30	4-10
	6-15	Fine sandy loam, sandy loam	SC-SM	A-4, A-2-4	0	0	100	100	85-95	30-45	20-30	4-10
	15-40	Fine sandy loam, sandy loam	CL-ML, CL, SC-SM, SC	A-4, A-2-4	0	0	100	100	60-95	30-60	20-30	4-10
	40-66	Fine sandy loam, sandy loam, loamy fine sand	SC-SM, SM	A-2-4, A-4	0	0	100	100	70-95	25-40	15-30	1-10
72F:												
Rhame----------	0-8	Fine sandy loam, sandy loam	CL-ML, ML, SC-SM, SM	A-4	0	0	100	100	70-85	40-55	20-30	3-10
	8-26	Fine sandy loam, sandy loam	CL-ML, ML, SC-SM, SM	A-4	0	0	100	100	70-85	40-55	20-30	3-10
	26-34	Fine sandy loam, sandy loam	CL-ML, ML, SC-SM, SM	A-4	0	0	100	100	70-85	40-55	20-30	3-10
	34-60	Bedrock			---	---	---	---	---	---	5-20	NP-5
Fleak----------	0-3	Loamy fine sand	SC-SM, SM	A-1, A-4, A-2	0	0	95-100	95-100	45-80	20-40	15-20	NP-4
	3-17	Loamy fine sand, fine sand	SM	A-1, A-2, A-4	0	0	95-100	95-100	40-85	20-40	15-20	NP-4
	17-60	Bedrock			---	---	---	---	---	---	15-20	NP-4

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
73D:												
Gerda----------	0-2	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-95	30-40	10-15
	2-11	Silty clay, clay loam, silty clay loam, clay	MH	A-7	0	0	100	100	90-100	80-95	50-70	20-35
	11-19	Clay, silty clay loam, clay loam, silty clay	MH	A-7	0	0	100	100	90-100	70-95	50-70	20-35
	19-29	Clay loam, silty clay, silty clay loam	CL, CH	A-7-6	0	0	100	100	90-100	70-95	40-60	20-30
	29-44	Silty clay loam, silty clay, clay loam	MH	A-7	0	0	100	100	90-100	70-95	50-65	20-30
	44-80	Loam, sandy loam, silt loam	CL	A-6, A-4	0	0	100	100	60-90	30-90	30-40	8-15
Kirby----------	0-4	Very channery loam, channery loam	CL-ML, SC-SM, CL, SC, GC-GM, GC	A-4, A-2-4	0	0-15	40-85	30-75	25-65	20-60	10-20	4-10
	4-12	Extremely channery loam, extremely channery sandy loam, very channery loam	GC-GM, GC	A-4, A-1, A-2-4	0	10-30	20-60	10-50	5-40	5-40	10-20	4-10
	12-60	Channers	GW	A-1-a	0	40-60	5-15	0-10	0-5	0-5	15-20	NP-1
74:												
Channel---------	---	---	---	---	---	---	---	---	---	---	---	---
Glendive--------	0-5	Fine sandy loam, sandy loam	CL-ML, CL, SC-SM, SC	A-2-4, A-4	0	0	100	100	65-85	30-55	20-30	4-10
	5-16	Loam, silt loam, sandy loam	CL, SC-SM, SC, SM, CL-ML, ML	A-4	0	0	100	100	65-95	40-70	20-30	3-10
	16-60	Stratified loamy fine sand to silt loam	SC, SM, SC-SM, CL-ML, ML	A-2-4, A-4	0	0	95-100	75-100	60-80	25-50	15-30	1-10

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
74:(cont.)												
Havre----------	0-10	Silt loam, loam	CL	A-6	0	0	100	100	85-95	60-75	25-35	10-15
	10-60	Stratified fine sandy loam to clay loam	CL	A-6, A-7-6	0	0	100	100	70-95	50-75	30-45	10-20
75:												
Havre----------	0-10	Silt loam, loam	CL	A-6	0	0	100	100	85-95	60-75	25-35	10-15
	10-60	Stratified fine sandy loam to clay loam	CL	A-6, A-7-6	0	0	100	100	70-95	50-75	30-45	10-20
76B:												
Lonna----------	0-2	Silt loam, loam	CL	A-6	0	0	100	100	90-100	75-90	25-35	10-15
	2-11	Silt loam, silty clay loam	CL	A-6, A-7-6	0	0	100	100	95-100	75-95	30-45	10-20
	11-34	Silt loam, silty clay loam	CL	A-6, A-7-6	0	0	100	100	95-100	75-95	30-45	10-20
	34-60	Silt loam, silty clay loam, very fine sandy loam	CL, CL-ML	A-6, A-4, A-7-6, A-5	0	0	100	100	95-100	75-90	20-45	4-20
76C:												
Lonna----------	0-2	Silt loam, loam	CL	A-6	0	0	100	100	90-100	75-90	25-35	10-15
	2-11	Silt loam, silty clay loam	CL	A-6, A-7-6	0	0	100	100	95-100	75-95	30-45	10-20
	11-34	Silt loam, silty clay loam	CL	A-6, A-7-6, A-5	0	0	100	100	95-100	75-95	30-45	10-20
	34-60	Silt loam, silty clay loam, very fine sandy loam	CL, CL-ML	A-6, A-4, A-7-6, A-5	0	0	100	100	95-100	75-90	20-45	4-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
77:												
Glendive--------	0-5	Fine sandy loam, sandy loam	CL-ML, CL, SC-SM, SC	A-2-4, A-4	0	0	100	100	65-85	30-55	20-30	4-10
	5-16	Loam, silt loam, sandy loam	CL, SC-SM, SC, SM, CL-ML, ML	A-4	0	0	100	100	65-95	40-70	20-30	3-10
	16-60	Stratified loamy fine sand to silt loam	CL-ML, ML, SC, SM, SC-SM	A-2-4, A-4	0	0	95-100	75-100	60-80	25-50	15-30	1-10
78B:												
Hanly----------	0-5	Fine sandy loam, sandy loam	SC-SM, CL, CL-ML, SC	A-4, A-2-4	0	0	100	100	70-85	30-55	20-30	4-10
	5-60	Stratified loamy sand to fine sandy loam	SM, SP-SM	A-2-4, A-3, A-4	0	0	100	100	50-85	5-40	15-20	NP-4
79C:												
Zeona----------	0-3	Loamy fine sand, loamy sand	SC-SM, SM, SP-SM, SW-SM	A-2-4	0	0	100	100	80-100	10-35	15-20	NP-4
	3-60	Fine sand, loamy fine sand	SC-SM, SM, SP-SM, SW-SM	A-2-4	0	0	100	100	75-95	10-35	15-20	NP-4
80:												
Ethridge--------	0-3	Silt loam, loam	CL	A-6	0	0	100	95-100	70-100	60-80	30-40	10-15
	3-10	Silty clay loam, silty clay, clay	CH	A-7	0	0	100	95-100	95-100	90-95	45-65	20-30
	10-23	Silty clay loam, clay loam, clay	CH	A-7	0	0	100	95-100	95-100	90-95	45-65	20-30
	23-38	Silty clay loam, clay loam, clay	CL, CH	A-7-6	0	0	100	95-100	90-100	85-95	40-60	15-30
	38-60	Silt loam, clay loam, silty clay loam	ML	A-6, A-7-6	0	0	100	95-100	90-100	85-95	35-50	10-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				*Pct*	*Pct*					*Pct*	
81B:												
Vebar----------	0-5	Fine sandy loam, sandy loam	CL, CL-ML, SC, SC-SM	A-2-4, A-4	0	0	95-100	90-100	60-100	30-55	20-30	4-10
	5-26	Fine sandy loam, sandy loam	CL, CL-ML, SC, SC-SM	A-2-4, A-4	0	0	95-100	90-100	60-100	30-55	20-30	4-10
	26-32	Fine sandy loam, loamy fine sand, sandy loam	CL, CL-ML, SC, SC-SM	A-4, A-2-4	0	0	95-100	90-100	60-100	30-55	20-30	4-10
	32-60	Bedrock			---	---	---	---	---	---	10-20	NP-4
Parshall--------	0-12	Fine sandy loam, sandy loam	CL-ML, CL, SC, SC-SM	A-2-4, A-4	0	0	100	100	60-85	30-55	20-30	4-10
	12-29	Fine sandy loam	CL-ML, CL, SC, SC-SM	A-2-4, A-4	0	0	100	100	60-85	30-55	20-30	4-10
	29-48	Fine sandy loam, loamy sand, sandy loam	CL-ML, ML, SC, SC-SM, CL, SM	A-2-4, A-4	0	0	100	100	60-85	25-55	15-30	1-10
	48-60	Loamy fine sand, fine sandy loam, sandy loam, loamy sand	CL-ML, ML, SC, CL, SC-SM, SM	A-2-4, A-4	0	0	100	100	60-85	25-55	15-30	1-10
81C:												
Vebar----------	0-5	Fine sandy loam, sandy loam	CL, CL-ML, SC, SC-SM	A-4, A-2-4	0	0	95-100	90-100	60-100	30-55	20-30	4-10
	5-26	Fine sandy loam, sandy loam	CL, CL-ML, SC, SC-SM	A-4, A-2-4	0	0	95-100	90-100	60-100	30-55	20-30	4-10
	26-32	Fine sandy loam, sandy loam, loamy fine sand	CL, CL-ML, SC, SC-SM	A-4, A-2-4	0	0	95-100	90-100	60-100	30-55	20-30	4-10
	32-60	Bedrock			---	---	---	---	---	---	10-20	NP-4

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
81C:(cont.)												
Tally----------	0-6	Fine sandy loam, sandy loam	SC, SC-SM, CL, CL-ML	A-2-4, A-4	0	0	90-100	80-100	55-100	25-55	20-30	4-10
	6-32	Fine sandy loam, sandy loam	SC, SC-SM, CL, CL-ML	A-2-4, A-4	0	0	90-100	80-100	60-100	25-50	20-30	4-10
	32-60	Fine sandy loam, sandy loam, loamy fine sand	CL-ML, SC, SC-SM, CL, ML, SM	A-2-4, A-4	0	0	90-100	80-100	60-100	15-50	15-30	1-10
81D:												
Vebar----------	0-5	Fine sandy loam, sandy loam	CL, CL-ML, SC, SC-SM	A-2-4, A-4	0	0	95-100	90-100	60-100	30-55	20-30	4-10
	5-26	Fine sandy loam, sandy loam	CL, CL-ML, SC, SC-SM	A-2-4, A-4	0	0	95-100	90-100	60-100	30-55	20-30	4-10
	26-32	Fine sandy loam, loamy fine sand, sandy loam	CL, CL-ML, SC, SC-SM	A-4, A-2-4	0	0	95-100	90-100	60-100	30-55	20-30	4-10
	32-60	Bedrock			---	---	---	---	---	---	10-20	NP-4
Flasher---------	0-6	Loamy fine sand, loamy sand	SM	A-2-4	0	0	85-100	85-100	50-100	15-35	15-20	NP-4
	6-10	Loamy fine sand, loamy sand, fine sand	SM	A-2-4	0	0	85-100	85-100	50-100	15-35	10-20	NP-4
	10-60	Bedrock			---	---	---	---	---	---	10-20	NP-4
Tally----------	0-6	Fine sandy loam, sandy loam	SC, SC-SM, CL, CL-ML	A-2-4, A-4	0	0	90-100	80-100	55-100	25-55	20-30	4-10
	6-32	Fine sandy loam, sandy loam	SC, SC-SM, CL, CL-ML	A-2-4, A-4	0	0	90-100	80-100	60-100	25-50	20-30	4-10
	32-60	Fine sandy loam, sandy loam, loamy fine sand	SC, SC-SM, CL, CL-ML, SM, ML	A-2-4, A-4	0	0	90-100	80-100	60-100	15-50	15-30	1-10

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
82E:												
Badland, outcrop	0-60	Bedrock			0	0	90-100	85-100	75-100	35-95	15-75	5-50
Patent----------	0-7	Loam, silt loam	CL	A-6	0	0	100	100	70-100	50-85	25-35	10-15
	7-60	Stratified fine sandy loam to silty clay loam	CL	A-4, A-6, A-7-6, A-5	0	0	100	100	70-100	50-90	25-45	8-20
83:												
Badland---------	0-60	Bedrock			0	0	90-100	85-100	75-100	35-95	15-75	5-50
85F:												
Lonna----------	0-2	Silt loam, loam	CL	A-6	0	0	100	100	90-100	75-90	25-35	10-15
	2-11	Silt loam, silty clay loam	CL	A-6, A-7-6	0	0	100	100	95-100	75-95	30-45	10-20
	11-34	Silt loam, silty clay loam	CL	A-6, A-7-6, A-5	0	0	100	100	95-100	75-95	30-45	10-20
	34-60	Silt loam, silty clay loam, very fine sandy loam	CL, CL-ML	A-6, A-4, A-7-6, A-5	0	0	100	100	95-100	75-90	20-45	4-20
Cabbart---------	0-3	Silt loam, loam	CL	A-6	0	0	90-100	85-100	75-95	55-80	25-35	10-15
	3-18	Loam, silt loam, clay loam, silty clay loam	CL	A-6	0	0	90-100	85-100	75-95	60-85	30-45	10-20
	18-60	Bedrock			---	---	---	---	---	---	20-45	4-20
86F:												
Kirby----------	0-4	Very channery loam, channery loam	CL-ML, SC-SM, CL	A-4, A-2-4	0	0-15	40-85	30-75	25-65	20-60	10-20	4-10
	4-12	Extremely channery loam, extremely channery sandy loam, very channery loam	GC-GM, GC	A-4, A-1, A-2-4	0	10-30	20-60	10-50	5-40	5-40	10-20	4-10
	12-60	Channers	GW	A-1-a	0	40-60	5-15	0-10	0-5	0-5	15-20	NP-1
Badland, outcrop	0-60	Bedrock			0	0	90-100	85-100	75-100	35-95	15-75	5-50

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
86F:(cont.)												
Patent----------	0-7	Loam, silt loam	CL	A-6	0	0	100	100	70-100	50-85	25-35	10-15
	7-60	Stratified fine sandy loam to silty clay loam	CL	A-4, A-6, A-7-6, A-5	0	0	100	100	70-100	50-90	25-45	8-20
88:												
Littlemo--------	0-6	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	25-35	10-15
	6-17	Loam, silt loam	CL	A-6	0	0	100	100	85-100	60-90	25-35	10-15
	17-28	Loam, clay loam	CL	A-6	0	0	100	95-100	80-100	60-90	30-40	10-15
	28-60	Very gravelly coarse sandy loam, gravelly sandy clay loam, gravelly loam	SC-SM, GC-GM, SC	A-1-a, A-2-4, A-4	0	0	30-70	15-60	15-45	5-40	20-40	4-15
Chanta----------	0-6	Loam, silt loam	CL	A-6	0	0	90-100	80-100	75-100	65-85	25-35	10-15
	6-22	Loam, clay loam	CL	A-6	0	0	80-100	75-100	65-90	65-85	30-40	10-20
	22-26	Sandy loam	CL-ML, SC, SC-SM, CL	A-2, A-4	0	0	80-100	75-100	65-90	30-65	20-30	4-10
	26-60	Gravelly sand	SM, SP-SM, SW-SM	A-1, A-3, A-2-4	0	5-20	60-80	40-65	15-55	5-15	15-20	NP-4
89B:												
Patent----------	0-7	Loam, silt loam	CL	A-6	0	0	100	100	70-100	50-85	25-35	10-15
	7-60	Stratified fine sandy loam to silty clay loam	CL	A-4, A-6, A-7-6, A-5	0	0	100	100	70-100	50-90	25-45	8-20
91F:												
Lonna----------	0-2	Silt loam, loam	CL	A-6	0	0	100	100	90-100	75-90	25-35	10-15
	2-11	Silt loam, silty clay loam	CL	A-6, A-7-6	0	0	100	100	95-100	75-95	30-45	10-20
	11-34	Silt loam, silty clay loam	CL	A-6, A-5, A-7-6	0	0	100	100	95-100	75-95	30-45	10-20
	34-60	Silt loam, silty clay loam, very fine sandy loam	CL, CL-ML	A-6, A-4, A-7-6, A-5	0	0	100	100	95-100	75-90	20-45	4-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				*Pct*	*Pct*					*Pct*	
91F:(cont.)												
Kirby----------	0-4	Very channery loam, channery loam	CL-ML, SC-SM, CL	A-4, A-2-4	0	0-15	40-85	30-75	25-65	20-60	10-20	4-10
	4-12	Extremely channery loam, extremely channery sandy loam, very channery loam	GC-GM, GC	A-4, A-1, A-2-4	0	10-30	20-60	10-50	5-40	5-40	10-20	4-10
	12-60	Channers	GW	A-1-a	0	40-60	5-15	0-10	0-5	0-5	15-20	NP-1
Cabbart---------	0-3	Silt loam, loam	CL	A-6	0	0	90-100	85-100	75-95	55-80	25-35	10-15
	3-18	Loam, silt loam, clay loam, silty clay loam	CL	A-6	0	0	90-100	85-100	75-95	60-85	30-45	10-20
	18-60	Bedrock			---	---	---	---	---	---	20-45	4-20
92B:												
Kremlin---------	0-11	Loam, silt loam	CL	A-6	0	0	90-100	80-100	75-100	65-85	25-35	10-15
	11-19	Loam, silt loam, clay loam	CL	A-6	0	0	95-100	90-100	75-95	55-80	30-40	10-20
	19-60	Loam, silt loam, clay loam	CL	A-6	0	0	95-100	90-100	75-95	55-80	30-40	10-20
Ethridge--------	0-3	Silt loam, loam	CL	A-6	0	0	100	95-100	70-100	60-80	30-40	10-15
	3-10	Silty clay loam, silty clay, clay	CH	A-7	0	0	100	95-100	95-100	90-95	45-65	20-30
	10-23	Silty clay loam, clay loam, clay	CH	A-7	0	0	100	95-100	95-100	90-95	45-65	20-30
	23-38	Silty clay loam, clay loam, clay	CL, CH	A-7-6	0	0	100	95-100	90-100	85-95	40-60	15-30
	38-60	Silt loam, clay loam, silty clay loam	ML	A-6, A-7-6	0	0	100	95-100	90-100	85-95	35-50	10-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
92B:(cont.)												
Gerda----------	0-2	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-95	30-40	10-15
	2-11	Clay loam, silty clay, clay, silty clay loam	MH	A-7	0	0	100	100	90-100	80-95	50-70	20-35
	11-19	Silty clay, clay loam, silty clay loam, clay	MH	A-7	0	0	100	100	90-100	70-95	50-70	20-35
	19-29	Silty clay loam, silty clay, clay loam	CL, CH	A-7-6	0	0	100	100	90-100	70-95	40-60	20-30
	29-44	Silty clay, clay loam, silty clay loam	MH	A-7	0	0	100	100	90-100	70-95	50-65	20-30
	44-80	Silt loam, loam, sandy loam	CL	A-6, A-4	0	0	100	100	60-90	30-90	30-40	8-15
94F:												
Kirby----------	0-4	Very channery loam, channery loam	CL-ML, SC-SM, CL	A-4, A-2-4	0	0-15	40-85	30-75	25-65	20-60	10-20	4-10
	4-12	Extremely channery loam, extremely channery sandy loam, very channery loam	GC-GM, GC	A-4, A-1, A-2-4	0	10-30	20-60	10-50	5-40	5-40	10-20	4-10
	12-60	Channers	GW	A-1-a	0	40-60	5-15	0-10	0-5	0-5	15-20	NP-1

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
94F:(cont.)												
Arikara---------	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	---	---	---	---
	1-2	Loam, clay loam	CL	A-6, A-7-6, A-5	0	0	100	100	85-100	70-80	30-45	10-20
	2-14	Loam, clay loam, silt loam, silty clay loam	CL	A-7-6, A-6, A-5	0	0	85-100	80-100	70-100	50-85	30-45	10-20
	14-39	Loam, fine sandy loam, silty clay loam, clay loam	SC-SM, CL	A-6, A-4, A-7-6, A-5	0	0	85-100	80-100	70-100	50-90	25-45	8-20
	39-60	Loam, clay loam, fine sandy loam, silt loam	CL, SC, SC-SM	A-4, A-6, A-7-6, A-5	0	0	85-100	80-100	70-100	40-90	25-45	8-20
Badland, outcrop	0-60	Unweathered bedrock			0	0	90-100	85-100	75-100	35-95	15-75	5-50
95F:												
Tinsley---------	0-3	Gravelly sandy loam, gravelly loamy sand, very gravelly sandy loam, very gravelly loamy sand	SM, SC-SM, SC	A-1-b, A-2-4, A-4	0	0-10	60-85	55-85	35-55	15-40	15-30	1-8
	3-60	Extremely gravelly loamy sand, very gravelly sand, extremely gravelly sand, very gravelly loamy sand	GM, GP-GM, SM, SP-SM, SC-SM, GC-GM, SW-SM, GW-GM	A-1-b, A-1-a	0-5	10-35	25-80	20-70	10-35	5-15	15-25	NP-4
Chanta----------	0-6	Loam, silt loam	CL	A-6	0	0	90-100	80-100	75-100	65-85	25-35	10-15
	6-22	Loam, clay loam	CL	A-6	0	0	80-100	75-100	65-90	65-85	30-40	10-20
	22-26	Sandy loam	CL-ML, SC, SC-SM, CL	A-2, A-4	0	0	80-100	75-100	65-90	30-65	20-30	4-10
	26-60	Gravelly sand	SM, SP-SM, SW-SM	A-1, A-3, A-2-4	0	5-20	60-80	40-65	15-55	5-15	15-20	NP-4

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
97:												
Kremlin---------	0-11	Loam, silt loam	CL	A-6	0	0	90-100	80-100	75-100	65-85	25-35	10-15
	11-19	Loam, silt loam, clay loam	CL	A-6	0	0	95-100	90-100	75-95	55-80	30-40	10-20
	19-60	Loam, silt loam, clay loam	CL	A-6	0	0	95-100	90-100	75-95	55-80	30-40	10-20
98:												
Wolf Point------	0-1	Silty clay loam			0	0	100	100	90-100	75-95	45-55	20-35
	1-10	Clay, silty clay, silty clay loam	CH, CL	A-7-6	0	0	100	100	90-100	75-95	45-75	25-50
	10-60	Silty clay, silty clay loam, clay	CH, CL	A-7-6	0	0	100	100	90-100	75-95	45-75	25-50
99F:												
Badland, outcrop	0-60	Bedrock			0	0	90-100	85-100	75-100	35-95	15-75	5-50
Cabbart---------	0-3	Loam, silt loam	CL	A-6	0	0	90-100	85-100	75-95	55-80	25-35	10-15
	3-18	Loam, silt loam, clay loam, silty clay loam	CL	A-6	0	0	90-100	85-100	75-95	60-85	30-45	10-20
	18-60	Bedrock			---	---	---	---	---	---	20-45	4-20
100C:												
Patent----------	0-7	Loam, silt loam	CL	A-6	0	0	100	100	70-100	50-85	25-35	10-15
	7-60	Stratified fine sandy loam to silty clay loam	CL	A-4, A-6, A-7-6, A-5	0	0	100	100	70-100	50-90	25-45	8-20
Gullied land----	0-60				0	0	95-100	85-100	75-95	35-90	20-50	5-25
Glendive--------	0-5	Fine sandy loam, sandy loam	CL-ML, CL, SC-SM, SC	A-2-4, A-4	0	0	100	100	65-85	30-55	20-30	4-10
	5-16	Loam, silt loam, sandy loam	SC-SM, CL, SC, SM, CL-ML, ML	A-4	0	0	100	100	65-95	40-70	20-30	3-10
	16-60	Stratified loamy fine sand to silt loam	CL-ML, ML, SC, SM, SC-SM	A-2-4, A-4	0	0	95-100	75-100	60-80	25-50	15-30	1-10

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
101F:												
Boxwell---------	0-5	Loam, silt loam	CL	A-6	0	0	100	95-100	90-100	70-90	25-35	10-15
	5-14	Loam, clay loam, silty clay loam	CL	A-6	0	0	100	95-100	90-95	70-85	30-40	10-20
	14-28	Loam, silt loam, very fine sandy loam	CL	A-6	0	0	100	95-100	85-95	70-80	25-35	10-15
	28-60	Bedrock			---	---	---	---	---	---	15-45	1-20
Cabbart---------	0-3	Loam, silt loam	CL	A-6	0	0	90-100	85-100	75-95	55-80	25-35	10-15
	3-18	Loam, silt loam, clay loam, silty clay loam	CL	A-6	0	0	90-100	85-100	75-95	60-85	30-45	10-20
	18-60	Bedrock			---	---	---	---	---	---	20-45	4-20
Arikara---------	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	---	---	---	---
	1-2	Loam, clay loam	CL	A-6, A-7-6, A-5	0	0	100	100	85-100	70-80	30-45	10-20
	2-14	Loam, clay loam, silt loam, silty clay loam	CL	A-7-6, A-6, A-5	0	0	85-100	80-100	70-100	50-85	30-45	10-20
	14-39	Loam, fine sandy loam, silty clay loam, clay loam	SC-SM, CL	A-6, A-4, A-7-6, A-5	0	0	85-100	80-100	70-100	50-90	25-45	8-20
	39-60	Loam, clay loam, fine sandy loam, silt loam	CL, SC, SC-SM	A-4, A-6, A-7-6, A-5	0	0	85-100	80-100	70-100	40-90	25-45	8-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
102B:												
Boxwell---------	0-5	Loam, silt loam	CL	A-6	0	0	100	95-100	90-100	70-90	25-35	10-15
	5-14	Loam, clay loam, silty clay loam	CL	A-6	0	0	100	95-100	90-95	70-85	30-40	10-20
	14-28	Loam, silt loam, very fine sandy loam	CL	A-6	0	0	100	95-100	85-95	70-80	25-35	10-15
	28-60	Bedrock			---	---	---	---	---	---	15-45	1-20
Kremlin---------	0-11	Loam, silt loam	CL	A-6	0	0	90-100	80-100	75-100	65-85	25-35	10-15
	11-19	Loam, silt loam, clay loam	CL	A-6	0	0	95-100	90-100	75-95	55-80	30-40	10-20
	19-60	Loam, silt loam, clay loam	CL	A-6	0	0	95-100	90-100	75-95	55-80	30-40	10-20
102D:												
Boxwell---------	0-5	Loam, silt loam	CL	A-6	0	0	100	95-100	90-100	70-90	25-35	10-15
	5-14	Loam, clay loam, silty clay loam	CL	A-6	0	0	100	95-100	90-95	70-85	30-40	10-20
	14-28	Loam, silt loam, very fine sandy loam	CL	A-6	0	0	100	95-100	85-95	70-80	25-35	10-15
	28-60	Bedrock			---	---	---	---	---	---	15-45	1-20
Kremlin---------	0-11	Loam, silt loam	CL	A-6	0	0	90-100	80-100	75-100	65-85	25-35	10-15
	11-19	Loam, silt loam, clay loam	CL	A-6	0	0	95-100	90-100	75-95	55-80	30-40	10-20
	19-60	Loam, silt loam, clay loam	CL	A-6	0	0	95-100	90-100	75-95	55-80	30-40	10-20
103F:												
Badland, outcrop	0-60	Bedrock			0	0	90-100	85-100	75-100	35-95	15-75	5-50

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
103F:(cont.)												
Arikara---------	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	---	---	---	---
	1-2	Loam, clay loam	CL	A-6, A-7-6, A-5	0	0	100	100	85-100	70-80	30-45	10-20
	2-14	Loam, clay loam, silt loam, silty clay loam	CL	A-7-6, A-6, A-5	0	0	85-100	80-100	70-100	50-85	30-45	10-20
	14-39	Loam, fine sandy loam, silty clay loam, clay loam	SC-SM, CL	A-6, A-4, A-7-6, A-5	0	0	85-100	80-100	70-100	50-90	25-45	8-20
	39-60	Loam, clay loam, fine sandy loam, silt loam	SC, SC-SM, CL	A-4, A-6, A-7-6, A-5	0	0	85-100	80-100	70-100	40-90	25-45	8-20
Cabbart---------	0-3	Loam, silt loam	CL	A-6	0	0	90-100	85-100	75-95	55-80	25-35	10-15
	3-18	Loam, silt loam, clay loam, silty clay loam	CL	A-6	0	0	90-100	85-100	75-95	60-85	30-45	10-20
	18-60	Bedrock			---	---	---	---	---	---	20-45	4-20
105:												
Harriet---------	0-2	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	25-40	5-15
	2-18	Clay loam, silty clay loam, silty clay, clay	CH, CL, ML, MH	A-7	0	0	100	100	90-100	70-100	45-65	20-30
	18-28	Loam, silty clay loam, clay loam	CL	A-6, A-7-6	0	0	100	100	90-100	60-100	30-50	10-25
	28-38	Very fine sandy loam	CL-ML, CL	A-4	0	0	100	100	85-95	50-65	25-30	4-10
	38-40	Clay loam	CL, ML	A-6, A-7-6	0	0	100	100	90-100	70-80	35-45	10-20
	40-60	Stratified very fine sandy loam to silty clay	CL, ML, CH	A-6, A-5, A-4, A-7-6	0	0	100	100	90-100	60-100	30-55	7-30

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
106:												
Riverwash-------	0-6	Gravelly sand			0	0-5	80-100	75-100	30-60	0-10	0-14	NP
	6-60	Stratified gravelly coarse sand to gravelly sandy loam, stratified coarse sand to sandy loam			0	0-5	80-100	75-100	40-70	0-20	0-14	NP
107D:												
Rhame----------	0-8	Fine sandy loam, sandy loam	CL-ML, ML, SC-SM, SM	A-4	0	0	100	100	70-85	40-55	20-30	3-10
	8-26	Fine sandy loam, sandy loam	CL-ML, ML, SC-SM, SM	A-4	0	0	100	100	70-85	40-55	20-30	3-10
	26-34	Fine sandy loam, sandy loam	CL-ML, ML, SC-SM, SM	A-4	0	0	100	100	70-85	40-55	20-30	3-10
	34-60	Bedrock			---	---	---	---	---	---	5-20	NP-5
Kremlin---------	0-11	Loam, silt loam	CL	A-6	0	0	90-100	80-100	75-100	65-85	25-35	10-15
	11-19	Loam, silt loam, clay loam	CL	A-6	0	0	95-100	90-100	75-95	55-80	30-40	10-20
	19-60	Loam, silt loam, clay loam	CL	A-6	0	0	95-100	90-100	75-95	55-80	30-40	10-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				*Pct*	*Pct*					*Pct*	
107D:(cont.)												
Maltese---------	0-7	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	30-40	10-15
	7-10	Silt loam	CL	A-6	0	0	100	100	90-100	60-90	30-40	10-15
	10-16	Silty clay, clay	CH	A-7	0	0	100	100	90-100	85-95	50-75	25-40
	16-20	Silty clay, silty clay loam, clay, clay loam	MH	A-7	0	0	100	100	90-100	70-90	50-65	20-30
	20-33	Silty clay loam, clay, clay loam, silty clay	MH	A-7	0	0	100	100	70-95	55-95	50-65	20-30
	33-60	Silty clay loam, fine sandy loam, loam, silt loam	CL, SC	A-6, A-4	0	0	100	100	70-100	45-95	30-55	8-25
108D:												
Boxwell---------	0-5	Loam, silt loam	CL	A-6	0	0	100	95-100	90-100	70-90	25-35	10-15
	5-14	Loam, clay loam, silty clay loam	CL	A-6	0	0	100	95-100	90-95	70-85	30-40	10-20
	14-28	Loam, silt loam, very fine sandy loam	CL	A-6	0	0	100	95-100	85-95	70-80	25-35	10-15
	28-60	Bedrock			---	---	---	---	---	---	15-45	1-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
108D:(cont.)												
Scairt----------	0-2	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	30-40	10-15
	2-6	Silty clay, clay, clay loam, silty clay loam	MH	A-7	0	0	100	100	90-100	70-95	50-70	20-35
	6-13	Silty clay loam, silty clay, clay loam, clay	MH	A-7	0	0	100	100	90-100	70-95	50-70	20-35
	13-22	Silty clay loam, silty clay, silt loam	CH, CL, MH, ML	A-7, A-6	0	0	100	100	90-100	70-95	30-65	10-30
	22-28	Silty clay loam, silty clay, silt loam	CH, CL, ML, MH	A-7, A-6	0	0	100	100	90-100	70-95	30-65	10-30
	28-60	Bedrock			---	---	---	---	---	---	25-80	10-50
Maltese---------	0-7	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	30-40	10-15
	7-10	Silt loam	CL	A-6	0	0	100	100	90-100	60-90	30-40	10-15
	10-16	Silty clay, clay	CH	A-7	0	0	100	100	90-100	85-95	50-75	25-40
	16-20	Silty clay, silty clay loam, clay, clay loam	MH	A-7	0	0	100	100	90-100	70-90	50-65	20-30
	20-33	Silty clay loam, clay, clay loam, silty clay	MH	A-7	0	0	100	100	70-95	55-95	50-65	20-30
	33-60	Silty clay loam, fine sandy loam, loam, silt loam	CL, SC	A-6, A-4	0	0	100	100	70-100	45-95	30-55	8-25

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
109F:												
Rhame----------	0-8	Fine sandy loam, sandy loam	CL-ML, ML, SC-SM, SM	A-4	0	0	100	100	70-85	40-55	20-30	3-10
	8-26	Fine sandy loam, sandy loam	CL-ML, ML, SC-SM, SM	A-4	0	0	100	100	70-85	40-55	20-30	3-10
	26-34	Fine sandy loam, sandy loam	CL-ML, ML, SC-SM, SM	A-4	0	0	100	100	70-85	40-55	20-30	3-10
	34-60	Bedrock			---	---	---	---	---	---	5-20	NP-5
Arikara---------	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	---	---	---	---
	1-2	Loam, clay loam	CL	A-6, A-7-6, A-5	0	0	100	100	85-100	70-80	30-45	10-20
	2-14	Loam, clay loam, silt loam, silty clay loam	CL	A-7-6, A-6, A-5	0	0	85-100	80-100	70-100	50-85	30-45	10-20
	14-39	Loam, fine sandy loam, silty clay loam, clay loam	SC-SM, CL	A-6, A-4, A-7-6, A-5	0	0	85-100	80-100	70-100	50-90	25-45	8-20
	39-60	Loam, clay loam, fine sandy loam, silt loam	CL, SC, SC-SM	A-4, A-6, A-7-6, A-5	0	0	85-100	80-100	70-100	40-90	25-45	8-20
Fleak----------	0-3	Loamy fine sand	SC-SM, SM	A-1, A-4, A-2	0	0	95-100	95-100	45-80	20-40	15-20	NP-4
	3-17	Loamy fine sand, fine sand	SM	A-1, A-2, A-4	0	0	95-100	95-100	40-85	20-40	15-20	NP-4
	17-60	Bedrock			---	---	---	---	---	---	15-20	NP-4
110C:												
Patent----------	0-7	Loam, silt loam	CL	A-6	0	0	100	100	70-100	50-85	25-35	10-15
	7-60	Stratified fine sandy loam to silty clay loam	CL	A-4, A-6, A-7-6, A-5	0	0	100	100	70-100	50-90	25-45	8-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
110C:(cont.)												
Gerda----------	0-2	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-95	30-40	10-15
	2-11	Silty clay, clay, clay loam, silty clay loam	MH	A-7	0	0	100	100	90-100	80-95	50-70	20-35
	11-19	Clay, silty clay loam, clay loam, silty clay	MH	A-7	0	0	100	100	90-100	70-95	50-70	20-35
	19-29	Clay loam, silty clay, silty clay loam	CL, CH	A-7-6	0	0	100	100	90-100	70-95	40-60	20-30
	29-44	Clay loam, silty clay loam, silty clay	MH	A-7	0	0	100	100	90-100	70-95	50-65	20-30
	44-80	Sandy loam, loam, silt loam	CL	A-6, A-4	0	0	100	100	60-90	30-90	30-40	8-15
Slickspots------	0-2	Silty clay	CH	A-7	0	0	100	100	90-100	80-100	50-75	25-40
	2-60	Stratified loam to silty clay	CH	A-7	0	0	100	100	90-100	60-100	30-65	10-30
111F:												
Lonna----------	0-2	Silt loam, loam	CL	A-6	0	0	100	100	90-100	75-90	25-35	10-15
	2-11	Silt loam, silty clay loam	CL	A-6, A-7-6	0	0	100	100	95-100	75-95	30-45	10-20
	11-34	Silt loam, silty clay loam	CL	A-6, A-7-6, A-5	0	0	100	100	95-100	75-95	30-45	10-20
	34-60	Silt loam, silty clay loam, very fine sandy loam	CL, CL-ML	A-6, A-4, A-7-6, A-5	0	0	100	100	95-100	75-90	20-45	4-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
111F:(cont.)												
Arikara---------	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	---	---	---	---
	1-2	Loam, clay loam	CL	A-6, A-7-6, A-5	0	0	100	100	85-100	70-80	30-45	10-20
	2-14	Loam, clay loam, silt loam, silty clay loam	CL	A-7-6, A-6, A-5	0	0	85-100	80-100	70-100	50-85	30-45	10-20
	14-39	Loam, fine sandy loam, silty clay loam, clay loam	SC-SM, CL	A-6, A-4, A-7-6, A-5	0	0	85-100	80-100	70-100	50-90	25-45	8-20
	39-60	Loam, clay loam, fine sandy loam, silt loam	CL, SC, SC-SM	A-4, A-6, A-7-6, A-5	0	0	85-100	80-100	70-100	40-90	25-45	8-20
Cabbart---------	0-3	Silt loam, loam	CL	A-6	0	0	90-100	85-100	75-95	55-80	25-35	10-15
	3-18	Loam, silt loam, clay loam, silty clay loam	CL	A-6	0	0	90-100	85-100	75-95	60-85	30-45	10-20
	18-60	Bedrock			---	---	---	---	---	---	20-45	4-20
112:												
Wolf Point, wooded---------	0-1	Silty clay loam			0	0	100	100	90-100	75-95	45-55	20-35
	1-10	Clay, silty clay, silty clay loam	CH, CL	A-7-6	0	0	100	100	90-100	75-95	45-75	25-50
	10-60	Silty clay, silty clay loam, clay	CH, CL	A-7-6	0	0	100	100	90-100	75-95	45-75	25-50
113:												
Havre, wooded---	0-10	Silt loam, loam	CL	A-6	0	0	100	100	85-95	60-75	25-35	10-15
	10-60	Stratified fine sandy loam to clay loam	CL	A-6, A-7-6	0	0	100	100	70-95	50-75	30-45	10-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
114B:												
Haplustolls-----	0-12	Gravelly loam, loam, sandy loam	CL	A-2-6, A-4, A-6, A-2-4	0	0-1	55-85	50-80	30-80	25-50	25-35	8-15
	12-19	Gravelly fine sandy loam, gravelly loam, very gravelly sandy loam	GC, SC	A-2-4, A-6, A-4, A-2-6	0	0-1	30-70	15-60	15-45	5-40	20-35	4-15
	19-60	Loam, sandy loam, fine sandy loam	CL, SC, CL-ML, SC-SM	A-2-4, A-4, A-6, A-2-6	0	0-1	85-100	80-100	60-95	30-70	20-35	4-15
Ustorthents-----	0-3	Sandy loam, fine sandy loam	SC-SM, CL-ML, CL, SC	A-4, A-2-4	0	0-5	95-100	95-100	85-95	30-90	20-30	4-10
	3-60	Fine sandy loam, sandy loam	SC-SM, CL, CL-ML, SC	A-4, A-2-4	0	0-5	95-100	95-100	80-100	30-80	20-30	4-10
115B:												
Cozberg---------	0-7	Loam	CL	A-4, A-6	0	0	95-100	95-100	85-95	60-70	25-35	8-15
	7-20	Fine sandy loam, sandy loam	CL-ML, SC-SM, SC, CL	A-2-4, A-4	0	0	95-100	80-100	60-90	30-60	20-30	4-10
	20-26	Fine sandy loam, sandy loam	SC, SC-SM, CL-ML, CL	A-4, A-2-4	0	0	95-100	80-100	60-90	30-60	20-30	4-10
	26-30	Gravelly loamy sand, loamy sand, sandy loam, loamy coarse sand, coarse sand	SM, SP-SM, SC-SM	A-4, A-2-4, A-1-b	0	0	60-100	50-95	25-90	5-40	15-20	NP-4
	30-60	Loamy sand, coarse sand, gravelly sand, loamy coarse sand	SC-SM, SM, SP-SM	A-2-4, A-1-b, A-4, A-3	0	0	60-100	50-95	25-70	5-40	15-20	NP-4
Chanta----------	0-6	Loam, silt loam	CL	A-6	0	0	90-100	80-100	75-100	65-85	25-35	10-15
	6-22	Loam, clay loam	CL	A-6	0	0	80-100	75-100	65-90	65-85	30-40	10-20
	22-26	Sandy loam	CL-ML, SC, SC-SM, CL	A-2, A-4	0	0	80-100	75-100	65-90	30-65	20-30	4-10
	26-60	Gravelly sand	SM, SP-SM, SW-SM	A-1, A-3, A-2-4	0	5-20	60-80	40-65	15-55	5-15	15-20	NP-4

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
116F:												
Kremlin---------	0-11	Loam, silt loam	CL	A-6	0	0	90-100	80-100	75-100	65-85	25-35	10-15
	11-19	Loam, silt loam, clay loam	CL	A-6	0	0	95-100	90-100	75-95	55-80	30-40	10-20
	19-60	Loam, silt loam, clay loam	CL	A-6	0	0	95-100	90-100	75-95	55-80	30-40	10-20
Shibah----------	0-4	Loam, silt loam, gravelly loam, cobbly loam	CL, SC	A-6	0-5	0-20	85-100	70-90	60-90	45-80	25-35	10-15
	4-8	Gravelly loam, cobbly loam, very cobbly loam, very gravelly loam	GC, CL, SC	A-6, A-2-6	0-5	5-45	60-95	50-80	45-80	30-60	25-35	10-15
	8-18	Very cobbly loam, silt loam, very gravelly loam	SC, CL, GC	A-6, A-2-6	0-5	0-50	60-100	55-80	45-80	25-70	25-35	10-15
	18-80	Very cobbly loam, extremely gravelly loam, extremely flaggy sandy clay loam, extremely gravelly sandy loam, very gravelly loam	GC, CL, CL-ML, SC, SC-SM, GC-GM	A-6, A-4, A-2-4, A-2-6	0-5	0-30	45-95	30-80	20-70	15-60	20-40	4-20
117B:												
Kremlin---------	0-11	Loam, silt loam	CL	A-6	0	0	90-100	80-100	75-100	65-85	25-35	10-15
	11-19	Loam, silt loam, clay loam	CL	A-6	0	0	95-100	90-100	75-95	55-80	30-40	10-20
	19-60	Loam, silt loam, clay loam	CL	A-6	0	0	95-100	90-100	75-95	55-80	30-40	10-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
117B:(cont.)												
Chanta----------	0-6	Loam, silt loam	CL	A-6	0	0	90-100	80-100	75-100	65-85	25-35	10-15
	6-22	Loam, clay loam	CL	A-6	0	0	80-100	75-100	65-90	65-85	30-40	10-20
	22-26	Sandy loam	SC, SC-SM, CL, CL-ML	A-2, A-4	0	0	80-100	75-100	65-90	30-65	20-30	4-10
	26-60	Gravelly sand	SM, SP-SM, SW-SM	A-1, A-3, A-2-4	0	5-20	60-80	40-65	15-55	5-15	15-20	NP-4
118F:												
Shibah----------	0-4	Loam, silt loam, gravelly loam, cobbly loam	CL, SC	A-6	0-5	0-20	85-100	70-90	60-90	45-80	25-35	10-15
	4-8	Gravelly loam, cobbly loam, very cobbly loam, very gravelly loam	GC, CL, SC	A-6	0-5	5-45	60-95	50-80	45-80	30-60	25-35	10-15
	8-18	Very cobbly loam, silt loam, very gravelly loam	CL, GC, SC	A-6	0-5	0-50	60-100	55-80	45-80	25-70	25-35	10-15
	18-80	Very cobbly loam, extremely gravelly loam, extremely flaggy sandy clay loam, extremely gravelly sandy loam, very gravelly loam	CL, CL-ML, GC, GC-GM, SC, SC-SM	A-6, A-4	0-5	0-30	45-95	30-80	20-70	15-60	20-40	4-20
Rubbleland------	---	---	---	---	---	---	---	---	---	---	---	---

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
118F:(cont.)												
Arikara---------	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	---	---	---	---
	1-2	Loam, clay loam	CL	A-6, A-7-6, A-5	0	0	100	100	85-100	70-80	30-45	10-20
	2-14	Loam, clay loam, silt loam, silty clay loam	CL	A-7-6, A-6, A-5	0	0	85-100	80-100	70-100	50-85	30-45	10-20
	14-39	Loam, fine sandy loam, silty clay loam, clay loam	SC-SM, CL	A-6, A-4, A-7-6, A-5	0	0	85-100	80-100	70-100	50-90	25-45	8-20
	39-60	Loam, clay loam, fine sandy loam, silt loam	CL, SC, SC-SM	A-4, A-6, A-7-6, A-5	0	0	85-100	80-100	70-100	40-90	25-45	8-20
119:												
Glendive, wooded	0-5	Fine sandy loam, sandy loam	CL-ML, CL, SC-SM, SC	A-2-4, A-4	0	0	100	100	65-85	30-55	20-30	4-10
	5-16	Loam, silt loam, sandy loam	SC-SM, CL, SC, SM, CL-ML, ML	A-4	0	0	100	100	65-95	40-70	20-30	3-10
	16-60	Stratified loamy fine sand to silt loam	CL-ML, ML, SC, SM, SC-SM	A-2-4, A-4	0	0	95-100	75-100	60-80	25-50	15-30	1-10
120B:												
Hanly, wooded---	0-5	Fine sandy loam, sandy loam	CL-ML, SC-SM, SC, CL	A-4, A-2-4	0	0	100	100	70-85	30-55	20-30	4-10
	5-60	Stratified sand to fine sandy loam	SM, SP-SM	A-3, A-4, A-2-4	0	0	100	100	50-85	5-40	15-20	NP-4

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
121F:												
Maltese---------	0-7	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	30-40	10-15
	7-10	Silt loam	CL	A-6	0	0	100	100	90-100	60-90	30-40	10-15
	10-16	Silty clay, clay	CH	A-7	0	0	100	100	90-100	85-95	50-75	25-40
	16-20	Silty clay, silty clay loam, clay, clay loam	MH	A-7	0	0	100	100	90-100	70-90	50-65	20-30
	20-33	Silty clay loam, clay, clay loam, silty clay	MH	A-7	0	0	100	100	70-95	55-95	50-65	20-30
	33-60	Silty clay loam, fine sandy loam, loam, silt loam	CL, SC	A-6, A-4	0	0	100	100	70-100	45-95	30-55	8-25
Lonna----------	0-2	Silt loam, loam	CL	A-6	0	0	100	100	90-100	75-90	25-35	10-15
	2-11	Silt loam, silty clay loam	CL	A-6, A-7-6	0	0	100	100	95-100	75-95	30-45	10-20
	11-34	Silt loam, silty clay loam	CL	A-6, A-7-6, A-5	0	0	100	100	95-100	75-95	30-45	10-20
	34-60	Silt loam, silty clay loam, very fine sandy loam	CL, CL-ML	A-6, A-4, A-5, A-7-6	0	0	100	100	95-100	75-90	20-45	4-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				*Pct*	*Pct*					*Pct*	
121F:(cont.)												
Arikara---------	0-1	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	1-2	Loam, clay loam	CL	A-6, A-7-6, A-5	0	0	100	100	85-100	70-80	30-45	10-20
	2-14	Loam, clay loam, silt loam, silty clay loam	CL	A-7-6, A-6, A-5	0	0	85-100	80-100	70-100	50-85	30-45	10-20
	14-39	Loam, fine sandy loam, silty clay loam, clay loam	SC-SM, CL	A-6, A-4, A-7-6, A-5	0	0	85-100	80-100	70-100	50-90	25-45	8-20
	39-60	Loam, clay loam, fine sandy loam, silt loam	CL, SC, SC-SM	A-4, A-6, A-7-6, A-5	0	0	85-100	80-100	70-100	40-90	25-45	8-20
122C:												
Bulltop---------	0-4	Loam, silt loam	CL	A-6	0	0	95-100	90-100	75-100	55-90	25-35	10-15
	4-15	Loam, fine sandy loam, sandy loam, gravelly loam	CL, SC	A-4, A-6	0	0-25	90-100	65-100	55-100	40-90	25-35	8-15
	15-19	Gravelly loam, very gravelly coarse sandy loam, very cobbly loam, extremely gravelly loam, cobbly loam	CL, GC, SC	A-6, A-4, A-2-6	0	0-35	30-100	30-85	30-80	20-65	25-35	8-15
	19-80	Very gravelly loam, very gravelly sandy loam, very cobbly sandy loam, extremely cobbly loam, very cobbly loam, extremely gravelly loam	CL, GC, SC	A-4, A-2-6, A-6	0	0-35	35-85	30-65	20-60	10-50	25-35	8-15

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
122C:(cont.)												
Shibah----------	0-4	Loam, silt loam, gravelly loam, cobbly loam	CL, SC	A-6	0-5	0-20	85-100	70-90	60-90	45-80	25-35	10-15
	4-8	Gravelly loam, cobbly loam, very cobbly loam, very gravelly loam	GC, CL, SC	A-6	0-5	5-45	60-95	50-80	45-80	30-60	25-35	10-15
	8-18	Very cobbly loam, silt loam, very gravelly loam	CL, GC, SC	A-6	0-5	0-50	60-100	55-80	45-80	25-70	25-35	10-15
	18-80	Very cobbly loam, extremely gravelly loam, extremely flaggy sandy clay loam, extremely gravelly sandy loam, very gravelly loam	CL, CL-ML, GC, GC-GM, SC, SC-SM	A-6, A-4	0-5	0-30	45-95	30-80	20-70	15-60	20-40	4-20
123E:												
Scairt----------	0-2	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	30-40	10-15
	2-6	Silty clay, clay, clay loam, silty clay loam	MH	A-7	0	0	100	100	90-100	70-95	50-70	20-35
	6-13	Silty clay loam, silty clay, clay loam, clay	MH	A-7	0	0	100	100	90-100	70-95	50-70	20-35
	13-22	Silty clay loam, silty clay, silt loam	CH, CL, MH, ML	A-6, A-7	0	0	100	100	90-100	70-95	30-65	10-30
	22-28	Silty clay loam, silty clay, silt loam	CH, CL, MH, ML	A-7, A-6	0	0	100	100	90-100	70-95	30-65	10-30
	28-60	Bedrock			---	---	---	---	---	---	25-80	10-50

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				*Pct*	*Pct*					*Pct*	
123E:(cont.)												
Maltese---------	0-7	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	30-40	10-15
	7-10	Silt loam	CL	A-6	0	0	100	100	90-100	60-90	30-40	10-15
	10-16	Silty clay, clay	CH	A-7	0	0	100	100	90-100	85-95	50-75	25-40
	16-20	Silty clay, silty clay loam, clay, clay loam	MH	A-7	0	0	100	100	90-100	70-90	50-65	20-30
	20-33	Silty clay loam, clay, clay loam, silty clay	MH	A-7	0	0	100	100	70-95	55-95	50-65	20-30
	33-60	Silty clay loam, fine sandy loam, loam, silt loam	CL, SC	A-6, A-4	0	0	100	100	70-100	45-95	30-55	8-25
Boxwell---------	0-5	Loam, silt loam	CL	A-6	0	0	100	95-100	90-100	70-90	25-35	10-15
	5-14	Loam, clay loam, silty clay loam	CL	A-6	0	0	100	95-100	90-95	70-85	30-40	10-20
	14-28	Loam, silt loam, very fine sandy loam	CL	A-6	0	0	100	95-100	85-95	70-80	25-35	10-15
	28-60	Bedrock			---	---	---	---	---	---	15-45	1-20
152:												
Heil----------	0-3	Silt loam	CL	A-6	0	0	100	100	90-100	70-100	30-40	10-15
	3-24	Silty clay, clay	CH, MH	A-7-6	0	0	100	100	90-100	75-100	55-70	25-40
	24-38	Silty clay, clay, silty clay loam, clay loam	CH, CL	A-7-6	0	0	100	100	90-100	70-95	40-60	15-30
	38-52	Silty clay, clay, silty clay loam, clay loam	CH, CL	A-7-6	0	0	100	100	90-100	70-95	40-60	15-30
	52-60	Silty clay, silty clay loam, loam, clay, clay loam	CH, ML	A-7-6, A-6	0	0	100	100	85-100	60-95	35-60	10-30

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
155:												
Dumps and pits, mine----------	0-4	Clay loam	CL	A-6, A-7-6	0-1	0-10	95-100	95-100	85-95	60-90	35-45	15-20
	4-60	Loam, clay loam	CL	A-6, A-7-6	0-10	0-10	95-100	95-100	80-100	60-80	30-45	10-20
159:												
Straw----------	0-5	Loam, silt loam	CL	A-6	0	0	95-100	90-100	85-100	60-90	25-35	10-15
	5-23	Loam, silt loam	CL	A-6	0	0	95-100	90-100	85-100	60-90	25-35	10-15
	23-30	Silty clay loam, loam, silt loam, clay loam	CL	A-6	0	0	95-100	90-100	85-100	60-90	25-40	10-20
	30-36	Silt loam, clay loam, loam	CL	A-6, A-7-6	0	0	95-100	90-100	85-100	60-90	30-45	10-20
	36-40	Silty clay loam, loam, silt loam, clay loam	CL	A-6, A-7-6	0	0	95-100	90-100	85-100	60-90	30-45	10-20
	40-66	Clay loam, silt loam, loam	CL	A-6, A-7-6	0	0	95-100	90-100	85-100	60-90	30-45	10-20
Daglum----------	0-7	Loam, silt loam	CL	A-6	0	0	100	100	85-100	60-90	20-40	10-25
	7-8	Silt loam, loam	CL	A-6	0	0	100	100	85-100	60-90	20-40	10-25
	8-18	Clay, silty clay, silty clay loam, clay loam	CH, CL	A-6, A-7	0	0	100	100	90-100	70-95	35-75	15-45
	18-32	Clay loam, clay, silty clay	CH, CL	A-7, A-6	0	0	100	100	90-100	70-95	35-75	15-45
	32-47	Silty clay loam, clay loam, clay			0	0	100	100	90-100	70-95	35-75	15-40
	47-60	Clay, clay loam, silty clay loam, silty clay, loam	CL, CH	A-6, A-7	0	0	100	100	85-100	60-95	35-60	15-40
175:												
Havre, rarely flooded--------	0-10	Silt loam, loam	CL	A-6	0	0	100	100	85-95	60-75	25-35	10-15
	10-60	Stratified fine sandy loam to clay loam	CL	A-6, A-7-6	0	0	100	100	70-95	50-75	30-45	10-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
177:												
Glendive, rarely flooded--------	0-5	Fine sandy loam, sandy loam	CL-ML, CL, SC-SM, SC	A-2-4, A-4	0	0	100	100	65-85	30-55	20-30	4-10
	5-16	Loam, silt loam, sandy loam	CL, SC-SM, SC, SM, CL-ML, ML	A-4	0	0	100	100	65-95	40-70	20-30	3-10
	16-60	Stratified loamy fine sand to silt loam	CL-ML, ML, SC, SM, SC-SM	A-2-4, A-4	0	0	95-100	75-100	60-80	25-50	15-30	1-10
183:												
Badland, high precipitation--	0-60	Bedrock	CH, CL-ML, SC, SC-SM, CL	A-4, A-6, A-7	0	0	90-100	85-100	75-100	35-95	15-75	5-50
205:												
Harriet---------	0-2	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	25-40	5-15
	2-18	Clay loam, silty clay loam, silty clay, clay	CH, CL, ML, MH	A-7	0	0	100	100	90-100	70-100	45-65	20-30
	18-28	Loam, silty clay loam, clay loam	CL	A-6, A-7-6	0	0	100	100	90-100	60-100	30-50	10-25
	28-38	Very fine sandy loam	CL-ML, CL	A-4	0	0	100	100	85-95	50-65	25-30	4-10
	38-40	Clay loam	CL, ML	A-6, A-7-6	0	0	100	100	90-100	70-80	35-45	10-20
	40-60	Stratified very fine sandy loam to silty clay	CL, ML, CH	A-5, A-6, A-4, A-7-6	0	0	100	100	90-100	60-100	30-55	7-30
210C:												
Lambert---------	0-5	Silt loam	CL	A-6	0	0	100	100	90-100	75-90	25-35	10-15
	5-36	Silt loam, silty clay loam	CL	A-7-6, A-6	0	0	100	100	90-100	80-90	30-45	10-20
	36-60	Very fine sandy loam, stratified very fine sandy loam to silty clay loam	CL	A-4, A-5, A-6, A-7-6	0	0	100	100	85-95	55-70	25-45	8-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
210C:(cont.)												
Slickspots------	0-2	Silty clay	CH	A-7	0	0	100	100	90-100	80-100	50-75	25-50
	2-60	Stratified loam to silty clay	CH	A-7	0	0	100	100	90-100	60-100	20-70	5-40
Rhoades---------	0-3	Silt loam, loam	CL	A-6, A-7-6	0	0	100	100	85-100	60-95	30-45	10-25
	3-8	Silty clay, clay loam, clay, silty clay loam	CH	A-7-6	0	0	100	100	90-100	80-95	50-65	25-35
	8-14	Silty clay, clay, clay loam, silty clay loam	CH	A-7-6	0	0	100	100	90-100	75-95	50-65	25-35
	14-46	Silty clay, clay, silty clay loam, clay loam, loam	CH, CL, MH, ML	A-6, A-7-6	0	0	100	100	90-100	70-95	35-60	10-30
	46-60	Silty clay loam, silt loam, loam, clay loam, silty clay	CH, CL, ML	A-6, A-7-6	0	0	100	100	85-100	75-95	35-60	10-30
255:												
Pits, gravel and sand, low precipitation--	0-6	Extremely gravelly sand	GW-GM, SW-SM	A-1, A-3	0	0-5	25-90	10-65	5-55	0-25	0-15	NP-5
	6-60	Extremely gravelly sand, extremely gravelly coarse sand, gravelly coarse sandy loam	GW-GM, SW-SM	A-1, A-3	0	0-10	25-90	10-65	5-55	0-25	0-15	NP-5
M-W:												
Miscellaneous water----------	---	---	---	---	---	---	---	---	---	---	---	---
W:												
Water----------	---	---	---	---	---	---	---	---	---	---	---	---

Physical Properties of the Soils

(The symbol < means less than; > means greater than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Wind erodibility index" apply only to the surface layer. Dashes (--) indicate that data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Moist bulk density	Ksat	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
3:												
Peta----------	0-10	18-27	1.20-1.30	0.6-2	0.20-0.22	0.0-2.9	3.0-6.0	.28	.28	5	5	56
	10-26	22-30	1.20-1.45	0.6-2	0.15-0.19	3.0-5.9	1.0-4.0	.32	.32			
	26-48	10-27	1.20-1.50	2-6	0.15-0.17	0.0-2.9	0.0-1.0	.20	.20			
	48-53	18-27	1.25-1.45	0.6-2	0.17-0.19	0.0-2.9	0.0-1.0	.28	.28			
	53-80	5-18	1.20-1.50	2-6	0.14-0.16	0.0-2.9	0.0-1.0	.20	.20			
5:												
Savage----------	0-7	27-40	1.15-1.35	0.2-0.6	0.18-0.23	3.0-5.9	1.0-5.0	.32	.32	5	7	38
	7-25	35-50	1.25-1.50	0.06-0.6	0.17-0.20	6.0-8.9	1.0-2.0	.32	.32			
	25-51	35-45	1.30-1.50	0.06-0.6	0.17-0.20	6.0-8.9	0.5-1.0	.32	.32			
	51-80	35-45	1.30-1.50	0.06-0.6	0.17-0.20	6.0-8.9	0.0-0.5	.43	.43			
5B:												
Savage----------	0-7	27-40	1.15-1.35	0.2-0.6	0.18-0.23	3.0-5.9	1.0-5.0	.32	.32	5	7	38
	7-25	35-50	1.25-1.50	0.06-0.6	0.17-0.20	6.0-8.9	1.0-2.0	.32	.32			
	25-51	35-45	1.30-1.50	0.06-0.6	0.17-0.20	6.0-8.9	0.5-1.0	.32	.32			
	51-80	35-45	1.30-1.50	0.06-0.6	0.17-0.20	6.0-8.9	0.0-0.5	.43	.43			
6:												
Regan----------	0-9	18-27	1.10-1.40	0.2-2	0.16-0.22	0.0-2.9	2.0-6.0	.32	.32	5	4L	86
	9-28	18-35	1.20-1.40	0.2-2	0.16-0.20	3.0-5.9	1.0-3.0	.43	.43			
	28-60	10-35	1.20-1.50	0.2-2	0.14-0.17	3.0-5.9	0.5-1.0	.32	.32			
7:												
Arnegard----------	0-13	18-27	1.00-1.40	0.6-2	0.18-0.20	0.0-2.9	3.0-6.0	.24	.24	5	6	48
	13-36	18-30	1.20-1.60	0.6-2	0.16-0.22	0.0-2.9	1.0-4.0	.28	.28			
	36-60	15-30	1.20-1.60	0.6-2	0.14-0.18	0.0-2.9	0.0-1.0	.28	.28			
9F:												
Cabba----------	0-3	18-27	1.30-1.50	0.6-2	0.16-0.20	0.0-2.9	1.0-3.0	.32	.32	2	4L	86
	3-15	18-35	1.30-1.50	0.6-2	0.14-0.18	0.0-5.9	0.5-1.0	.43	.43			
	15-60	10-35	1.40-1.70	0.06-0.6	0.02-0.08	---	0.0-0.5	.49	.49			
Sen----------	0-6	18-27	1.10-1.30	0.6-2	0.20-0.24	0.0-2.9	2.0-4.0	.32	.32	3	6	48
	6-17	18-35	1.20-1.50	0.6-2	0.16-0.22	0.0-5.9	1.0-3.0	.43	.43			
	17-34	18-30	1.30-1.50	0.6-2	0.16-0.22	0.0-5.9	1.0-2.0	.43	.43			
	34-60	15-35	1.40-1.65	0.06-0.6	0.04-0.10	---	0.0-0.5	.49	.49			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Ksat	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
9F:(cont.)												
Chama----------	0-4	15-27	1.10-1.35	0.6-2	0.20-0.24	0.0-2.9	1.0-4.0	.32	.32	3	4L	86
	4-8	18-35	1.20-1.50	0.6-2	0.18-0.20	0.0-5.9	1.0-3.0	.32	.32			
	8-34	18-35	1.20-1.50	0.6-2	0.18-0.20	0.0-5.9	0.5-1.0	.43	.43			
	34-60	10-35	1.40-1.65	0.06-0.6	0.04-0.10	---	0.0-0.5	.49	.49			
12B:												
Rhoades----------	0-3	18-27	1.10-1.30	0.2-2	0.13-0.15	0.0-2.9	2.0-4.0	.32	.32	2	6	48
	3-8	35-50	1.20-1.40	0.001-0.2	0.10-0.12	6.0-8.9	0.5-2.0	.28	.28			
	8-14	35-50	1.25-1.50	0.001-0.2	0.10-0.12	6.0-8.9	0.5-2.0	.32	.32			
	14-46	20-50	1.30-1.50	0.001-2.0	0.10-0.12	6.0-8.9	0.0-0.5	.32	.32			
	46-60	20-45	1.30-1.50	0.001-2.0	0.10-0.12	6.0-8.9	0.0-0.5	.32	.32			
Daglum----------	0-7	18-27	1.00-1.20	0.6-2	0.13-0.15	0.0-2.9	2.0-4.0	.32	.32	2	6	48
	7-8	18-27	1.20-1.40	0.2-2	0.12-0.14	0.0-2.9	1.0-3.0	.32	.32			
	8-18	35-60	1.20-1.40	0.001-0.2	0.12-0.14	6.0-8.9	1.0-2.0	.32	.32			
	18-32	35-60	1.30-1.45	0.001-0.2	0.12-0.14	6.0-8.9	0.0-1.0	.32	.32			
	32-47	35-60	1.30-1.45	0.001-0.2	0.12-0.14	6.0-8.9	0.0-1.0	.32	.32			
	47-60	20-45	1.30-1.45	0.001-2.0	0.12-0.14	3.0-5.9	0.0-0.5	.32	.32			
13B:												
Dogtooth----------	0-2	18-27	1.10-1.30	0.2-2	0.20-0.24	0.0-2.9	2.0-4.0	.28	.28	2	6	48
	2-8	35-50	1.20-1.40	0.001-0.2	0.10-0.16	6.0-8.9	1.0-2.0	.32	.32			
	8-13	35-50	1.20-1.50	0.001-0.2	0.10-0.16	6.0-8.9	0.5-2.0	.32	.32			
	13-21	18-50	1.20-1.50	0.001-0.6	0.10-0.16	6.0-8.9	0.5-1.0	.32	.32			
	21-60	10-90	1.20-1.50	0.001-0.6	0.04-0.10	---	0.0-0.5	.43	.43			
Janesburg----------	0-8	18-27	1.00-1.20	0.2-0.6	0.20-0.24	0.0-2.9	2.0-4.0	.28	.28	2	6	48
	8-10	15-27	1.20-1.40	0.2-2	0.16-0.24	0.0-2.9	2.0-3.0	.32	.32			
	10-21	35-50	1.20-1.40	0.001-0.2	0.10-0.16	6.0-8.9	1.0-2.0	.32	.32			
	21-26	18-45	1.20-1.50	0.06-2	0.10-0.16	6.0-8.9	0.5-1.0	.43	.43			
	26-60	10-90	1.20-1.50	0.001-0.6	0.04-0.10	---	0.0-0.5	.43	.43			
13D:												
Dogtooth----------	0-2	27-35	1.10-1.30	0.2-2	0.17-0.23	3.0-5.9	2.0-4.0	.28	.28	2	6	48
	2-8	35-50	1.20-1.40	0.001-0.2	0.10-0.16	6.0-8.9	1.0-2.0	.32	.32			
	8-13	35-50	1.20-1.50	0.001-0.2	0.10-0.16	6.0-8.9	0.5-2.0	.32	.32			
	13-21	18-50	1.20-1.50	0.001-0.6	0.10-0.16	6.0-8.9	0.5-1.0	.32	.32			
	21-60	10-90	1.20-1.50	0.001-0.6	0.04-0.10	---	0.0-0.5	.43	.43			
Janesburg----------	0-8	18-27	1.00-1.20	0.2-0.6	0.20-0.24	0.0-2.9	2.0-4.0	.28	.28	2	6	48
	8-10	15-27	1.20-1.40	0.2-2	0.16-0.24	0.0-2.9	2.0-3.0	.32	.32			
	10-21	35-50	1.20-1.40	0.001-0.2	0.10-0.16	6.0-8.9	1.0-2.0	.32	.32			
	21-26	18-45	1.20-1.50	0.06-2	0.10-0.16	6.0-8.9	0.5-1.0	.43	.43			
	26-60	10-90	1.20-1.50	0.001-0.6	0.04-0.10	---	0.0-0.5	.43	.43			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Ksat	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	Pct					
14E:												
Amor----------	0-8	15-25	1.20-1.35	0.6-2	0.18-0.20	0.0-2.9	2.0-4.0	.24	.24	3	6	48
	8-19	18-30	1.20-1.40	0.6-2	0.17-0.19	0.0-2.9	1.0-3.0	.32	.32			
	19-31	18-30	1.20-1.60	0.6-2	0.17-0.19	0.0-2.9	0.5-1.0	.32	.32			
	31-60	5-35	1.40-1.65	0.06-0.6	0.04-0.10	---	0.0-0.2	.43	.43			
Brandenburg----------	0-4	10-25	1.20-1.40	0.6-2	0.12-0.16	0.0-2.9	2.0-3.0	.24	.49	2	7	38
	4-10	5-25	1.20-1.40	0.6-2	0.13-0.20	0.0-2.9	0.0-1.0	.24	.49			
	10-60	1-5	1.00-1.30	20-60	0.01-0.03	0.0-2.9	0.0-0.5	.10	.32			
15B:												
Daglum----------	0-7	18-27	1.00-1.20	0.6-2	0.13-0.15	0.0-2.9	2.0-4.0	.32	.32	2	6	48
	7-8	18-27	1.20-1.40	0.2-2	0.12-0.14	0.0-2.9	1.0-3.0	.32	.32			
	8-18	35-60	1.20-1.40	0.001-0.2	0.12-0.14	6.0-8.9	1.0-2.0	.32	.32			
	18-32	35-60	1.30-1.45	0.001-0.2	0.12-0.14	6.0-8.9	0.0-1.0	.32	.32			
	32-47	35-60	1.30-1.45	0.001-0.2	0.12-0.14	6.0-8.9	0.0-1.0	.32	.32			
	47-60	20-45	1.30-1.45	0.001-2.0	0.12-0.14	3.0-5.9	0.0-0.5	.32	.32			
Rhoades----------	0-3	18-27	1.10-1.30	0.2-2	0.13-0.15	0.0-2.9	2.0-4.0	.32	.32	2	6	48
	3-8	35-50	1.20-1.40	0.001-0.2	0.10-0.12	6.0-8.9	0.5-2.0	.28	.28			
	8-14	35-50	1.25-1.50	0.001-0.2	0.10-0.12	6.0-8.9	0.5-2.0	.32	.32			
	14-46	20-50	1.30-1.50	0.001-2.0	0.10-0.12	6.0-8.9	0.0-0.5	.32	.32			
	46-60	20-45	1.30-1.50	0.001-2.0	0.10-0.12	6.0-8.9	0.0-0.5	.32	.32			
17:												
Amor----------	0-8	15-25	1.20-1.35	0.6-2	0.18-0.20	0.0-2.9	2.0-4.0	.24	.24	3	6	48
	8-19	18-30	1.20-1.40	0.6-2	0.17-0.19	0.0-2.9	1.0-3.0	.32	.32			
	19-31	18-30	1.20-1.60	0.6-2	0.17-0.19	0.0-2.9	0.5-1.0	.32	.32			
	31-60	5-35	1.40-1.65	0.06-0.6	0.04-0.10	---	0.0-0.5	.43	.43			
Arnegard----------	0-13	18-27	1.00-1.40	0.6-2	0.18-0.20	0.0-2.9	3.0-6.0	.24	.24	5	6	48
	13-36	18-30	1.20-1.60	0.6-2	0.16-0.22	0.0-2.9	1.0-4.0	.28	.28			
	36-60	15-30	1.20-1.60	0.6-2	0.14-0.18	0.0-2.9	0.0-1.0	.28	.28			
17B:												
Amor----------	0-8	15-25	1.20-1.35	0.6-2	0.18-0.20	0.0-2.9	2.0-4.0	.24	.24	3	6	48
	8-19	18-30	1.20-1.40	0.6-2	0.17-0.19	0.0-2.9	1.0-3.0	.32	.32			
	19-31	18-30	1.20-1.60	0.6-2	0.17-0.19	0.0-2.9	0.5-1.0	.32	.32			
	31-60	5-35	1.40-1.65	0.06-0.6	0.04-0.10	---	0.0-0.5	.43	.43			
Shambo----------	0-9	18-27	1.10-1.30	0.6-2	0.20-0.22	0.0-2.9	2.0-6.0	.28	.28	5	6	48
	9-13	18-30	1.20-1.50	0.6-2	0.17-0.19	0.0-2.9	1.0-3.0	.28	.28			
	13-29	18-30	1.20-1.50	0.6-2	0.17-0.19	0.0-2.9	1.0-2.0	.28	.28			
	29-48	18-30	1.20-1.50	0.6-2	0.17-0.19	0.0-2.9	0.5-1.0	.32	.32			
	48-60	18-35	1.20-1.50	0.6-2	0.17-0.19	0.0-2.9	0.0-1.0	.32	.32			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Ksat	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
17C:												
Amor	0-8	15-25	1.20-1.35	0.6-2	0.18-0.20	0.0-2.9	2.0-4.0	.24	.24	3	6	48
	8-19	18-30	1.20-1.40	0.6-2	0.17-0.19	0.0-2.9	1.0-3.0	.32	.32			
	19-31	18-30	1.20-1.60	0.6-2	0.17-0.19	0.0-2.9	0.5-1.0	.32	.32			
	31-60	5-35	1.40-1.65	0.06-0.6	0.04-0.10	---	0.0-0.2	.43	.43			
Cabba	0-3	18-27	1.30-1.50	0.6-2	0.16-0.20	0.0-2.9	1.0-3.0	.32	.32	2	4L	86
	3-15	18-35	1.30-1.50	0.6-2	0.14-0.18	0.0-5.9	0.5-1.0	.43	.43			
	15-60	10-35	1.40-1.70	0.06-0.6	0.02-0.08	---	0.0-0.5	.49	.49			
17D:												
Amor	0-8	15-25	1.20-1.35	0.6-2	0.18-0.20	0.0-2.9	2.0-4.0	.24	.24	3	6	48
	8-19	18-30	1.20-1.40	0.6-2	0.17-0.19	0.0-2.9	1.0-3.0	.32	.32			
	19-31	18-30	1.20-1.60	0.6-2	0.17-0.19	0.0-2.9	0.5-1.0	.32	.32			
	31-60	5-35	1.40-1.65	0.06-0.6	0.04-0.10	---	0.0-0.2	.43	.43			
Cabba	0-3	18-27	1.30-1.50	0.6-2	0.16-0.20	0.0-2.9	1.0-3.0	.32	.32	2	4L	86
	3-15	18-35	1.30-1.50	0.6-2	0.14-0.18	0.0-5.9	0.5-1.0	.43	.43			
	15-60	10-35	1.40-1.70	0.06-0.6	0.02-0.08	---	0.0-0.5	.49	.49			
18E:												
Manning	0-5	10-18	1.10-1.30	2-6	0.13-0.18	0.0-2.9	2.0-5.0	.20	.20	4	3	86
	5-18	10-20	1.20-1.50	2-6	0.13-0.19	0.0-2.9	1.0-3.0	.20	.24			
	18-25	10-20	1.30-1.50	2-6	0.12-0.20	0.0-2.9	1.0-2.0	.10	.20			
	25-60	1-10	1.20-1.70	20-60	0.02-0.08	0.0-2.9	0.0-1.0	.10	.20			
Schaller	0-9	10-18	1.10-1.50	2-6	0.13-0.15	0.0-2.9	1.0-3.0	.20	.20	3	3	86
	9-15	5-18	1.10-1.50	2-6	0.02-0.04	0.0-2.9	0.0-2.0	.20	.20			
	15-60	1-10	1.10-1.50	6-20	0.02-0.04	0.0-2.9	0.0-0.5	.20	.20			
Wabek	0-5	15-27	1.10-1.50	2-6	0.20-0.22	0.0-2.9	1.0-2.0	.20	.28	2	5	56
	5-9	10-25	1.20-1.60	2-20	0.11-0.15	0.0-2.9	0.0-1.0	.10	.17			
	9-60	1-10	1.30-1.70	20-60	0.02-0.04	0.0-2.9	0.0-1.0	.10	.10			
19:												
Sen	0-6	18-27	1.10-1.30	0.6-2	0.20-0.24	0.0-2.9	2.0-4.0	.32	.32	3	6	48
	6-17	18-35	1.20-1.50	0.6-2	0.16-0.22	0.0-5.9	1.0-3.0	.43	.43			
	17-34	18-30	1.30-1.50	0.6-2	0.16-0.22	0.0-5.9	1.0-2.0	.43	.43			
	34-60	15-35	1.40-1.65	0.06-0.6	0.04-0.10	---	0.0-0.5	.49	.49			
Golva	0-5	18-27	1.20-1.50	0.6-2	0.20-0.23	0.0-2.9	1.0-6.0	.32	.32	5	6	48
	5-15	18-35	1.10-1.30	0.6-2	0.18-0.21	3.0-5.9	1.0-3.0	.32	.32			
	15-21	18-35	1.10-1.30	0.6-2	0.18-0.21	3.0-5.9	1.0-3.0	.32	.32			
	21-40	18-30	1.20-1.50	0.6-2	0.17-0.20	3.0-5.9	0.5-1.0	.43	.43			
	40-60	18-30	1.20-1.50	0.6-2	0.16-0.19	3.0-5.9	0.0-0.5	.43	.43			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Ksat	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
19B:												
Chama----------	0-4	15-27	1.10-1.35	0.6-2	0.20-0.24	0.0-2.9	1.0-4.0	.32	.32	3	4L	86
	4-8	18-35	1.20-1.50	0.6-2	0.18-0.20	0.0-5.9	1.0-3.0	.32	.32			
	8-34	18-35	1.20-1.50	0.6-2	0.18-0.20	0.0-5.9	0.5-1.0	.43	.43			
	34-60	10-35	1.40-1.65	0.06-0.6	0.04-0.10	---	0.0-0.5	.49	.49			
Sen----------	0-6	18-27	1.10-1.30	0.6-2	0.20-0.24	0.0-2.9	2.0-4.0	.32	.32	3	6	48
	6-17	18-35	1.20-1.50	0.6-2	0.16-0.22	0.0-5.9	1.0-3.0	.43	.43			
	17-34	18-30	1.30-1.50	0.6-2	0.16-0.22	0.0-5.9	1.0-2.0	.43	.43			
	34-60	15-35	1.40-1.65	0.06-0.6	0.04-0.10	---	0.0-0.5	.49	.49			
Cabba----------	0-3	18-27	1.30-1.50	0.6-2	0.16-0.20	0.0-2.9	1.0-3.0	.32	.32	2	4L	86
	3-15	18-35	1.30-1.50	0.6-2	0.14-0.18	0.0-5.9	0.5-1.0	.43	.43			
	15-60	10-35	1.40-1.70	0.06-0.6	0.02-0.08	---	0.0-0.5	.49	.49			
19C:												
Chama----------	0-4	15-27	1.10-1.35	0.6-2	0.20-0.24	0.0-2.9	1.0-4.0	.32	.32	3	4L	86
	4-8	18-35	1.20-1.50	0.6-2	0.18-0.20	0.0-5.9	1.0-3.0	.32	.32			
	8-34	18-35	1.20-1.50	0.6-2	0.18-0.20	0.0-5.9	0.5-1.0	.43	.43			
	34-60	10-35	1.40-1.65	0.06-0.6	0.04-0.10	---	0.0-0.5	.49	.49			
Cabba----------	0-3	18-27	1.30-1.50	0.6-2	0.16-0.20	0.0-2.9	1.0-3.0	.32	.32	2	4L	86
	3-15	18-35	1.30-1.50	0.6-2	0.14-0.18	0.0-5.9	0.5-1.0	.43	.43			
	15-60	10-35	1.40-1.70	0.06-0.6	0.02-0.08	---	0.0-0.5	.49	.49			
Sen----------	0-6	18-27	1.10-1.30	0.6-2	0.20-0.24	0.0-2.9	2.0-4.0	.32	.32	3	6	48
	6-17	18-35	1.20-1.50	0.6-2	0.16-0.22	0.0-5.9	1.0-3.0	.43	.43			
	17-34	18-30	1.30-1.50	0.6-2	0.16-0.22	0.0-5.9	1.0-2.0	.43	.43			
	34-60	15-35	1.40-1.65	0.06-0.6	0.04-0.10	---	0.0-0.5	.49	.49			
19D:												
Cabba----------	0-3	18-27	1.30-1.50	0.6-2	0.16-0.20	0.0-2.9	1.0-3.0	.32	.32	2	4L	86
	3-15	18-35	1.30-1.50	0.6-2	0.14-0.18	0.0-5.9	0.5-1.0	.43	.43			
	15-60	10-35	1.40-1.70	0.06-0.6	0.02-0.08	---	0.0-0.5	.49	.49			
Chama----------	0-4	15-27	1.10-1.35	0.6-2	0.20-0.24	0.0-2.9	1.0-4.0	.32	.32	3	4L	86
	4-8	18-35	1.20-1.50	0.6-2	0.18-0.20	0.0-5.9	1.0-3.0	.32	.32			
	8-34	18-35	1.20-1.50	0.6-2	0.18-0.20	0.0-5.9	0.5-1.0	.43	.43			
	34-60	10-35	1.40-1.65	0.06-0.6	0.04-0.10	---	0.0-0.5	.49	.49			
Sen----------	0-6	18-27	1.10-1.30	0.6-2	0.20-0.24	0.0-2.9	2.0-4.0	.32	.32	3	6	48
	6-17	18-35	1.20-1.50	0.6-2	0.16-0.22	0.0-5.9	1.0-3.0	.43	.43			
	17-34	18-30	1.30-1.50	0.6-2	0.16-0.22	0.0-5.9	1.0-2.0	.43	.43			
	34-60	15-35	1.40-1.65	0.06-0.6	0.04-0.10	---	0.0-0.5	.49	.49			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Ksat	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
21B:												
Parshall----------	0-12	10-18	1.10-1.40	2-6	0.16-0.18	0.0-2.9	1.0-4.0	.20	.20	5	3	86
	12-29	10-18	1.20-1.50	2-6	0.13-0.17	0.0-2.9	1.0-3.0	.20	.20			
	29-48	5-18	1.20-1.60	2-6	0.10-0.17	0.0-2.9	0.0-1.0	.24	.24			
	48-60	5-18	1.40-1.70	6-20	0.10-0.14	0.0-2.9	0.0-1.0	.17	.17			
22B:												
Regent----------	0-10	27-40	1.10-1.30	0.2-0.6	0.17-0.20	3.0-5.9	1.0-5.0	.32	.32	3	7	38
	10-26	35-50	1.30-1.50	0.06-0.2	0.17-0.20	6.0-8.9	0.5-1.0	.32	.32			
	26-39	35-50	1.30-1.50	0.06-0.2	0.17-0.20	6.0-8.9	0.5-1.0	.43	.43			
	39-60	10-90	1.40-1.65	0.001-0.6	0.06-0.12	---	0.0-0.5	.43	.43			
Savage----------	0-7	27-40	1.15-1.35	0.2-0.6	0.18-0.23	3.0-5.9	1.0-5.0	.32	.32	5	7	38
	7-25	35-50	1.25-1.50	0.06-0.6	0.17-0.20	6.0-8.9	1.0-2.0	.32	.32			
	25-51	35-45	1.30-1.50	0.06-0.6	0.17-0.20	6.0-8.9	0.5-1.0	.32	.32			
	51-60	35-45	1.30-1.50	0.06-0.6	0.17-0.20	6.0-8.9	0.0-0.5	.43	.43			
24B:												
Janesburg----------	0-8	10-18	1.00-1.20	2-6	0.16-0.18	0.0-2.9	2.0-4.0	.20	.20	2	3	86
	8-10	8-18	1.20-1.40	0.6-6	0.16-0.24	0.0-2.9	2.0-3.0	.32	.32			
	10-21	35-55	1.20-1.40	0.001-0.2	0.10-0.16	6.0-8.9	1.0-2.0	.32	.32			
	21-26	18-45	1.20-1.50	0.06-2	0.10-0.16	6.0-8.9	0.5-1.0	.43	.43			
	26-60	10-90	1.20-1.50	0.001-0.6	0.04-0.10	---	0.0-0.5	.43	.43			
25B:												
Lefor----------	0-7	10-25	1.10-1.30	2-6	0.16-0.18	0.0-2.9	2.0-4.0	.20	.20	3	3	86
	7-15	10-25	1.25-1.40	2-6	0.16-0.18	0.0-2.9	1.0-3.0	.32	.32			
	15-30	18-27	1.20-1.50	0.6-2	0.15-0.17	0.0-2.9	0.5-1.0	.32	.32			
	30-36	10-25	1.20-1.50	0.6-2	0.15-0.17	0.0-2.9	0.0-0.5	.24	.24			
	36-60	1-10	1.45-1.70	0.01-0.3	0.02-0.04	---	0.0-0.5	.32	.32			
27F:												
Badland, outcrop------	0-60	10-60	1.10-1.50	0.001-2	0.04-0.08	3.0-9.0	0.0-0.3	.43	.43	1	4	86
Lambert----------	0-5	18-27	1.10-1.30	0.6-2	0.18-0.22	0.0-2.9	1.0-3.0	.37	.37	5	4L	86
	5-36	18-35	1.25-1.45	0.6-2	0.16-0.20	3.0-5.9	0.5-1.0	.37	.37			
	36-60	15-35	1.30-1.50	0.6-2	0.16-0.20	0.0-2.9	0.0-0.5	.37	.37			
Cabba----------	0-3	18-27	1.30-1.50	0.6-2	0.16-0.20	0.0-2.9	1.0-3.0	.32	.32	2	4L	86
	3-15	18-35	1.30-1.50	0.6-2	0.14-0.18	0.0-5.9	0.5-1.0	.43	.43			
	15-60	10-35	1.40-1.70	0.06-0.6	0.02-0.08	---	0.0-0.5	.49	.49			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Ksat	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
28F:												
Flasher----------	0-6	3-10	1.10-1.50	6-20	0.08-0.12	0.0-2.9	0.5-1.0	.17	.17	2	2	134
	6-10	1-10	1.10-1.50	6-20	0.08-0.12	0.0-2.9	0.0-0.5	.17	.17			
	10-60	1-10	1.45-1.70	0.01-2	0.04-0.08	---	0.0-0.5	.32	.32			
Rock outcrop----------	---	---	---	---	---	---	---	---	---	1	8	0
Vebar----------	0-5	10-18	1.20-1.50	2-6	0.15-0.17	0.0-2.9	1.0-4.0	.20	.20	3	3	86
	5-26	10-18	1.20-1.60	2-6	0.15-0.17	0.0-2.9	1.0-3.0	.20	.20			
	26-32	10-18	1.20-1.60	2-6	0.15-0.17	0.0-2.9	0.0-1.0	.20	.20			
	32-60	1-10	1.45-1.70	0.06-2	0.04-0.08	---	0.0-0.5	.32	.32			
29F:												
Arikara----------	0-1	0-5	0.20-0.35	2-20	0.55-0.65	---	70-90	.32	.32	5	6	48
	1-2	18-35	1.00-1.20	0.6-2	0.18-0.22	0.0-2.9	3.0-6.0	.28	.28			
	2-14	18-35	1.20-1.40	0.6-2	0.18-0.22	3.0-5.9	1.0-2.0	.28	.28			
	14-39	15-35	1.20-1.40	0.6-2	0.15-0.20	3.0-5.9	1.0-2.0	.28	.32			
	39-60	15-35	1.15-1.35	0.6-2	0.14-0.20	0.0-2.9	0.5-1.0	.28	.32			
Shambo----------	0-9	18-27	1.10-1.30	0.6-2	0.20-0.22	0.0-2.9	2.0-6.0	.28	.28	5	6	48
	9-13	18-30	1.20-1.50	0.6-2	0.17-0.19	0.0-2.9	1.0-3.0	.28	.28			
	13-29	18-30	1.20-1.50	0.6-2	0.17-0.19	0.0-2.9	1.0-2.0	.28	.28			
	29-48	18-30	1.20-1.50	0.6-2	0.17-0.19	0.0-2.9	0.5-1.0	.32	.32			
	48-60	18-35	1.20-1.50	0.6-2	0.17-0.19	0.0-2.9	0.0-1.0	.32	.32			
Cabba----------	0-3	18-27	1.30-1.50	0.6-2	0.16-0.20	0.0-2.9	1.0-3.0	.32	.32	2	4L	86
	3-15	18-35	1.30-1.50	0.6-2	0.14-0.18	3.0-5.9	0.5-1.0	.43	.43			
	15-60	10-35	1.40-1.70	0.06-0.6	0.02-0.08	---	0.0-0.5	.49	.49			
30F:												
Vebar, extremely stony	0-5	10-18	1.20-1.60	2-6	0.15-0.17	0.0-2.9	1.0-4.0	.20	.24	3	8	0
	5-26	10-18	1.20-1.60	2-6	0.15-0.17	0.0-2.9	1.0-3.0	.20	.20			
	26-32	10-18	1.20-1.60	2-6	0.15-0.17	0.0-2.9	0.0-1.0	.20	.20			
	32-60	1-10	1.45-1.70	0.06-2	0.02-0.04	---	0.0-0.5	.32	.32			
Amor, extremely stony-	0-8	15-25	1.20-1.35	0.6-2	0.18-0.20	0.0-2.9	2.0-4.0	.24	.24	3	8	0
	8-19	18-30	1.20-1.40	0.6-2	0.17-0.19	0.0-2.9	1.0-3.0	.32	.32			
	19-31	18-30	1.20-1.60	0.6-2	0.17-0.19	0.0-2.9	0.5-1.0	.32	.32			
	31-60	---	1.40-1.65	0.06-0.6	0.04-0.10	---	---	.43	.43			
31B:												
Sen----------	0-6	18-27	1.10-1.30	0.6-2	0.20-0.24	0.0-2.9	2.0-4.0	.32	.32	3	6	48
	6-17	18-35	1.20-1.50	0.6-2	0.16-0.22	0.0-5.9	1.0-3.0	.43	.43			
	17-34	18-30	1.30-1.50	0.6-2	0.16-0.22	0.0-5.9	1.0-2.0	.43	.43			
	34-60	15-35	1.40-1.65	0.06-0.6	0.04-0.10	---	0.0-0.5	.49	.49			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Ksat	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	Pct					
31B:(cont.)												
Janesburg----------	0-8	18-27	1.00-1.20	0.2-0.6	0.20-0.24	0.0-2.9	2.0-4.0	.28	.28	2	6	48
	8-10	15-27	1.20-1.40	0.2-2	0.16-0.24	0.0-2.9	2.0-3.0	.32	.32			
	10-21	35-50	1.20-1.40	0.001-0.2	0.10-0.16	6.0-8.9	1.0-2.0	.32	.32			
	21-26	18-45	1.20-1.50	0.06-2	0.10-0.16	6.0-8.9	0.5-1.0	.43	.43			
	26-60	10-90	1.20-1.50	0.001-0.6	0.04-0.10	---	0.0-0.5	.43	.43			
31C:												
Sen----------	0-6	18-27	1.10-1.30	0.6-2	0.20-0.24	0.0-2.9	2.0-4.0	.32	.32	3	6	48
	6-17	18-35	1.20-1.50	0.6-2	0.16-0.22	0.0-5.9	1.0-3.0	.43	.43			
	17-34	18-30	1.30-1.50	0.6-2	0.16-0.22	0.0-5.9	1.0-2.0	.43	.43			
	34-60	15-35	1.40-1.65	0.06-0.6	0.04-0.10	---	0.0-0.5	.49	.49			
Janesburg----------	0-8	18-27	1.00-1.20	0.2-0.6	0.20-0.24	0.0-2.9	2.0-4.0	.28	.28	2	6	48
	8-10	15-27	1.20-1.40	0.2-2	0.16-0.24	0.0-2.9	2.0-3.0	.32	.32			
	10-21	35-50	1.20-1.40	0.001-0.2	0.10-0.16	6.0-8.9	1.0-2.0	.32	.32			
	21-26	18-45	1.20-1.50	0.06-2	0.10-0.16	6.0-8.9	0.5-1.0	.43	.43			
	26-60	10-90	1.20-1.50	0.001-0.6	0.04-0.10	---	0.0-0.5	.43	.43			
35F:												
Flasher----------	0-6	3-10	1.10-1.50	6-20	0.08-0.12	0.0-2.9	0.5-1.0	.17	.17	2	2	134
	6-10	1-10	1.10-1.50	6-20	0.08-0.12	0.0-2.9	0.0-0.5	.17	.17			
	10-60	1-10	1.45-1.70	0.01-2	0.04-0.08	---	0.0-0.5	.32	.32			
Vebar----------	0-5	10-18	1.20-1.50	2-6	0.15-0.17	0.0-2.9	1.0-4.0	.20	.20	3	3	86
	5-26	10-18	1.20-1.60	2-6	0.15-0.17	0.0-2.9	1.0-3.0	.20	.20			
	26-32	10-18	1.20-1.60	2-6	0.15-0.17	0.0-2.9	0.0-1.0	.20	.20			
	32-60	1-10	1.45-1.70	0.06-2	0.04-0.08	---	0.0-0.5	.32	.32			
Parshall----------	0-12	10-18	1.20-1.60	2-6	0.16-0.18	0.0-2.9	1.0-4.0	.20	.20	5	3	86
	12-29	10-18	1.30-1.60	2-6	0.12-0.17	0.0-2.9	1.0-3.0	.20	.20			
	29-48	5-18	1.30-1.60	2-6	0.12-0.17	0.0-2.9	0.0-1.0	.24	.24			
	48-60	5-18	1.40-1.60	6-20	0.10-0.12	0.0-2.9	0.0-1.0	.17	.17			
36B:												
Ekalaka----------	0-6	10-18	1.30-1.50	2-6	0.16-0.18	0.0-2.9	1.0-2.0	.24	.24	2	3	86
	6-12	5-18	1.35-1.55	0.6-6	0.16-0.18	0.0-2.9	1.0-2.0	.24	.24			
	12-17	10-18	1.50-1.70	0.001-0.2	0.11-0.13	0.0-2.9	0.0-1.0	.24	.24			
	17-33	5-18	1.40-1.60	0.6-6	0.14-0.16	0.0-2.9	0.0-1.0	.24	.24			
	33-60	5-18	1.45-1.60	0.6-6	0.06-0.10	0.0-2.9	0.0-0.5	.24	.24			
Parshall----------	0-12	10-18	1.20-1.60	2-6	0.16-0.18	0.0-2.9	1.0-4.0	.20	.20	5	3	86
	12-29	10-18	1.30-1.60	2-6	0.12-0.17	0.0-2.9	1.0-3.0	.20	.20			
	29-48	5-18	1.30-1.60	2-6	0.12-0.17	0.0-2.9	0.0-1.0	.24	.24			
	48-60	5-18	1.40-1.60	6-20	0.10-0.12	0.0-2.9	0.0-1.0	.17	.17			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Ksat	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
36B:(cont.)												
Desart----------	0-20	10-18	1.20-1.50	2-6	0.13-0.17	0.0-2.9	1.0-2.0	.20	.20	3	3	86
	20-24	5-15	1.20-1.50	0.6-6	0.09-0.13	0.0-2.9	0.5-2.0	.20	.20			
	24-31	10-18	1.50-1.70	0.001-0.2	0.12-0.14	0.0-2.9	0.5-1.0	.32	.32			
	31-60	5-20	1.30-1.60	0.06-6	0.08-0.10	0.0-2.9	0.0-0.5	.32	.32			
37B:												
Farfeld----------	0-4	18-27	1.10-1.30	0.6-2	0.20-0.23	0.0-2.9	2.0-4.0	.32	.32	2	6	48
	4-15	18-27	1.10-1.40	0.6-2	0.17-0.20	0.0-2.9	1.0-3.0	.32	.32			
	15-37	---	2.50-2.60	0.001-0.06	0.02-0.04	---	0.0-0.5	.43	.43			
	37-53	35-50	1.30-1.45	0.06-0.2	0.13-0.17	6.0-8.9	0.5-1.0	.32	.32			
	53-120	35-50	1.30-1.40	0.06-0.2	0.12-0.16	6.0-8.9	0.0-0.5	.32	.32			
Cedarpan----------	0-4	18-27	1.20-1.40	0.6-2	0.20-0.24	0.0-2.9	2.0-4.0	.32	.32	2	6	48
	4-9	18-27	1.20-1.40	0.2-2	0.18-0.22	0.0-2.9	2.0-4.0	.32	.32			
	9-15	35-60	1.30-1.50	0.001-0.2	0.14-0.18	6.0-8.9	1.0-3.0	.28	.28			
	15-26	---	2.50-2.60	0.001-0.06	0.02-0.04	---	0.0-0.5	.43	.43			
	26-45	35-60	1.55-1.75	0.001-0.2	0.13-0.18	6.0-8.9	0.0-1.0	.28	.28			
	45-80	35-60	1.45-1.70	0.06-0.2	0.13-0.15	6.0-8.9	0.0-0.5	.28	.28			
37F:												
Cedarpan----------	0-4	18-27	1.20-1.40	0.6-2	0.20-0.24	0.0-2.9	2.0-4.0	.32	.32	2	6	48
	4-9	18-27	1.20-1.40	0.2-2	0.18-0.22	0.0-2.9	2.0-4.0	.32	.32			
	9-15	35-60	1.30-1.50	0.001-0.2	0.14-0.18	6.0-8.9	1.0-3.0	.28	.28			
	15-26	---	2.50-2.60	0.001-0.06	0.02-0.04	---	0.0-0.5	.43	.43			
	26-45	35-60	1.55-1.75	0.001-0.2	0.13-0.18	6.0-8.9	0.0-1.0	.28	.28			
	45-80	35-60	1.45-1.70	0.06-0.2	0.13-0.15	6.0-8.9	0.0-0.5	.28	.28			
Slickspots, stony-----	0-2	40-60	1.30-1.50	0.06-0.2	0.10-0.12	6.0-8.9	0.5-1.0	.32	.32	1	4L	86
	2-60	18-50	1.20-1.60	0.06-2	0.10-0.12	3.0-8.9	0.0-0.5	.32	.32			
Farfeld----------	0-4	18-27	1.10-1.30	0.6-2	0.20-0.23	0.0-2.9	2.0-4.0	.32	.32	2	6	48
	4-15	18-27	1.10-1.40	0.6-2	0.17-0.20	0.0-2.9	1.0-3.0	.32	.32			
	15-37	---	2.50-2.60	0.001-0.06	0.02-0.04	---	0.0-0.5	.43	.43			
	37-53	35-50	1.30-1.45	0.06-0.2	0.13-0.17	6.0-8.9	0.5-1.0	.32	.32			
	53-120	35-50	1.30-1.40	0.06-0.2	0.12-0.16	6.0-8.9	0.0-0.5	.32	.32			
41C:												
Wayden----------	0-3	40-50	1.10-1.50	0.06-0.2	0.15-0.18	6.0-8.9	0.5-2.0	.28	.28	2	4	86
	3-7	35-50	1.10-1.50	0.06-0.2	0.14-0.19	6.0-8.9	0.5-1.0	.32	.32			
	7-15	35-50	1.10-1.50	0.06-0.2	0.14-0.19	6.0-8.9	0.0-1.0	.32	.32			
	15-60	30-90	1.40-1.65	0.001-0.2	0.04-0.08	---	0.0-0.5	.43	.43			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Ksat	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
41C:(cont.)												
Moreau----------	0-6	40-50	1.10-1.30	0.06-0.2	0.15-0.18	6.0-8.9	1.0-4.0	.28	.28	3	4L	86
	6-13	35-60	1.25-1.60	0.06-0.2	0.14-0.17	6.0-8.9	1.0-3.0	.32	.32			
	13-35	35-60	1.25-1.60	0.06-0.2	0.13-0.15	6.0-8.9	0.0-1.0	.43	.43			
	35-60	30-90	1.40-1.65	0.001-0.2	0.04-0.08	---	0.0-0.5	.43	.43			
42B:												
Searing----------	0-8	18-27	1.20-1.40	0.6-2	0.20-0.23	0.0-2.9	3.0-7.0	.28	.28	3	6	48
	8-23	18-27	1.20-1.40	0.6-2	0.17-0.20	0.0-2.9	2.0-4.0	.28	.28			
	23-33	18-27	1.20-1.40	0.6-6	0.16-0.18	0.0-2.9	0.5-2.0	.28	.55			
	33-60	1-5	1.00-1.30	20-60	0.01-0.03	0.0-2.9	0.0-0.5	.10	.32			
Ringling----------	0-5	18-27	1.10-1.30	0.6-2	0.16-0.20	0.0-2.9	2.0-5.0	.17	.17	2	5	56
	5-17	18-27	1.25-1.50	2-6	0.06-0.07	0.0-2.9	1.0-2.0	.10	.32			
	17-42	1-5	1.30-1.50	6-20	0.01-0.03	0.0-2.9	0.0-0.5	.10	.32			
	42-60	1-5	1.30-1.50	6-20	0.01-0.03	0.0-2.9	0.0-0.5	.10	.32			
43:												
Belfield----------	0-9	27-35	1.00-1.20	0.2-2	0.17-0.22	3.0-6.0	2.0-6.0	.37	.37	5	7	38
	9-12	27-35	1.20-1.40	0.2-2	0.17-0.22	3.0-6.0	2.0-6.0	.37	.37			
	12-17	35-45	1.20-1.40	0.06-0.2	0.14-0.18	6.0-8.9	1.0-2.0	.37	.37			
	17-24	35-45	1.20-1.40	0.06-0.2	0.14-0.18	6.0-8.9	1.0-2.0	.37	.37			
	24-43	27-45	1.30-1.50	0.06-0.2	0.13-0.16	6.0-8.9	0.0-0.5	.43	.43			
	43-60	27-45	1.30-1.50	0.06-0.2	0.13-0.16	6.0-8.9	0.0-0.5	.43	.43			
Grail----------	0-10	27-35	1.10-1.40	0.2-0.6	0.20-0.23	3.0-5.9	4.0-6.0	.37	.37	5	7	38
	10-24	35-45	1.20-1.50	0.06-0.6	0.14-0.20	6.0-8.9	2.0-4.0	.37	.37			
	24-52	27-45	1.20-1.50	0.06-0.6	0.14-0.20	6.0-8.9	0.1-2.0	.37	.37			
	52-60	18-45	1.20-1.50	0.06-0.6	0.13-0.22	3.0-5.9	0.1-1.0	.37	.37			
44:												
Shambo----------	0-9	18-27	1.10-1.30	0.6-2	0.20-0.22	0.0-2.9	2.0-6.0	.28	.28	5	6	48
	9-13	18-30	1.20-1.50	0.6-2	0.17-0.19	0.0-2.9	1.0-3.0	.28	.28			
	13-29	18-30	1.20-1.50	0.6-2	0.17-0.19	0.0-2.9	1.0-2.0	.28	.28			
	29-48	18-30	1.20-1.50	0.6-2	0.17-0.19	0.0-2.9	0.5-1.0	.32	.32			
	48-60	18-35	1.20-1.50	0.6-2	0.17-0.19	0.0-2.9	0.0-1.0	.32	.32			
44B:												
Shambo----------	0-9	18-27	1.10-1.30	0.6-2	0.20-0.22	0.0-2.9	2.0-6.0	.28	.28	5	6	48
	9-13	18-30	1.20-1.50	0.6-2	0.17-0.19	0.0-2.9	1.0-3.0	.28	.28			
	13-29	18-30	1.20-1.50	0.6-2	0.17-0.19	0.0-2.9	1.0-2.0	.28	.28			
	29-48	18-30	1.20-1.50	0.6-2	0.17-0.19	0.0-2.9	0.5-1.0	.32	.32			
	48-60	18-35	1.20-1.50	0.6-2	0.17-0.19	0.0-2.9	0.0-1.0	.32	.32			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Ksat	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
47:												
Stady----------	0-6	18-27	1.10-1.30	0.6-2	0.17-0.20	0.0-2.9	2.0-4.0	.28	.28	4	5	56
	6-15	18-27	1.10-1.30	0.6-2	0.17-0.19	0.0-2.9	1.0-3.0	.28	.28			
	15-29	18-27	1.10-1.40	0.6-2	0.17-0.19	0.0-2.9	0.0-1.0	.24	.32			
	29-60	1-10	1.30-1.70	20-60	0.02-0.04	0.0-2.9	0.0-0.5	.10	.17			
48B:												
Manning----------	0-5	10-18	1.10-1.30	2-6	0.13-0.18	0.0-2.9	2.0-5.0	.20	.20	4	3	86
	5-18	10-20	1.20-1.50	2-6	0.13-0.19	0.0-2.9	1.0-3.0	.20	.24			
	18-25	10-20	1.30-1.50	2-6	0.12-0.20	0.0-2.9	1.0-2.0	.10	.20			
	25-60	1-10	1.20-1.70	20-60	0.02-0.08	0.0-2.9	0.0-1.0	.10	.20			
49B:												
Lihen----------	0-9	1-10	1.25-1.60	6-20	0.06-0.18	0.0-2.9	1.0-3.0	.17	.17	5	2	134
	9-24	1-10	1.25-1.60	6-20	0.06-0.18	0.0-2.9	1.0-3.0	.17	.17			
	24-32	1-10	1.25-1.45	6-20	0.06-0.12	0.0-2.9	1.0-2.0	.17	.17			
	32-60	1-10	1.40-1.60	6-20	0.05-0.12	0.0-2.9	0.0-0.5	.17	.17			
Parshall----------	0-12	10-18	1.20-1.60	2-6	0.16-0.18	0.0-2.9	1.0-4.0	.20	.20	5	3	86
	12-29	10-18	1.30-1.60	2-6	0.12-0.17	0.0-2.9	1.0-3.0	.20	.20			
	29-48	5-18	1.30-1.60	2-6	0.12-0.17	0.0-2.9	0.0-1.0	.24	.24			
	48-60	5-18	1.40-1.60	6-20	0.10-0.12	0.0-2.9	0.0-1.0	.17	.17			
51B:												
Janesburg----------	0-8	18-27	1.00-1.20	0.2-0.6	0.20-0.24	0.0-2.9	2.0-4.0	.28	.28	2	6	48
	8-10	15-27	1.20-1.40	0.2-2	0.16-0.24	0.0-2.9	2.0-3.0	.32	.32			
	10-21	35-50	1.20-1.40	0.001-0.2	0.10-0.16	6.0-8.9	1.0-2.0	.32	.32			
	21-26	18-45	1.20-1.50	0.06-2	0.10-0.16	6.0-8.9	0.5-1.0	.43	.43			
	26-60	10-90	1.20-1.50	0.001-0.6	0.06-0.12	---	0.0-0.5	.43	.43			
Dogtooth----------	0-2	18-27	1.10-1.30	0.2-2	0.20-0.24	0.0-2.9	2.0-4.0	.28	.28	2	6	48
	2-8	35-50	1.20-1.40	0.001-0.2	0.10-0.16	6.0-8.9	1.0-2.0	.32	.32			
	8-13	35-50	1.20-1.50	0.001-0.2	0.10-0.16	6.0-8.9	0.5-2.0	.32	.32			
	13-21	18-50	1.20-1.50	0.001-0.6	0.10-0.16	6.0-8.9	0.5-1.0	.32	.32			
	21-60	10-90	1.20-1.50	0.001-0.6	0.04-0.10	---	0.0-0.5	.43	.43			
52:												
Heil----------	0-3	18-27	1.20-1.40	0.2-2	0.15-0.24	0.0-2.9	3.0-6.0	.37	.37	2	6	48
	3-24	45-60	1.20-1.55	0.001-0.06	0.13-0.19	6.0-8.9	0.0-1.0	.37	.37			
	24-38	27-50	1.30-1.60	0.001-0.2	0.13-0.19	6.0-8.9	0.0-0.5	.37	.37			
	38-52	27-50	1.30-1.60	0.001-0.2	0.13-0.19	6.0-8.9	0.0-0.5	.37	.37			
	52-60	20-50	1.30-1.60	0.001-2	0.13-0.19	6.0-8.9	0.0-0.5	.32	.32			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Ksat	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
53B:												
Savage----------	0-7	18-40	1.10-1.35	0.6-2	0.18-0.24	0.0-2.9	1.0-5.0	.32	.32	5	6	48
	7-25	35-50	1.25-1.50	0.06-0.6	0.12-0.20	6.0-8.9	1.0-2.0	.32	.32			
	25-51	35-45	1.30-1.50	0.06-0.6	0.12-0.20	6.0-8.9	0.5-1.0	.32	.32			
	51-60	35-45	1.30-1.50	0.06-0.6	0.12-0.20	6.0-8.9	0.0-0.5	.43	.43			
Daglum----------	0-7	18-27	1.00-1.20	0.6-2	0.13-0.15	0.0-2.9	2.0-4.0	.32	.32	2	6	48
	7-8	18-27	1.20-1.40	0.2-2	0.12-0.14	0.0-2.9	1.0-3.0	.32	.32			
	8-18	35-60	1.20-1.40	0.001-0.2	0.12-0.14	6.0-8.9	1.0-2.0	.32	.32			
	18-32	35-60	1.30-1.45	0.001-0.2	0.12-0.14	6.0-8.9	0.0-1.0	.32	.32			
	32-47	35-60	1.30-1.45	0.001-0.2	0.12-0.14	6.0-8.9	0.0-1.0	.32	.32			
	47-60	20-45	1.30-1.45	0.001-0.2	0.12-0.14	3.0-5.9	0.0-0.5	.32	.32			
54:												
Channel----------	---	---	---	---	---	---	---	---	---	-	---	---
Straw----------	0-5	18-27	1.10-1.30	0.6-2	0.16-0.18	0.0-2.9	3.0-5.0	.32	.32	5	6	48
	5-23	18-27	1.10-1.30	0.6-2	0.16-0.18	0.0-2.9	1.0-4.0	.32	.32			
	23-30	18-30	1.15-1.40	0.6-2	0.15-0.19	3.0-5.9	1.0-3.0	.32	.32			
	30-36	18-35	1.20-1.40	0.6-2	0.13-0.19	3.0-5.9	0.5-2.0	.32	.32			
	36-40	18-35	1.10-1.30	0.6-2	0.15-0.19	3.0-5.9	1.0-3.0	.32	.32			
	40-66	18-35	1.20-1.40	0.6-2	0.13-0.19	3.0-5.9	0.5-1.0	.32	.32			
55:												
Pits, gravel and sand-	0-6	1-10	1.40-1.60	6-60	0.01-0.04	0.0-2.9	0.5-1.0	.10	.20	1	8	0
	6-60	1-15	1.40-1.70	6-60	0.01-0.04	0.0-2.9	0.0-0.5	.10	.17			
57:												
Straw----------	0-5	18-27	1.10-1.30	0.6-2	0.16-0.18	0.0-2.9	3.0-5.0	.32	.32	5	6	48
	5-23	18-27	1.10-1.30	0.6-2	0.16-0.18	0.0-2.9	1.0-4.0	.32	.32			
	23-30	18-30	1.15-1.40	0.6-2	0.15-0.19	3.0-5.9	1.0-3.0	.32	.32			
	30-36	18-35	1.20-1.40	0.6-2	0.13-0.19	3.0-5.9	0.5-2.0	.32	.32			
	36-40	18-35	1.10-1.30	0.6-2	0.15-0.19	3.0-5.9	1.0-3.0	.32	.32			
	40-66	18-35	1.20-1.40	0.6-2	0.13-0.19	3.0-5.9	0.5-1.0	.32	.32			
Rhoades----------	0-3	18-27	1.10-1.30	0.2-2	0.13-0.15	0.0-2.9	2.0-4.0	.32	.32	2	6	48
	3-8	35-50	1.20-1.40	0.001-0.2	0.10-0.12	6.0-8.9	0.5-2.0	.28	.28			
	8-14	35-50	1.25-1.50	0.001-0.2	0.10-0.12	6.0-8.9	0.5-2.0	.32	.32			
	14-46	20-50	1.30-1.50	0.001-2.0	0.10-0.12	6.0-8.9	0.0-0.5	.32	.32			
	46-60	20-45	1.30-1.50	0.001-2.0	0.10-0.12	6.0-8.9	0.0-0.5	.32	.32			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Ksat	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
57:(cont.)												
Daglum----------	0-7	18-27	1.00-1.20	0.6-2	0.13-0.15	0.0-2.9	2.0-4.0	.32	.32	2	6	48
	7-8	18-27	1.20-1.40	0.2-2	0.12-0.14	0.0-2.9	1.0-3.0	.32	.32			
	8-18	35-60	1.20-1.40	0.001-0.2	0.12-0.14	6.0-8.9	1.0-2.0	.32	.32			
	18-32	35-60	1.30-1.45	0.001-0.2	0.12-0.14	6.0-8.9	0.0-1.0	.32	.32			
	32-47	35-60	1.30-1.45	0.001-0.2	0.12-0.14	6.0-8.9	0.0-1.0	.32	.32			
	47-60	20-45	1.30-1.45	0.001-2.0	0.12-0.14	3.0-5.9	0.0-0.5	.32	.32			
58:												
Straw----------	0-5	18-27	1.10-1.30	0.6-2	0.16-0.18	0.0-2.9	3.0-5.0	.32	.32	5	6	48
	5-23	18-27	1.10-1.30	0.6-2	0.16-0.18	0.0-2.9	1.0-4.0	.32	.32			
	23-30	18-30	1.15-1.40	0.6-2	0.15-0.19	3.0-5.9	1.0-3.0	.32	.32			
	30-36	18-35	1.20-1.40	0.6-2	0.13-0.19	3.0-5.9	0.5-2.0	.32	.32			
	36-40	18-35	1.10-1.30	0.6-2	0.15-0.19	3.0-5.9	1.0-3.0	.32	.32			
	40-66	18-35	1.20-1.40	0.6-2	0.13-0.19	3.0-5.9	0.5-1.0	.32	.32			
60:												
Korell----------	0-8	18-27	1.15-1.35	0.6-2	0.15-0.19	0.0-2.9	2.0-4.0	.32	.32	5	6	48
	8-15	18-27	1.20-1.40	0.6-2	0.15-0.19	0.0-2.9	1.0-2.0	.37	.37			
	15-48	18-27	1.25-1.45	0.6-2	0.15-0.19	0.0-2.9	1.0-2.0	.37	.37			
	48-60	18-30	1.30-1.50	0.6-2	0.13-0.19	0.0-2.9	1.0-2.0	.37	.37			
62F:												
Dogtooth----------	0-2	18-27	1.10-1.30	0.2-2	0.20-0.24	0.0-2.9	2.0-4.0	.28	.28	2	6	48
	2-8	35-50	1.20-1.40	0.001-0.2	0.10-0.16	6.0-8.9	1.0-2.0	.32	.32			
	8-13	35-50	1.20-1.50	0.001-0.2	0.10-0.16	6.0-8.9	0.5-2.0	.32	.32			
	13-21	18-50	1.20-1.50	0.001-0.6	0.10-0.16	6.0-8.9	0.5-1.0	.32	.32			
	21-60	10-90	1.20-1.50	0.001-0.6	0.04-0.10	---	0.0-0.5	.43	.43			
Janesburg----------	0-8	18-27	1.00-1.20	0.2-0.6	0.20-0.24	0.0-2.9	2.0-4.0	.28	.28	2	6	48
	8-10	15-27	1.20-1.40	0.2-2	0.16-0.24	0.0-2.9	2.0-3.0	.32	.32			
	10-21	35-50	1.20-1.40	0.001-0.2	0.10-0.16	6.0-8.9	1.0-2.0	.32	.32			
	21-26	18-45	1.20-1.50	0.06-2	0.10-0.16	6.0-8.9	0.5-1.0	.43	.43			
	26-60	10-90	1.20-1.50	0.001-0.6	0.04-0.10	---	0.0-0.5	.43	.43			
Brandenburg----------	0-4	10-25	1.20-1.40	0.6-2	0.12-0.16	0.0-2.9	2.0-3.0	.24	.49	2	7	38
	4-10	5-25	1.20-1.40	0.6-2	0.13-0.20	0.0-2.9	0.0-1.0	.24	.49			
	10-60	1-5	1.00-1.30	20-60	0.01-0.03	0.0-2.9	0.0-0.5	.10	.32			
63F:												
Dogtooth----------	0-2	18-27	1.10-1.30	0.2-2	0.20-0.24	0.0-2.9	2.0-4.0	.28	.28	2	6	48
	2-8	35-50	1.20-1.40	0.001-0.2	0.10-0.16	6.0-8.9	1.0-2.0	.32	.32			
	8-13	35-50	1.20-1.50	0.001-0.2	0.10-0.16	6.0-8.9	0.5-2.0	.32	.32			
	13-21	18-50	1.20-1.50	0.001-0.6	0.10-0.16	6.0-8.9	0.5-1.0	.32	.32			
	21-60	10-90	1.20-1.50	0.001-0.6	0.04-0.10	---	0.0-0.5	.43	.43			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Ksat	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
63F:(cont.)												
Janesburg----------	0-8	18-27	1.00-1.20	0.2-0.6	0.20-0.24	0.0-2.9	2.0-4.0	.28	.28	2	6	48
	8-10	15-27	1.20-1.40	0.2-2	0.16-0.24	0.0-2.9	2.0-3.0	.32	.32			
	10-21	35-50	1.20-1.40	0.001-0.2	0.10-0.16	6.0-8.9	1.0-2.0	.32	.32			
	21-26	18-45	1.20-1.50	0.06-2	0.10-0.16	6.0-8.9	0.5-1.0	.43	.43			
	26-60	10-90	1.20-1.50	0.001-0.6	0.04-0.10	---	0.0-0.5	.43	.43			
Cabba----------	0-3	18-27	1.30-1.50	0.6-2	0.16-0.20	0.0-2.9	1.0-3.0	.32	.32	2	4L	86
	3-15	18-35	1.30-1.50	0.6-2	0.14-0.18	0.0-5.9	0.5-1.0	.43	.43			
	15-60	10-35	1.40-1.70	0.06-0.6	0.02-0.08	---	0.0-0.5	.49	.49			
65:												
Channel----------	---	---	---	---	---	---	---	---	---	-	---	---
Banks----------	0-4	10-18	1.30-1.50	2-6	0.14-0.21	0.0-2.9	0.5-1.0	.24	.24	5	3	86
	4-30	1-10	1.40-1.70	6-20	0.06-0.13	0.0-2.9	0.0-0.5	.17	.17			
	30-60	1-10	1.40-1.70	6-20	0.05-0.12	---	0.0-0.5	.17	.17			
Trembles----------	0-9	10-18	1.20-1.40	2-6	0.16-0.18	0.0-2.9	1.0-3.0	.20	.20	5	3	86
	9-59	10-18	1.35-1.55	0.6-6	0.14-0.20	0.0-2.9	0.5-1.0	.20	.20			
	59-80	5-18	1.45-1.65	6-20	0.05-0.07	0.0-2.9	0.0-0.5	.15	.15			
66B:												
Stady----------	0-6	18-27	1.10-1.30	0.6-2	0.17-0.20	0.0-2.9	2.0-4.0	.28	.28	4	5	56
	6-15	18-27	1.10-1.30	0.6-2	0.17-0.19	0.0-2.9	1.0-3.0	.28	.28			
	15-29	18-27	1.10-1.40	0.6-2	0.17-0.19	0.0-2.9	0.0-1.0	.24	.32			
	29-60	1-10	1.30-1.70	20-60	0.02-0.04	0.0-2.9	0.0-0.5	.10	.17			
67B:												
Evridge----------	0-12	10-18	1.20-1.35	2-6	0.11-0.16	0.0-2.9	1.0-3.0	.24	.24	2	3	86
	12-17	5-18	1.20-1.35	0.6-6	0.10-0.12	0.0-2.9	1.0-2.0	.24	.24			
	17-21	10-18	1.35-1.50	0.001-0.2	0.09-0.11	0.0-2.9	1.0-2.0	.24	.24			
	21-31	10-18	1.35-1.50	0.6-6	0.08-0.10	0.0-2.9	1.0-2.0	.24	.24			
	31-38	1-10	1.35-1.50	0.6-6	0.08-0.10	0.0-2.9	0.0-1.0	.17	.17			
	38-60	1-10	1.40-1.70	0.001-2	0.02-0.08	---	0.0-0.5	.32	.32			
Desart----------	0-20	10-18	1.20-1.50	2-6	0.13-0.17	0.0-2.9	1.0-2.0	.20	.20	3	3	86
	20-24	5-15	1.20-1.50	0.6-6	0.09-0.13	0.0-2.9	0.5-2.0	.20	.20			
	24-31	10-18	1.50-1.70	0.001-0.2	0.12-0.14	0.0-2.9	0.5-1.0	.32	.32			
	31-60	5-20	1.30-1.60	0.06-6	0.08-0.10	0.0-2.9	0.0-0.5	.32	.32			
Telfer----------	0-6	10-18	1.40-1.70	2-6	0.13-0.18	0.0-2.9	1.0-3.0	.24	.24	5	3	86
	6-60	1-10	1.40-1.70	6-20	0.06-0.10	0.0-2.9	0.0-1.0	.17	.17			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Ksat	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
68F:												
Cabbart----------	0-3	18-27	1.00-1.20	0.6-2	0.17-0.21	0.0-2.9	1.0-2.0	.37	.37	2	4L	86
	3-18	18-35	1.10-1.30	0.6-2	0.15-0.19	3.0-5.9	0.5-1.0	.37	.37			
	18-60	10-35	1.40-1.65	0.06-0.6	0.04-0.10	---	0.0-0.5	.43	.43			
Badland, outcrop------	0-60	10-60	1.10-1.50	0.001-2	0.04-0.08	3.0-9.0	0.0-0.3	.43	.43	1	4	86
69F:												
Patent----------	0-7	18-27	1.10-1.40	0.6-2	0.16-0.22	0.0-2.9	1.0-3.0	.32	.32	5	4L	86
	7-60	15-35	1.20-1.60	0.6-2	0.14-0.19	3.0-5.9	0.5-1.0	.32	.32			
Badland, outcrop------	0-60	10-60	1.10-1.50	0.001-2	0.04-0.08	3.0-9.0	0.0-0.3	.43	.43	1	4	86
Cabbart----------	0-3	18-27	1.00-1.20	0.6-2	0.17-0.21	0.0-2.9	1.0-2.0	.37	.37	2	4L	86
	3-18	18-35	1.10-1.30	0.6-2	0.15-0.19	3.0-5.9	0.5-1.0	.37	.37			
	18-60	10-35	1.40-1.65	0.06-0.6	0.04-0.10	---	0.0-0.5	.43	.43			
70B:												
Maltese----------	0-7	18-27	1.00-1.20	0.2-2	0.13-0.15	0.0-2.9	2.0-4.0	.32	.32	2	6	48
	7-10	18-27	1.20-1.40	0.2-2	0.13-0.15	0.0-2.9	2.0-4.0	.37	.37			
	10-16	40-60	1.20-1.40	0.001-0.2	0.12-0.14	6.0-8.9	1.0-3.0	.37	.37			
	16-20	35-50	1.30-1.45	0.001-0.2	0.12-0.14	6.0-8.9	1.0-2.0	.37	.37			
	20-33	35-50	1.30-1.45	0.001-0.2	0.12-0.14	6.0-8.9	1.0-2.0	.37	.37			
	33-60	15-40	1.30-1.45	0.2-6	0.12-0.14	3.0-5.9	0.5-1.0	.37	.37			
Gerda----------	0-2	18-27	1.10-1.30	0.2-0.6	0.13-0.15	0.0-2.9	2.0-4.0	.32	.32	2	6	48
	2-11	35-55	1.20-1.40	0.001-0.2	0.10-0.12	6.0-8.9	2.0-4.0	.32	.32			
	11-19	35-55	1.25-1.50	0.001-0.2	0.10-0.12	6.0-8.9	1.0-2.0	.32	.32			
	19-29	30-45	1.30-1.50	0.2-2	0.10-0.12	6.0-8.9	1.0-2.0	.43	.43			
	29-44	30-50	1.30-1.50	0.2-2	0.10-0.12	6.0-8.9	0.5-1.0	.32	.32			
	44-80	15-27	1.30-1.50	0.2-6	0.09-0.11	0.0-2.9	0.5-1.0	.43	.43			
71B:												
Chinook----------	0-6	10-18	1.25-1.30	2-6	0.11-0.17	0.0-2.9	1.0-2.0	.20	.20	5	3	86
	6-15	10-18	1.30-1.40	2-6	0.09-0.15	0.0-2.9	0.5-1.0	.24	.24			
	15-40	10-18	1.40-1.60	2-6	0.09-0.15	0.0-2.9	0.5-1.0	.24	.24			
	40-66	5-18	1.35-1.55	2-20	0.08-0.15	0.0-2.9	0.0-0.5	.24	.24			
Rhame----------	0-8	10-18	1.10-1.50	2-6	0.16-0.18	0.0-2.9	1.0-3.0	.20	.20	3	3	86
	8-26	10-18	1.10-1.50	2-6	0.15-0.17	0.0-2.9	0.5-1.0	.20	.20			
	26-34	10-18	1.10-1.50	2-6	0.14-0.16	0.0-2.9	0.0-0.5	.24	.24			
	34-60	1-10	1.45-1.70	0.06-2	0.02-0.04	---	0.0-0.5	.32	.32			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Ksat	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
71D:												
Rhame----------	0-8	10-18	1.10-1.50	2-6	0.16-0.18	0.0-2.9	1.0-3.0	.20	.20	3	3	86
	8-26	10-18	1.10-1.50	2-6	0.15-0.17	0.0-2.9	0.5-1.0	.20	.20			
	26-34	10-18	1.10-1.50	2-6	0.14-0.16	0.0-2.9	0.0-0.5	.24	.24			
	34-60	1-10	1.45-1.70	0.06-2	0.02-0.04	---	0.0-0.5	.32	.32			
Chinook----------	0-6	10-18	1.25-1.30	2-6	0.11-0.17	0.0-2.9	1.0-2.0	.20	.20	5	3	86
	6-15	10-18	1.30-1.40	2-6	0.09-0.15	0.0-2.9	0.5-1.0	.24	.24			
	15-40	10-18	1.40-1.60	2-6	0.09-0.15	0.0-2.9	0.5-1.0	.24	.24			
	40-66	5-18	1.35-1.55	2-20	0.08-0.15	0.0-2.9	0.0-0.5	.24	.24			
72F:												
Rhame----------	0-8	10-18	1.10-1.50	2-6	0.16-0.18	0.0-2.9	1.0-3.0	.20	.20	3	3	86
	8-26	10-18	1.10-1.50	2-6	0.15-0.17	0.0-2.9	0.5-1.0	.20	.20			
	26-34	10-18	1.10-1.50	2-6	0.14-0.16	0.0-2.9	0.0-0.5	.24	.24			
	34-60	1-10	1.45-1.70	0.06-2	0.02-0.04	---	0.0-0.5	.32	.32			
Fleak----------	0-3	3-10	1.10-1.50	6-20	0.06-0.12	0.0-2.9	0.5-1.0	.17	.17	2	2	134
	3-17	1-10	1.10-1.50	6-20	0.06-0.10	0.0-2.9	0.0-0.5	.17	.17			
	17-60	1-10	1.45-1.70	0.06-2	0.02-0.04	---	0.0-0.5	.32	.32			
73D:												
Gerda----------	0-2	18-27	1.10-1.30	0.2-0.6	0.13-0.15	0.0-2.9	2.0-4.0	.32	.32	2	6	48
	2-11	35-55	1.20-1.40	0.001-0.2	0.10-0.12	6.0-8.9	2.0-4.0	.32	.32			
	11-19	35-55	1.15-1.45	0.001-0.2	0.10-0.12	6.0-8.9	1.0-2.0	.32	.32			
	19-29	30-45	1.30-1.50	0.2-2	0.10-0.12	6.0-8.9	1.0-2.0	.43	.43			
	29-44	30-50	1.30-1.50	0.2-2	0.10-0.12	6.0-8.9	0.5-1.0	.32	.32			
	44-80	15-27	1.30-1.50	0.2-6	0.09-0.11	0.0-2.9	0.5-1.0	.43	.43			
Kirby----------	0-4	10-22	1.30-1.60	2-6	0.07-0.14	0.0-2.9	1.0-2.0	.10	.32	2	5	56
	4-12	10-22	1.45-1.65	6-20	0.05-0.06	0.0-2.9	0.5-1.0	.05	.28			
	12-60	1-5	1.60-1.80	6-20	0.00-0.01	0.0-2.9	0.0-0.5	.02	.32			
74:												
Channel----------	---	---	---	---	---	---	---	---	---	-	---	---
Glendive----------	0-5	10-18	1.40-1.60	2-6	0.10-0.13	0.0-2.9	0.5-1.0	.20	.20	5	3	86
	5-16	8-18	1.30-1.50	2-6	0.15-0.19	0.0-2.9	0.5-1.0	.32	.32			
	16-60	5-18	1.30-1.50	2-6	0.10-0.13	0.0-2.9	0.5-1.0	.20	.20			
Havre----------	0-10	18-27	1.15-1.35	0.6-2	0.20-0.22	0.0-2.9	0.5-1.0	.37	.37	5	4L	86
	10-60	18-35	1.35-1.55	0.6-2	0.17-0.19	0.0-2.9	0.5-1.0	.28	.28			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Ksat	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
75:												
Havre----------	0-10	18-27	1.15-1.35	0.6-2	0.20-0.22	0.0-2.9	0.5-1.0	.37	.37	5	4L	86
	10-60	18-35	1.35-1.55	0.6-2	0.17-0.19	0.0-2.9	0.5-1.0	.28	.28			
76B:												
Lonna----------	0-2	18-27	1.10-1.30	0.6-2	0.16-0.20	0.0-2.9	1.0-3.0	.37	.37	5	4L	86
	2-11	18-35	1.25-1.45	0.6-2	0.16-0.20	3.0-5.9	0.5-1.0	.37	.37			
	11-34	18-35	1.25-1.50	0.6-2	0.14-0.18	3.0-5.9	0.5-1.0	.37	.37			
	34-60	10-35	1.25-1.50	0.6-2	0.12-0.16	3.0-5.9	0.0-0.5	.37	.37			
76C:												
Lonna----------	0-2	18-27	1.10-1.30	0.6-2	0.16-0.20	0.0-2.9	1.0-3.0	.37	.37	5	4L	86
	2-11	18-35	1.25-1.45	0.6-2	0.16-0.20	3.0-5.9	0.5-1.0	.37	.37			
	11-34	18-35	1.25-1.50	0.6-2	0.14-0.18	3.0-5.9	0.5-1.0	.37	.37			
	34-60	10-35	1.25-1.50	0.6-2	0.12-0.16	3.0-5.9	0.0-0.5	.37	.37			
77:												
Glendive----------	0-5	10-18	1.40-1.60	2-6	0.10-0.13	0.0-2.9	0.5-1.0	.20	.20	5	3	86
	5-16	8-18	1.30-1.50	2-6	0.15-0.19	0.0-2.9	0.5-1.0	.32	.32			
	16-60	5-18	1.30-1.50	2-6	0.10-0.13	0.0-2.9	0.5-1.0	.20	.20			
78B:												
Hanly----------	0-5	10-18	1.10-1.50	2-6	0.13-0.15	0.0-2.9	0.5-1.0	.24	.24	5	3	86
	5-60	1-10	1.20-1.60	6-20	0.05-0.14	0.0-2.9	0.0-0.5	.17	.17			
79C:												
Zeona----------	0-3	1-10	1.30-1.50	6-20	0.10-0.12	0.0-2.9	1.0-2.0	.17	.17	5	2	134
	3-60	1-10	1.45-1.60	6-20	0.06-0.10	0.0-2.9	0.0-0.5	.17	.17			
80:												
Ethridge----------	0-3	18-27	1.10-1.30	0.6-2	0.20-0.24	0.0-2.9	1.0-3.0	.43	.43	5	6	48
	3-10	35-50	1.30-1.50	0.06-0.2	0.15-0.19	6.0-8.9	1.0-2.0	.32	.32			
	10-23	35-50	1.30-1.50	0.06-0.2	0.14-0.18	6.0-8.9	1.0-2.0	.37	.37			
	23-38	27-45	1.30-1.50	0.06-0.2	0.14-0.18	6.0-8.9	0.5-1.0	.37	.37			
	38-60	20-35	1.30-1.50	0.06-0.2	0.14-0.18	3.0-5.9	0.0-0.5	.37	.37			
81B:												
Vebar----------	0-5	10-18	1.20-1.50	2-6	0.15-0.17	0.0-2.9	1.0-4.0	.20	.20	3	3	86
	5-26	10-18	1.20-1.60	2-6	0.15-0.17	0.0-2.9	1.0-3.0	.20	.20			
	26-32	10-18	1.20-1.60	2-6	0.15-0.17	0.0-2.9	0.0-1.0	.20	.20			
	32-60	1-10	1.45-1.70	0.06-2	0.04-0.08	---	0.0-0.5	.32	.32			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Ksat	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
81B:(cont.)												
Parshall----------	0-12	10-18	1.20-1.60	2-6	0.16-0.18	0.0-2.9	1.0-4.0	.20	.20	5	3	86
	12-29	10-18	1.30-1.60	2-6	0.12-0.17	0.0-2.9	1.0-3.0	.20	.20			
	29-48	5-18	1.30-1.60	2-6	0.12-0.17	0.0-2.9	0.0-1.0	.24	.24			
	48-60	5-18	1.40-1.60	6-20	0.10-0.12	0.0-2.9	0.0-1.0	.17	.17			
81C:												
Vebar----------	0-5	10-18	1.20-1.60	2-6	0.15-0.17	0.0-2.9	1.0-4.0	.20	.24	3	3	86
	5-26	10-18	1.20-1.60	2-6	0.15-0.17	0.0-2.9	1.0-3.0	.20	.20			
	26-32	10-18	1.20-1.60	2-6	0.15-0.17	0.0-2.9	0.0-1.0	.20	.20			
	32-60	1-10	1.45-1.70	0.06-2	0.02-0.04	---	0.0-0.5	.32	.32			
Tally----------	0-6	10-18	1.20-1.60	2-6	0.15-0.17	0.0-2.9	1.0-3.0	.20	.20	5	3	86
	6-32	10-18	1.30-1.60	2-6	0.13-0.15	0.0-2.9	0.5-1.0	.20	.20			
	32-60	5-18	1.30-1.60	2-6	0.11-0.13	0.0-2.9	0.0-0.5	.24	.24			
81D:												
Vebar----------	0-5	10-18	1.20-1.50	2-6	0.15-0.17	0.0-2.9	1.0-4.0	.20	.20	3	3	86
	5-26	10-18	1.20-1.60	2-6	0.15-0.17	0.0-2.9	1.0-3.0	.20	.20			
	26-32	10-18	1.20-1.60	2-6	0.15-0.17	0.0-2.9	0.0-1.0	.20	.20			
	32-60	1-10	1.45-1.70	0.06-2	0.04-0.08	---	0.0-0.5	.32	.32			
Flasher----------	0-6	3-10	1.10-1.50	6-20	0.08-0.12	0.0-2.9	0.5-1.0	.17	.17	2	2	134
	6-10	1-10	1.10-1.50	6-20	0.08-0.12	0.0-2.9	0.0-0.5	.17	.17			
	10-60	1-10	1.45-1.70	0.01-2	0.04-0.08	---	0.0-0.5	.32	.32			
Tally----------	0-6	10-18	1.20-1.60	2-6	0.15-0.17	0.0-2.9	1.0-3.0	.20	.20	5	3	86
	6-32	10-18	1.30-1.60	2-6	0.13-0.15	0.0-2.9	0.5-1.0	.20	.20			
	32-60	5-18	1.30-1.60	2-6	0.11-0.13	0.0-2.9	0.0-0.5	.24	.24			
82E:												
Badland, outcrop------	0-60	10-60	1.10-1.50	0.001-2	0.04-0.08	3.0-9.0	0.0-0.3	.43	.43	1	4	86
Patent----------	0-7	18-27	1.10-1.40	0.6-2	0.16-0.22	0.0-2.9	1.0-3.0	.32	.32	5	4L	86
	7-60	15-35	1.20-1.60	0.6-2	0.14-0.19	3.0-5.9	0.5-1.0	.32	.32			
83:												
Badland----------	0-60	10-60	1.10-1.50	0.001-2	0.04-0.08	3.0-9.0	0.0-0.3	.43	.43	1	4	86
85F:												
Lonna----------	0-2	18-27	1.10-1.30	0.6-2	0.16-0.20	0.0-2.9	1.0-3.0	.37	.37	5	4L	86
	2-11	18-35	1.25-1.45	0.6-2	0.16-0.20	3.0-5.9	0.5-1.0	.37	.37			
	11-34	18-35	1.25-1.50	0.6-2	0.14-0.18	3.0-5.9	0.5-1.0	.37	.37			
	34-60	10-35	1.25-1.50	0.6-2	0.12-0.16	3.0-5.9	0.0-0.5	.37	.37			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Ksat	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
85F:(cont.)												
Cabbart----------	0-3	18-27	1.00-1.20	0.6-2	0.17-0.21	0.0-2.9	1.0-2.0	.37	.37	2	4L	86
	3-18	18-35	1.10-1.30	0.6-2	0.15-0.19	3.0-5.9	0.5-1.0	.37	.37			
	18-60	10-35	1.40-1.65	0.06-0.6	0.04-0.10	---	0.0-0.5	.43	.43			
86F:												
Kirby----------	0-4	10-22	1.30-1.60	2-6	0.07-0.14	0.0-2.9	1.0-2.0	.10	.32	2	5	56
	4-12	10-22	1.45-1.65	6-20	0.05-0.06	0.0-2.9	0.5-1.0	.05	.28			
	12-60	1-5	1.60-1.80	6-20	0.00-0.01	0.0-2.9	0.0-0.5	.02	.32			
Badland, outcrop------	0-60	10-60	1.10-1.50	0.001-2	0.04-0.08	3.0-9.0	0.0-0.3	.43	.43	1	4	86
Patent----------	0-7	18-27	1.10-1.40	0.6-2	0.16-0.22	0.0-2.9	1.0-3.0	.32	.32	5	4L	86
	7-60	15-35	1.20-1.60	0.6-2	0.14-0.19	3.0-5.9	0.5-1.0	.32	.32			
88:												
Littlemo----------	0-6	18-27	1.20-1.50	0.6-2	0.20-0.24	0.0-2.9	1.0-3.0	.32	.32	5	6	48
	6-17	18-27	1.20-1.50	0.6-2	0.17-0.22	0.0-2.9	1.0-3.0	.32	.32			
	17-28	18-30	1.20-1.50	0.2-2	0.15-0.19	3.0-5.9	1.0-2.0	.32	.32			
	28-60	10-30	1.20-1.60	2-20	0.05-0.13	0.0-2.9	0.0-1.0	.15	.28			
Chanta----------	0-6	18-27	1.20-1.40	0.6-2	0.18-0.21	0.0-2.9	2.0-4.0	.28	.32	4	6	48
	6-22	18-30	1.20-1.40	0.6-2	0.18-0.21	3.0-5.9	1.0-3.0	.28	.32			
	22-26	10-20	1.30-1.50	0.6-6	0.14-0.18	0.0-2.9	1.0-2.0	.28	.32			
	26-60	1-10	1.40-1.70	6-20	0.03-0.05	0.0-2.9	0.5-1.0	.10	.17			
89B:												
Patent----------	0-7	18-27	1.10-1.40	0.6-2	0.16-0.22	0.0-2.9	1.0-3.0	.32	.32	5	4L	86
	7-60	15-35	1.20-1.60	0.6-2	0.14-0.19	3.0-5.9	0.5-1.0	.32	.32			
91F:												
Lonna----------	0-2	18-27	1.10-1.30	0.6-2	0.16-0.20	0.0-2.9	1.0-3.0	.37	.37	5	4L	86
	2-11	18-35	1.25-1.45	0.6-2	0.16-0.20	3.0-5.9	0.5-1.0	.37	.37			
	11-34	18-35	1.25-1.50	0.6-2	0.14-0.18	3.0-5.9	0.5-1.0	.37	.37			
	34-60	10-35	1.25-1.50	0.6-2	0.12-0.16	3.0-5.9	0.0-0.5	.37	.37			
Kirby----------	0-4	10-22	1.30-1.60	2-6	0.07-0.14	0.0-2.9	1.0-2.0	.10	.32	2	5	56
	4-12	10-22	1.45-1.65	6-20	0.05-0.06	0.0-2.9	0.5-1.0	.05	.28			
	12-60	1-5	1.60-1.80	6-20	0.00-0.01	0.0-2.9	0.0-0.5	.02	.32			
Cabbart----------	0-3	18-27	1.00-1.20	0.6-2	0.17-0.21	0.0-2.9	1.0-2.0	.37	.37	2	4L	86
	3-18	18-35	1.10-1.30	0.6-2	0.15-0.19	3.0-5.9	0.5-1.0	.37	.37			
	18-60	10-35	1.40-1.65	0.06-0.6	0.04-0.10	---	0.0-0.5	.43	.43			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Ksat	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
92B:												
Kremlin----------	0-11	18-27	1.15-1.35	0.6-2	0.16-0.20	0.0-2.9	1.0-3.0	.37	.37	5	6	48
	11-19	18-30	1.25-1.45	0.6-2	0.16-0.20	3.0-5.9	0.0-1.0	.37	.37			
	19-60	18-30	1.30-1.55	0.6-2	0.16-0.20	3.0-5.9	0.0-1.0	.37	.37			
Ethridge----------	0-3	18-27	1.10-1.30	0.6-2	0.20-0.24	0.0-2.9	1.0-3.0	.43	.43	5	6	48
	3-10	35-50	1.30-1.50	0.06-0.2	0.15-0.19	6.0-8.9	1.0-2.0	.32	.32			
	10-23	35-50	1.30-1.50	0.06-0.2	0.14-0.18	6.0-8.9	1.0-2.0	.37	.37			
	23-38	27-45	1.30-1.50	0.06-0.2	0.14-0.18	6.0-8.9	0.5-1.0	.37	.37			
	38-60	20-35	1.30-1.50	0.06-0.2	0.14-0.18	3.0-5.9	0.0-0.5	.37	.37			
Gerda----------	0-2	18-27	1.10-1.30	0.2-0.6	0.13-0.15	0.0-2.9	2.0-4.0	.32	.32	2	6	48
	2-11	35-55	1.20-1.40	0.001-0.2	0.10-0.12	6.0-8.9	2.0-4.0	.32	.32			
	11-19	35-55	1.15-1.45	0.001-0.2	0.10-0.12	6.0-8.9	1.0-2.0	.32	.32			
	19-29	30-45	1.30-1.50	0.2-2	0.10-0.12	6.0-8.9	1.0-2.0	.43	.43			
	29-44	30-50	1.30-1.50	0.2-2	0.10-0.12	6.0-8.9	0.5-1.0	.32	.32			
	44-80	15-27	1.30-1.50	0.2-6	0.09-0.11	0.0-2.9	0.5-1.0	.43	.43			
94F:												
Kirby----------	0-4	10-22	1.30-1.60	2-6	0.07-0.14	0.0-2.9	1.0-2.0	.10	.32	2	5	56
	4-12	10-22	1.45-1.65	6-20	0.05-0.06	0.0-2.9	0.5-1.0	.05	.28			
	12-60	1-5	1.60-1.80	6-20	0.00-0.01	0.0-2.9	0.0-0.5	.02	.32			
Arikara----------	0-1	0-5	0.20-0.35	2-20	0.55-0.65	---	70-90	.32	.32	5	6	48
	1-2	18-35	1.00-1.20	0.6-2	0.18-0.22	0.0-2.9	3.0-6.0	.28	.28			
	2-14	18-35	1.20-1.40	0.6-2	0.18-0.22	3.0-5.9	1.0-2.0	.28	.28			
	14-39	15-35	1.20-1.40	0.6-2	0.15-0.20	3.0-5.9	1.0-2.0	.28	.32			
	39-60	15-35	1.15-1.35	0.6-2	0.14-0.20	0.0-2.9	0.5-1.0	.28	.32			
Badland, outcrop------	0-60	10-60	1.10-1.50	0.001-2	0.04-0.08	3.0-9.0	0.0-0.3	.43	.43	1	4	86
95F:												
Tinsley----------	0-3	5-15	1.30-1.50	2-6	0.08-0.11	0.0-2.9	0.7-2.0	.10	.20	2	3	86
	3-60	0-10	1.45-1.65	6-20	0.01-0.02	0.0-2.9	0.0-0.5	.05	.17			
Chanta----------	0-6	18-27	1.20-1.40	0.6-2	0.18-0.21	0.0-2.9	2.0-4.0	.28	.32	4	6	48
	6-22	18-30	1.20-1.40	0.6-2	0.18-0.21	3.0-5.9	1.0-3.0	.28	.32			
	22-26	10-20	1.30-1.50	0.6-6	0.14-0.18	0.0-2.9	1.0-2.0	.28	.32			
	26-60	1-10	1.40-1.70	6-20	0.03-0.05	0.0-2.9	0.5-1.0	.10	.17			
97:												
Kremlin----------	0-11	18-27	1.15-1.35	0.6-2	0.16-0.20	0.0-2.9	1.0-3.0	.37	.37	5	6	48
	11-19	18-30	1.25-1.45	0.6-2	0.16-0.20	3.0-5.9	0.0-1.0	.37	.37			
	19-60	18-30	1.30-1.55	0.6-2	0.16-0.20	3.0-5.9	0.0-1.0	.37	.37			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Ksat	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
98:												
Wolf Point----------	0-1	27-40	1.20-1.40	0.06-0.2	0.18-0.20	6.0-8.9	0.5-1.0	.37	.37	5	7	38
	1-10	35-50	1.20-1.40	0.06-0.2	0.15-0.18	6.0-8.9	0.5-1.0	.37	.37			
	10-60	30-60	1.20-1.40	0.06-0.2	0.14-0.20	6.0-8.9	0.0-0.5	.37	.37			
99F:												
Badland, outcrop------	0-60	10-60	1.10-1.50	0.001-2	0.04-0.08	3.0-9.0	0.0-0.3	.43	.43	1	4	86
Cabbart----------	0-3	18-27	1.00-1.20	0.6-2	0.17-0.21	0.0-2.9	1.0-2.0	.37	.37	2	4L	86
	3-18	18-35	1.10-1.30	0.6-2	0.15-0.19	3.0-5.9	0.5-1.0	.37	.37			
	18-60	10-35	1.40-1.65	0.06-0.6	0.04-0.10	---	0.0-0.5	.43	.43			
100C:												
Patent----------	0-7	18-27	1.10-1.40	0.6-2	0.16-0.22	0.0-2.9	1.0-3.0	.32	.32	5	4L	86
	7-60	15-35	1.20-1.60	0.6-2	0.14-0.19	3.0-5.9	0.5-1.0	.32	.32			
Gullied land----------	0-60	10-40	1.20-1.50	0.6-6	0.10-0.20	3.0-5.9	0.0-0.5	.37	.37	1	4L	86
Glendive----------	0-5	10-18	1.40-1.60	2-6	0.10-0.13	0.0-2.9	0.5-1.0	.20	.20	5	3	86
	5-16	8-18	1.30-1.50	2-6	0.15-0.19	0.0-2.9	0.5-1.0	.32	.32			
	16-60	5-18	1.30-1.50	2-6	0.10-0.13	0.0-2.9	0.5-1.0	.20	.20			
101F:												
Boxwell----------	0-5	18-27	1.20-1.40	0.6-2	0.16-0.20	0.0-2.9	1.0-3.0	.37	.37	3	6	48
	5-14	18-30	1.30-1.50	0.6-2	0.16-0.18	3.0-5.9	1.0-2.0	.32	.32			
	14-28	18-27	1.30-1.50	0.6-2	0.16-0.20	0.0-2.9	0.5-1.0	.37	.37			
	28-60	5-35	1.40-1.65	0.06-0.6	0.04-0.10	---	0.0-0.5	.43	.43			
Cabbart----------	0-3	18-27	1.00-1.20	0.6-2	0.17-0.21	0.0-2.9	1.0-2.0	.37	.37	2	4L	86
	3-18	18-35	1.10-1.30	0.6-2	0.15-0.19	3.0-5.9	0.5-1.0	.37	.37			
	18-60	10-35	1.40-1.65	0.06-0.6	0.04-0.10	---	0.0-0.5	.43	.43			
Arikara----------	0-1	0-5	0.20-0.35	2-20	0.55-0.65	---	70-90	.32	.32	5	6	48
	1-2	18-35	1.00-1.20	0.6-2	0.18-0.22	0.0-2.9	3.0-6.0	.28	.28			
	2-14	18-35	1.20-1.40	0.6-2	0.18-0.22	3.0-5.9	1.0-2.0	.28	.28			
	14-39	15-35	1.20-1.40	0.6-2	0.15-0.20	3.0-5.9	1.0-2.0	.28	.32			
	39-60	15-35	1.15-1.35	0.6-2	0.14-0.20	0.0-2.9	0.5-1.0	.28	.32			
102B:												
Boxwell----------	0-5	18-27	1.20-1.40	0.6-2	0.16-0.20	0.0-2.9	1.0-3.0	.37	.37	3	6	48
	5-14	18-30	1.30-1.50	0.6-2	0.16-0.18	3.0-5.9	1.0-2.0	.32	.32			
	14-28	18-27	1.30-1.50	0.6-2	0.16-0.20	0.0-2.9	0.5-1.0	.37	.37			
	28-60	5-35	1.40-1.65	0.06-0.6	0.04-0.10	---	0.0-0.5	.43	.43			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Ksat	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
102B:(cont.)												
Kremlin----------	0-11	18-27	1.15-1.35	0.6-2	0.16-0.20	0.0-2.9	1.0-3.0	.37	.37	5	6	48
	11-19	18-30	1.25-1.45	0.6-2	0.16-0.20	3.0-5.9	0.0-1.0	.37	.37			
	19-60	18-30	1.30-1.55	0.6-2	0.16-0.20	3.0-5.9	0.0-1.0	.37	.37			
102D:												
Boxwell----------	0-5	18-27	1.20-1.40	0.6-2	0.16-0.20	0.0-2.9	1.0-3.0	.37	.37	3	6	48
	5-14	18-30	1.30-1.50	0.6-2	0.16-0.18	3.0-5.9	1.0-2.0	.32	.32			
	14-28	18-27	1.30-1.50	0.6-2	0.16-0.20	0.0-2.9	0.5-1.0	.37	.37			
	28-60	5-35	1.40-1.65	0.06-0.6	0.04-0.10	---	0.0-0.5	.43	.43			
Kremlin----------	0-11	18-27	1.15-1.35	0.6-2	0.16-0.20	0.0-2.9	1.0-3.0	.37	.37	5	6	48
	11-19	18-30	1.25-1.45	0.6-2	0.16-0.20	3.0-5.9	0.0-1.0	.37	.37			
	19-60	18-30	1.30-1.55	0.6-2	0.16-0.20	3.0-5.9	0.0-1.0	.37	.37			
103F:												
Badland, outcrop------	0-60	10-60	1.10-1.50	0.001-2	0.04-0.08	3.0-9.0	0.0-0.3	.43	.43	1	4	86
Arikara----------	0-1	0-5	0.20-0.35	2-20	0.55-0.65	---	70-90	.32	.32	5	6	48
	1-2	18-35	1.00-1.20	0.6-2	0.18-0.22	0.0-2.9	3.0-6.0	.28	.28			
	2-14	18-35	1.20-1.40	0.6-2	0.18-0.22	3.0-5.9	1.0-2.0	.28	.28			
	14-39	15-35	1.20-1.40	0.6-2	0.15-0.20	3.0-5.9	1.0-2.0	.28	.32			
	39-60	15-35	1.15-1.35	0.6-2	0.14-0.20	0.0-2.9	0.5-1.0	.28	.32			
Cabbart----------	0-3	18-27	1.00-1.20	0.6-2	0.17-0.21	0.0-2.9	1.0-2.0	.37	.37	2	4L	86
	3-18	18-35	1.10-1.30	0.6-2	0.15-0.19	3.0-5.9	0.5-1.0	.37	.37			
	18-60	10-35	1.40-1.65	0.06-0.6	0.04-0.10	---	0.0-0.5	.43	.43			
105:												
Harriet----------	0-2	12-27	1.10-1.40	0.2-2	0.20-0.24	0.0-2.9	3.0-6.0	.37	.37	2	6	48
	2-18	35-50	1.20-1.60	0.001-0.06	0.10-0.15	6.0-8.9	1.0-3.0	.37	.37			
	18-28	18-40	1.20-1.60	0.6-2	0.10-0.15	3.0-5.9	0.5-1.0	.37	.37			
	28-38	10-18	1.40-1.60	0.6-2	0.09-0.15	0.0-2.9	0.0-1.0	.37	.37			
	38-40	23-35	1.35-1.55	0.6-2	0.09-0.12	3.0-5.9	0.0-0.5	.32	.32			
	40-60	15-45	1.20-1.60	0.06-0.2	0.09-0.12	3.0-5.9	0.0-0.5	.32	.32			
106:												
Riverwash----------	0-6	1-5	1.40-1.60	6-20	0.03-0.04	0.0-2.9	0.0-0.5	.15	.15	5	1	180
	6-60	1-10	1.40-1.60	6-20	0.04-0.06	0.0-2.9	0.0-0.5	.15	.15			
107D:												
Rhame----------	0-8	10-18	1.10-1.50	2-6	0.16-0.18	0.0-2.9	1.0-3.0	.20	.20	3	3	86
	8-26	10-18	1.10-1.50	2-6	0.15-0.17	0.0-2.9	0.5-1.0	.20	.20			
	26-34	10-18	1.10-1.50	2-6	0.14-0.16	0.0-2.9	0.0-0.5	.24	.24			
	34-60	1-10	1.45-1.70	0.06-2	0.02-0.04	---	0.0-0.5	.32	.32			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Ksat	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
107D:(cont.)												
Kremlin----------	0-11	18-27	1.15-1.35	0.6-2	0.16-0.20	0.0-2.9	1.0-3.0	.37	.37	5	6	48
	11-19	18-30	1.25-1.45	0.6-2	0.16-0.20	3.0-5.9	0.0-1.0	.37	.37			
	19-60	18-30	1.30-1.55	0.6-2	0.16-0.20	3.0-5.9	0.0-1.0	.37	.37			
Maltese----------	0-7	18-27	1.00-1.20	0.2-2	0.13-0.15	0.0-2.9	2.0-4.0	.32	.32	2	6	48
	7-10	18-27	1.20-1.40	0.2-2	0.13-0.15	0.0-2.9	2.0-4.0	.37	.37			
	10-16	40-60	1.20-1.40	0.001-0.2	0.12-0.14	6.0-8.9	1.0-3.0	.37	.37			
	16-20	35-50	1.30-1.45	0.001-0.2	0.12-0.14	6.0-8.9	1.0-2.0	.37	.37			
	20-33	35-50	1.30-1.45	0.001-0.2	0.12-0.14	6.0-8.9	1.0-2.0	.37	.37			
	33-60	15-40	1.30-1.45	0.2-6	0.12-0.14	3.0-5.9	0.5-1.0	.37	.37			
108D:												
Boxwell----------	0-5	18-27	1.20-1.40	0.6-2	0.16-0.20	0.0-2.9	1.0-3.0	.37	.37	3	6	48
	5-14	18-30	1.30-1.50	0.6-2	0.16-0.18	3.0-5.9	1.0-2.0	.32	.32			
	14-28	18-27	1.30-1.50	0.6-2	0.16-0.20	0.0-2.9	0.5-1.0	.37	.37			
	28-60	5-35	1.40-1.65	0.06-0.6	0.04-0.10	---	0.0-0.5	.43	.43			
Scairt----------	0-2	18-27	1.10-1.30	0.2-2	0.20-0.24	0.0-2.9	2.0-4.0	.32	.32	2	6	48
	2-6	35-55	1.20-1.40	0.001-0.2	0.10-0.16	6.0-8.9	2.0-4.0	.28	.28			
	6-13	35-55	1.20-1.50	0.001-0.2	0.10-0.16	6.0-8.9	1.0-2.0	.43	.43			
	13-22	18-50	1.20-1.50	0.2-0.6	0.10-0.18	6.0-8.9	0.5-1.0	.43	.43			
	22-28	18-50	1.20-1.50	0.2-0.6	0.10-0.18	6.0-8.9	0.0-0.5	.43	.43			
	28-60	10-90	1.20-1.50	0.001-0.6	0.04-0.10	---	0.0-0.5	.43	.43			
Maltese----------	0-7	18-27	1.00-1.20	0.2-2	0.13-0.15	0.0-2.9	2.0-4.0	.32	.32	2	6	48
	7-10	18-27	1.20-1.40	0.2-2	0.13-0.15	0.0-2.9	2.0-4.0	.37	.37			
	10-16	40-60	1.20-1.40	0.001-0.2	0.12-0.14	6.0-8.9	1.0-3.0	.37	.37			
	16-20	35-50	1.30-1.45	0.001-0.2	0.12-0.14	6.0-8.9	1.0-2.0	.37	.37			
	20-33	35-50	1.30-1.45	0.001-0.2	0.12-0.14	6.0-8.9	1.0-2.0	.37	.37			
	33-60	15-40	1.30-1.45	0.2-6	0.12-0.14	3.0-5.9	0.5-1.0	.37	.37			
109F:												
Rhame----------	0-8	10-18	1.10-1.50	2-6	0.16-0.18	0.0-2.9	1.0-3.0	.20	.20	3	3	86
	8-26	10-18	1.10-1.50	2-6	0.15-0.17	0.0-2.9	0.5-1.0	.20	.20			
	26-34	10-18	1.10-1.50	2-6	0.14-0.16	0.0-2.9	0.0-0.5	.24	.24			
	34-60	1-10	1.45-1.70	0.06-2	0.02-0.04	---	0.0-0.5	.32	.32			
Arikara----------	0-1	0-5	0.20-0.35	2-20	0.55-0.65	---	70-90	.32	.32	5	6	48
	1-2	18-35	1.00-1.20	0.6-2	0.18-0.22	0.0-2.9	3.0-6.0	.28	.28			
	2-14	18-35	1.20-1.40	0.6-2	0.18-0.22	3.0-5.9	1.0-2.0	.28	.28			
	14-39	15-35	1.20-1.40	0.6-2	0.15-0.20	3.0-5.9	1.0-2.0	.28	.32			
	39-60	15-35	1.15-1.35	0.6-2	0.14-0.20	0.0-2.9	0.5-1.0	.28	.32			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Ksat	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
109F:(cont.)												
Fleak----------	0-3	3-10	1.10-1.50	6-20	0.06-0.12	0.0-2.9	0.5-1.0	.17	.17	2	2	134
	3-17	1-10	1.10-1.50	6-20	0.06-0.10	0.0-2.9	0.0-0.5	.17	.17			
	17-60	1-10	1.45-1.70	0.06-2	0.02-0.04	---	0.0-0.5	.32	.32			
110C:												
Patent----------	0-7	18-27	1.10-1.40	0.6-2	0.16-0.22	0.0-2.9	1.0-3.0	.32	.32	5	4L	86
	7-60	15-35	1.20-1.60	0.6-2	0.14-0.19	3.0-5.9	0.5-1.0	.32	.32			
Gerda----------	0-2	18-27	1.10-1.30	0.2-0.6	0.13-0.15	0.0-2.9	2.0-4.0	.32	.32	2	6	48
	2-11	35-55	1.20-1.40	0.001-0.2	0.10-0.12	6.0-8.9	2.0-4.0	.32	.32			
	11-19	35-55	1.15-1.45	0.001-0.2	0.10-0.12	6.0-8.9	1.0-2.0	.32	.32			
	19-29	30-45	1.30-1.50	0.2-2	0.10-0.12	6.0-8.9	1.0-2.0	.43	.43			
	29-44	30-50	1.30-1.50	0.2-2	0.10-0.12	6.0-8.9	0.5-1.0	.32	.32			
	44-80	15-27	1.30-1.50	0.2-6	0.09-0.11	0.0-2.9	0.5-1.0	.43	.43			
Slickspots----------	0-2	40-60	1.30-1.50	0.06-0.2	0.10-0.12	6.0-8.9	0.5-1.0	.32	.32	1	4L	86
	2-60	18-50	1.20-1.60	0.06-2	0.10-0.12	3.0-8.9	0.0-0.5	.32	.32			
111F:												
Lonna----------	0-2	18-27	1.10-1.30	0.6-2	0.16-0.20	0.0-2.9	1.0-3.0	.37	.37	5	4L	86
	2-11	18-35	1.25-1.45	0.6-2	0.16-0.20	3.0-5.9	0.5-1.0	.37	.37			
	11-34	18-35	1.25-1.50	0.6-2	0.14-0.18	3.0-5.9	0.5-1.0	.37	.37			
	34-60	10-35	1.25-1.50	0.6-2	0.12-0.16	3.0-5.9	0.0-0.5	.37	.37			
Arikara----------	0-1	0-5	0.20-0.35	2-20	0.55-0.65	---	70-90	.32	.32	5	6	48
	1-2	18-35	1.00-1.20	0.6-2	0.18-0.22	0.0-2.9	3.0-6.0	.28	.28			
	2-14	18-35	1.20-1.40	0.6-2	0.18-0.22	3.0-5.9	1.0-2.0	.28	.28			
	14-39	15-35	1.20-1.40	0.6-2	0.15-0.20	3.0-5.9	1.0-2.0	.28	.32			
	39-60	15-35	1.15-1.35	0.6-2	0.14-0.20	0.0-2.9	0.5-1.0	.28	.32			
Cabbart----------	0-3	18-27	1.00-1.20	0.6-2	0.17-0.21	0.0-2.9	1.0-2.0	.37	.37	2	4L	86
	3-18	18-35	1.10-1.30	0.6-2	0.15-0.19	3.0-5.9	0.5-1.0	.37	.37			
	18-60	10-35	1.40-1.65	0.06-0.6	0.04-0.10	---	0.0-0.5	.43	.43			
112:												
Wolf Point, wooded----	0-1	27-40	1.20-1.40	0.06-0.2	0.18-0.20	6.0-8.9	0.5-1.0	.37	.37	5	7	38
	1-10	35-50	1.20-1.40	0.06-0.2	0.15-0.18	6.0-8.9	0.5-1.0	.37	.37			
	10-60	30-60	1.20-1.40	0.06-0.2	0.14-0.20	6.0-8.9	0.0-0.5	.37	.37			
113:												
Havre, wooded---------	0-10	18-27	1.15-1.35	0.6-2	0.20-0.22	0.0-2.9	0.5-1.0	.37	.37	5	4L	86
	10-60	18-35	1.35-1.55	0.6-2	0.17-0.19	0.0-2.9	0.5-1.0	.28	.28			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Ksat	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
114B:												
Haplustolls----------	0-12	15-27	1.20-1.60	2-6	0.12-0.20	0.0-2.9	2.0-4.0	.20	.28	5	5	56
	12-19	10-27	1.30-1.70	0.2-2	0.15-0.19	0.0-2.9	1.0-2.0	.15	.28			
	19-60	10-27	1.20-1.50	2-6	0.10-0.16	0.0-2.9	0.0-0.5	.28	.28			
Ustorthents----------	0-3	10-18	1.40-1.60	2-6	0.13-0.18	0.0-2.9	0.5-2.0	.20	.24	5	3	86
	3-60	10-18	1.40-1.60	2-6	0.11-0.16	0.0-2.9	0.0-1.0	.28	.28			
115B:												
Cozberg----------	0-7	15-25	1.15-1.35	2-6	0.16-0.20	0.0-2.9	2.0-4.0	.32	.32	3	5	56
	7-20	10-18	1.30-1.55	2-6	0.13-0.16	0.0-2.9	2.0-4.0	.20	.20			
	20-26	10-18	1.30-1.55	2-6	0.13-0.16	0.0-2.9	0.5-2.0	.20	.20			
	26-30	1-10	1.45-1.65	6-20	0.03-0.14	0.0-2.9	0.0-0.5	.10	.20			
	30-60	1-10	1.45-1.65	6-20	0.02-0.10	0.0-2.9	0.0-0.5	.17	.17			
Chanta----------	0-6	18-27	1.20-1.40	0.6-2	0.18-0.21	0.0-2.9	2.0-4.0	.28	.32	4	6	48
	6-22	18-30	1.20-1.40	0.6-2	0.18-0.21	3.0-5.9	1.0-3.0	.28	.32			
	22-26	10-20	1.30-1.50	0.6-6	0.14-0.18	0.0-2.9	1.0-2.0	.28	.32			
	26-60	1-10	1.40-1.70	6-20	0.03-0.05	0.0-2.9	0.5-1.0	.10	.17			
116F:												
Kremlin----------	0-11	18-27	1.15-1.35	0.6-2	0.16-0.20	0.0-2.9	1.0-3.0	.37	.37	5	6	48
	11-19	18-30	1.25-1.45	0.6-2	0.16-0.20	3.0-5.9	0.0-1.0	.37	.37			
	19-60	18-30	1.30-1.55	0.6-2	0.16-0.20	3.0-5.9	0.0-1.0	.37	.37			
Shibah----------	0-4	18-27	1.20-1.50	0.6-2	0.20-0.24	0.0-2.9	1.0-3.0	.28	.28	3	6	48
	4-8	18-27	1.20-1.50	0.6-2	0.10-0.15	0.0-2.9	1.0-2.0	.15	.28			
	8-18	18-27	1.20-1.50	6-20	0.06-0.10	0.0-5.9	0.5-1.0	.10	.32			
	18-80	10-30	1.70-2.00	6-20	0.03-0.05	0.0-2.9	0.0-0.5	.10	.32			
117B:												
Kremlin----------	0-11	18-27	1.15-1.35	0.6-2	0.16-0.20	0.0-2.9	1.0-3.0	.37	.37	5	6	48
	11-19	18-30	1.25-1.45	0.6-2	0.16-0.20	3.0-5.9	0.0-1.0	.37	.37			
	19-60	18-30	1.30-1.55	0.6-2	0.16-0.20	3.0-5.9	0.0-1.0	.37	.37			
Chanta----------	0-6	18-27	1.20-1.40	0.6-2	0.18-0.21	0.0-2.9	2.0-4.0	.28	.32	4	6	48
	6-22	18-30	1.20-1.40	0.6-2	0.18-0.21	3.0-5.9	1.0-3.0	.28	.32			
	22-26	10-20	1.30-1.50	0.6-6	0.14-0.18	0.0-2.9	1.0-2.0	.28	.32			
	26-60	1-10	1.40-1.70	6-20	0.03-0.05	0.0-2.9	0.5-1.0	.10	.17			
118F:												
Shibah----------	0-4	18-27	1.20-1.50	0.6-2	0.20-0.24	0.0-2.9	1.0-3.0	.28	.28	3	6	48
	4-8	18-27	1.20-1.50	0.6-2	0.10-0.15	0.0-2.9	1.0-2.0	.15	.28			
	8-18	18-27	1.20-1.50	6-20	0.06-0.10	0.0-5.9	0.5-1.0	.10	.32			
	18-80	10-30	1.70-2.00	6-20	0.03-0.05	0.0-2.9	0.0-0.5	.10	.32			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Ksat	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
118F:(cont.)												
Rubbleland----------	---	---	---	---	---	---	---	---	---	5	6	48
Arikara----------	0-1	0-5	0.20-0.35	2-20	0.55-0.65	---	70-90	.32	.32	5	6	48
	1-2	18-35	1.00-1.20	0.6-2	0.18-0.22	0.0-2.9	3.0-6.0	.28	.28			
	2-14	18-35	1.20-1.40	0.6-2	0.18-0.22	3.0-5.9	1.0-2.0	.28	.28			
	14-39	15-35	1.20-1.40	0.6-2	0.15-0.20	3.0-5.9	1.0-2.0	.28	.32			
	39-60	15-35	1.15-1.35	0.6-2	0.14-0.20	0.0-2.9	0.5-1.0	.28	.32			
119:												
Glendive, wooded------	0-5	10-18	1.40-1.60	2-6	0.10-0.13	0.0-2.9	0.5-1.0	.20	.20	5	3	86
	5-16	8-18	1.30-1.50	2-6	0.15-0.19	0.0-2.9	0.5-1.0	.32	.32			
	16-60	5-18	1.30-1.50	2-6	0.10-0.13	0.0-2.9	0.5-1.0	.20	.20			
120B:												
Hanly, wooded---------	0-5	10-18	1.10-1.50	2-6	0.13-0.15	0.0-2.9	0.5-1.0	.24	.24	5	3	86
	5-60	1-10	1.20-1.60	6-20	0.05-0.14	0.0-2.9	0.0-0.5	.17	.17			
121F:												
Maltese----------	0-7	18-27	1.00-1.20	0.2-2	0.13-0.15	0.0-2.9	2.0-4.0	.32	.32	2	6	48
	7-10	18-27	1.20-1.40	0.2-2	0.13-0.15	0.0-2.9	2.0-4.0	.37	.37			
	10-16	40-60	1.20-1.40	0.001-0.2	0.12-0.14	6.0-8.9	1.0-3.0	.37	.37			
	16-20	35-50	1.30-1.45	0.001-0.2	0.12-0.14	6.0-8.9	1.0-2.0	.37	.37			
	20-33	35-50	1.30-1.45	0.001-0.2	0.12-0.14	6.0-8.9	1.0-2.0	.37	.37			
	33-60	15-40	1.30-1.45	0.2-6	0.12-0.14	3.0-5.9	0.5-1.0	.37	.37			
Lonna----------	0-2	18-27	1.10-1.30	0.6-2	0.16-0.20	0.0-2.9	1.0-3.0	.37	.37	5	4L	86
	2-11	18-35	1.25-1.45	0.6-2	0.16-0.20	3.0-5.9	0.5-1.0	.37	.37			
	11-34	18-35	1.25-1.50	0.6-2	0.14-0.18	3.0-5.9	0.5-1.0	.37	.37			
	34-60	10-35	1.25-1.50	0.6-2	0.12-0.16	3.0-5.9	0.0-0.5	.37	.37			
Arikara----------	0-1	---	0.20-0.35	2-20	0.55-0.65	---	70-90	.32	.32	5	6	48
	1-2	18-35	1.00-1.20	0.6-2	0.18-0.22	0.0-2.9	3.0-6.0	.28	.28			
	2-14	18-35	1.20-1.40	0.6-2	0.18-0.22	3.0-5.9	1.0-2.0	.28	.28			
	14-39	15-35	1.20-1.40	0.6-2	0.15-0.20	3.0-5.9	1.0-2.0	.28	.32			
	39-60	15-35	1.15-1.35	0.6-2	0.14-0.20	0.0-2.9	0.5-1.0	.28	.32			
122C:												
Bulltop----------	0-4	18-27	1.10-1.30	0.6-2	0.20-0.24	0.0-2.9	1.0-3.0	.28	.28	5	6	48
	4-15	15-27	1.20-1.40	0.6-2	0.17-0.22	0.0-2.9	1.0-2.0	.28	.28			
	15-19	15-27	1.30-1.50	0.6-2	0.10-0.16	0.0-2.9	0.5-1.0	.17	.32			
	19-80	15-27	1.70-2.00	6-20	0.03-0.05	0.0-2.9	0.0-0.5	.10	.32			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Ksat	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
122C:(cont.)												
Shibah----------	0-4	18-27	1.20-1.50	0.6-2	0.20-0.24	0.0-2.9	1.0-3.0	.28	.28	3	6	48
	4-8	18-27	1.20-1.50	0.6-2	0.10-0.15	0.0-2.9	1.0-2.0	.15	.28			
	8-18	18-27	1.20-1.50	6-20	0.06-0.10	0.0-5.9	0.5-1.0	.10	.32			
	18-80	10-30	1.70-2.00	6-20	0.03-0.05	0.0-2.9	0.0-0.5	.10	.32			
123E:												
Scairt----------	0-2	18-27	1.10-1.30	0.2-2	0.20-0.24	0.0-2.9	2.0-4.0	.32	.32	2	6	48
	2-6	35-55	1.20-1.40	0.001-0.2	0.10-0.16	6.0-8.9	2.0-4.0	.28	.28			
	6-13	35-55	1.20-1.50	0.001-0.2	0.10-0.16	6.0-8.9	1.0-2.0	.43	.43			
	13-22	18-50	1.20-1.50	0.2-0.6	0.10-0.18	6.0-8.9	0.5-1.0	.43	.43			
	22-28	18-50	1.20-1.50	0.2-0.6	0.10-0.18	6.0-8.9	0.0-0.5	.43	.43			
	28-60	10-90	1.20-1.50	0.001-0.6	0.04-0.10	---	0.0-0.5	.43	.43			
Maltese----------	0-7	18-27	1.00-1.20	0.2-2	0.13-0.15	0.0-2.9	2.0-4.0	.32	.32	2	6	48
	7-10	18-27	1.20-1.40	0.2-2	0.13-0.15	0.0-2.9	2.0-4.0	.37	.37			
	10-16	40-60	1.20-1.40	0.001-0.2	0.12-0.14	6.0-8.9	1.0-3.0	.37	.37			
	16-20	35-50	1.30-1.45	0.001-0.2	0.12-0.14	6.0-8.9	1.0-2.0	.37	.37			
	20-33	35-50	1.30-1.45	0.001-0.2	0.12-0.14	6.0-8.9	1.0-2.0	.37	.37			
	33-60	15-40	1.30-1.45	0.2-6	0.12-0.14	3.0-5.9	0.5-1.0	.37	.37			
Boxwell----------	0-5	18-27	1.20-1.40	0.6-2	0.16-0.20	0.0-2.9	1.0-3.0	.37	.37	3	6	48
	5-14	18-30	1.30-1.50	0.6-2	0.16-0.18	3.0-5.9	1.0-2.0	.32	.32			
	14-28	18-27	1.30-1.50	0.6-2	0.16-0.20	0.0-2.9	0.5-1.0	.37	.37			
	28-60	5-35	1.40-1.65	0.06-0.6	0.04-0.10	---	0.0-0.5	.43	.43			
152:												
Heil----------	0-3	18-27	1.20-1.40	0.2-2	0.15-0.24	0.0-2.9	3.0-6.0	.37	.37	2	6	48
	3-24	45-60	1.20-1.55	0.001-0.06	0.13-0.19	6.0-8.9	0.0-1.0	.37	.37			
	24-38	27-50	1.30-1.60	0.001-0.2	0.13-0.19	6.0-8.9	0.0-0.5	.37	.37			
	38-52	27-50	1.30-1.60	0.001-0.2	0.13-0.19	6.0-8.9	0.0-0.5	.37	.37			
	52-60	20-50	1.30-1.60	0.001-2	0.13-0.19	6.0-8.9	0.0-0.5	.32	.32			
155:												
Channel----------	---	---	---	---	---	---	---	---	---	-	---	---
Dumps and pits, mine--	0-4	27-35	1.40-1.60	0.06-2	0.16-0.18	3.0-5.9	0.5-1.0	.37	.37	5	4L	86
	4-60	18-35	1.40-1.80	0.06-0.6	0.10-0.13	3.0-5.9	0.0-1.0	.37	.37			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Ksat	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
159:												
Straw----------	0-5	18-27	1.10-1.30	0.6-2	0.16-0.18	0.0-2.9	3.0-5.0	.32	.32	5	6	48
	5-23	18-27	1.10-1.30	0.6-2	0.16-0.18	0.0-2.9	1.0-4.0	.32	.32			
	23-30	18-30	1.15-1.40	0.6-2	0.15-0.19	3.0-5.9	1.0-3.0	.32	.32			
	30-36	18-35	1.20-1.40	0.6-2	0.13-0.19	3.0-5.9	0.5-2.0	.32	.32			
	36-40	18-35	1.10-1.30	0.6-2	0.15-0.19	3.0-5.9	1.0-3.0	.32	.32			
	40-66	18-35	1.20-1.40	0.6-2	0.13-0.19	3.0-5.9	0.5-1.0	.32	.32			
Daglum----------	0-7	18-27	1.00-1.20	0.6-2	0.13-0.15	0.0-2.9	2.0-4.0	.32	.32	2	6	48
	7-8	18-27	1.20-1.40	0.2-2	0.12-0.14	0.0-2.9	1.0-3.0	.32	.32			
	8-18	35-60	1.20-1.40	0.001-0.2	0.12-0.14	6.0-8.9	1.0-2.0	.32	.32			
	18-32	35-60	1.30-1.45	0.001-0.2	0.12-0.14	6.0-8.9	0.0-1.0	.32	.32			
	32-47	35-60	1.30-1.45	0.001-0.2	0.12-0.14	6.0-8.9	0.0-1.0	.32	.32			
	47-60	20-45	1.30-1.45	0.001-2.0	0.12-0.14	3.0-5.9	0.0-0.5	.32	.32			
175:												
Havre, rarely flooded-	0-10	18-27	1.15-1.35	0.6-2	0.20-0.22	0.0-2.9	0.5-1.0	.37	.37	5	4L	86
	10-60	18-35	1.35-1.55	0.6-2	0.17-0.19	0.0-2.9	0.5-1.0	.28	.28			
177:												
Glendive, rarely flooded----------	0-5	10-18	1.40-1.60	2-6	0.10-0.13	0.0-2.9	0.5-1.0	.20	.20	5	3	86
	5-16	8-18	1.30-1.50	2-6	0.15-0.19	0.0-2.9	0.5-1.0	.32	.32			
	16-60	5-18	1.30-1.50	2-6	0.10-0.13	0.0-2.9	0.5-1.0	.20	.20			
183:												
Badland, high precipitation--------	0-60	10-60	1.10-1.50	0.001-2	0.04-0.08	3.0-9.0	0.0-0.3	.43	.43	1	4	86
205:												
Harriet, low precipitation--------	0-2	12-27	1.10-1.40	0.2-2	0.20-0.24	0.0-2.9	3.0-6.0	.37	.37	2	6	48
	2-18	35-50	1.20-1.60	0.001-0.06	0.10-0.15	6.0-8.9	1.0-3.0	.37	.37			
	18-28	18-40	1.20-1.60	0.6-2	0.10-0.15	3.0-5.9	0.5-1.0	.37	.37			
	28-38	10-18	1.40-1.60	0.6-2	0.09-0.15	0.0-2.9	0.0-1.0	.37	.37			
	38-40	23-35	1.35-1.55	0.6-2	0.09-0.12	3.0-5.9	0.0-0.5	.32	.32			
	40-60	15-45	1.20-1.60	0.06-0.2	0.09-0.12	3.0-5.9	0.0-0.5	.32	.32			
210C:												
Lambert----------	0-5	18-27	1.10-1.30	0.6-2	0.18-0.22	0.0-2.9	1.0-3.0	.37	.37	5	4L	86
	5-36	18-35	1.25-1.45	0.6-2	0.16-0.20	3.0-5.9	0.5-1.0	.37	.37			
	36-60	15-35	1.30-1.50	0.6-2	0.16-0.20	0.0-2.9	0.0-0.5	.37	.37			
Slickspots----------	0-2	40-60	1.30-1.50	0.06-0.2	0.10-0.12	6.0-8.9	0.5-1.0	.32	.32	1	6	48
	2-60	18-50	1.20-1.60	0.06-2	0.10-0.12	3.0-8.9	0.0-0.5	.32	.32			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Ksat	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
210C:(cont.)												
Rhoades----------	0-3	18-27	1.10-1.30	0.2-2	0.13-0.15	0.0-2.9	2.0-4.0	.32	.32	2	6	48
	3-8	35-50	1.20-1.40	0.001-0.2	0.10-0.12	6.0-8.9	0.5-2.0	.28	.28			
	8-14	35-50	1.25-1.50	0.001-0.2	0.10-0.12	6.0-8.9	0.5-2.0	.32	.32			
	14-46	20-50	1.30-1.50	0.001-2.0	0.10-0.12	6.0-8.9	0.0-0.5	.32	.32			
	46-60	20-45	1.30-1.50	0.001-2.0	0.10-0.12	6.0-8.9	0.0-0.5	.32	.32			
255:												
Pits, gravel and sand, low precipitation----	0-6	1-10	1.20-1.60	6-20	0.01-0.04	0.0-2.9	0.5-1.0	.10	.20	5	8	0
	6-60	1-15	1.20-1.60	6-20	0.01-0.04	0.0-2.9	0.0-0.5	.10	.17			
M-W:												
Miscellaneous water---	---	---	---	---	---	---	---	---	---	-	---	---
W:												
Water----------	---	---	---	---	---	---	---	---	---	-	---	---

Chemical Properties of the Soils

(Dashes (--) indicate that data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	*Pct*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
3:								
Peta----------	0-10	18-27	15-25	6.1-7.3	0	0	0	0
	10-26	22-30	10-25	6.6-7.8	0	0	0-2	0
	26-48	10-27	5-15	6.6-7.8	0	0	0-2	0
	48-53	18-27	5-15	7.4-8.4	3-15	0	0-2	0
	53-80	5-18	1-15	7.4-8.4	1-10	0-1	0-2	0
5:								
Savage----------	0-7	27-40	20-40	6.1-7.8	0	0	0	0
	7-25	35-50	25-40	6.6-7.8	0	0	0	0
	25-51	35-45	20-35	7.4-8.4	5-15	0	0-2	0
	51-80	35-45	20-35	7.4-8.4	5-15	0-2	0-4	0
5B:								
Savage----------	0-7	27-40	20-40	6.1-7.8	0	0	0	0
	7-25	35-50	25-40	6.6-7.8	0	0	0	0
	25-51	35-45	20-35	7.4-8.4	5-15	0	0-2	0
	51-80	35-45	20-35	7.4-8.4	5-15	0-2	0-4	0
6:								
Regan----------	0-9	18-27	10-30	7.4-8.4	5-25	0	0-4	0
	9-28	18-35	10-25	7.4-8.4	15-35	0-2	0-8	0-5
	28-60	10-35	10-25	7.4-8.4	5-30	0-5	0-8	0-5
7:								
Arnegard----------	0-13	18-27	15-25	6.1-7.3	0	0	0	0
	13-36	18-30	10-20	6.1-7.8	0	0	0-2	0
	36-60	15-30	5-15	7.4-8.4	3-20	0	0-2	0
9F:								
Cabba----------	0-3	18-27	10-15	6.6-8.4	2-5	0	0-2	0
	3-15	18-35	10-20	7.4-8.4	1-15	0	1-2	0
	15-60	10-35	5-20	7.4-8.4	0-15	0-5	2-4	0-4
Sen----------	0-6	18-27	10-25	6.6-7.8	0	0-2	0	0
	6-17	18-35	10-25	6.6-8.4	1-3	0-2	0	0
	17-34	18-30	10-25	7.4-8.4	10-30	0-2	0	0
	34-60	15-35	5-20	7.4-8.4	0-15	0-8	0-4	0-4
Chama----------	0-4	15-27	10-30	6.6-8.4	0-2	0	0-2	0
	4-8	18-35	10-25	7.4-8.4	3-10	0	0-2	0
	8-34	18-35	10-25	7.4-8.4	10-30	0	0-2	0
	34-60	10-35	5-20	7.4-8.4	0-15	0-5	0-8	0-4
12B:								
Rhoades----------	0-3	18-27	20-35	6.1-7.9	0	0-1	0-1	0-1
	3-8	35-50	20-45	7.4-8.4	0-5	0-1	0-5	5-10
	8-14	35-50	20-45	7.9-8.4	3-15	0-5	5-15	2-20
	14-46	20-50	15-35	7.9-8.4	3-15	0-5	5-15	5-25
	46-60	20-45	15-35	7.9-8.4	5-25	0-5	5-15	5-25
Daglum----------	0-7	18-27	10-30	6.1-7.3	0	0-1	0-1	0-1
	7-8	18-27	10-30	6.1-7.3	0	0-1	0-1	0-2
	8-18	35-60	20-50	7.3-8.4	0-3	0-1	0-2	5-10
	18-32	35-60	20-50	7.9-9.0	3-15	0-5	5-15	10-20
	32-47	35-60	20-50	7.9-9.0	5-25	0-5	5-15	10-20
	47-60	20-45	10-40	7.9-9.0	3-15	0-5	5-15	10-20

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	*Pct*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
13B:								
Dogtooth----------	0-2	18-27	15-30	6.1-7.9	0	0-1	0-1	0-5
	2-8	35-50	20-50	7.4-8.4	1-15	0-1	0-5	5-10
	8-13	35-50	20-50	7.9-8.4	3-15	0-5	5-15	10-25
	13-21	18-50	10-55	7.9-8.4	3-15	0-5	5-15	10-25
	21-60	10-90	5-40	7.9-8.4	0-15	0-5	5-15	10-25
Janesburg----------	0-8	18-27	15-25	6.1-7.3	0	0-1	0-1	0-1
	8-10	15-27	10-25	6.1-7.3	0	0-1	0-1	0-1
	10-21	35-50	25-45	7.3-8.4	0-3	0-1	0-5	5-10
	21-26	18-45	10-40	7.9-8.4	3-15	0-5	5-15	10-20
	26-60	10-90	5-40	7.9-8.4	0-5	0-5	5-15	10-20
13D:								
Dogtooth----------	0-2	27-35	20-35	6.1-7.9	0	0-1	0-1	0-5
	2-8	35-50	20-50	7.4-8.4	1-15	0-1	0-5	5-10
	8-13	35-50	20-50	7.9-8.4	3-15	0-5	5-15	10-25
	13-21	18-50	10-55	7.9-8.4	3-15	0-5	5-15	10-25
	21-60	10-90	5-40	7.9-8.4	0-15	0-5	5-15	10-25
Janesburg----------	0-8	18-27	15-25	6.1-7.3	0	0-1	0-1	0-1
	8-10	15-27	10-25	6.1-7.3	0	0-1	0-1	0-1
	10-21	35-50	25-45	7.3-8.4	0-3	0-1	0-5	5-10
	21-26	18-45	10-40	7.9-8.4	3-15	0-5	5-15	10-20
	26-60	10-90	5-40	7.9-8.4	0-5	0-5	5-15	10-20
14E:								
Amor----------	0-8	15-25	15-20	6.1-7.8	0	0	0	0
	8-19	18-30	15-20	6.6-7.8	0-5	0	0	0
	19-31	18-30	10-15	7.4-8.4	5-30	0-2	0-2	0-2
	31-60	5-35	5-20	7.4-8.4	0-15	0-2	0-4	0-4
Brandenburg----------	0-4	10-25	10-25	6.6-7.8	1-5	0	0	0
	4-10	5-25	0-20	6.6-8.4	3-15	0	0	0
	10-60	1-5	0-3	6.6-8.4	3-15	0	0	0
15B:								
Daglum----------	0-7	18-27	10-30	6.1-7.3	0	0-1	0-1	0-1
	7-8	18-27	10-30	6.1-7.3	0	0-1	0-1	0-2
	8-18	35-60	20-50	7.3-8.4	0-3	0-1	0-2	5-10
	18-32	35-60	20-50	7.9-9.0	3-15	0-5	5-15	10-20
	32-47	35-60	20-50	7.9-9.0	5-25	0-5	5-15	10-20
	47-60	20-45	10-40	7.9-9.0	3-15	0-5	5-15	10-20
Rhoades----------	0-3	18-27	20-35	6.1-7.9	0	0-1	0-1	0-1
	3-8	35-50	20-45	7.4-8.4	0-5	0-1	0-5	5-10
	8-14	35-50	20-45	7.9-8.4	3-15	0-5	5-15	2-20
	14-46	20-50	15-35	7.9-8.4	3-15	0-5	5-15	5-25
	46-60	20-45	15-35	7.9-8.4	5-25	0-5	5-15	5-25
17:								
Amor----------	0-8	15-25	15-20	6.1-7.8	0	0	0	0
	8-19	18-30	15-20	6.6-7.8	0-5	0	0	0
	19-31	18-30	10-15	7.4-8.4	5-30	0-2	0-2	0-2
	31-60	5-35	5-20	7.4-8.4	0-15	0-2	0-4	0-4
Arnegard----------	0-13	18-27	15-25	6.1-7.3	0	0	0	0
	13-36	18-30	10-20	6.1-7.8	0	0	0-2	0
	36-60	15-30	5-15	7.4-8.4	3-20	0	0-2	0

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	*Pct*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
17B:								
Amor----------	0-8	15-25	15-20	6.1-7.8	0	0	0	0
	8-19	18-30	15-20	6.6-7.8	0-5	0	0	0
	19-31	18-30	10-15	7.4-8.4	5-30	0-2	0-2	0-2
	31-60	5-35	5-20	7.4-8.4	0-15	0-2	0-4	0-4
Shambo----------	0-9	18-27	10-25	6.1-7.8	0	0	0	0
	9-13	18-30	10-20	6.6-7.8	0	0	0	0
	13-29	18-30	10-20	6.6-8.4	0-5	0	0	0
	29-48	18-30	10-20	7.4-8.4	5-20	0	0	0
	48-60	18-35	10-15	7.4-8.4	1-15	0	0	0
17C:								
Amor----------	0-8	15-25	15-20	6.1-7.8	0	0	0	0
	8-19	18-30	15-20	6.6-7.8	0-5	0	0	0
	19-31	18-30	10-15	7.4-8.4	5-30	0-2	0-2	0-2
	31-60	5-35	5-20	7.4-8.4	0-15	0-2	0-4	0-4
Cabba----------	0-3	18-27	10-15	6.6-8.4	2-5	0	0-2	0
	3-15	18-35	10-20	7.4-8.4	1-15	0	1-2	0
	15-60	10-35	5-20	7.4-8.4	0-15	0-5	2-4	0-4
17D:								
Amor----------	0-8	15-25	15-20	6.1-7.8	0	0	0	0
	8-19	18-30	15-20	6.6-7.8	0-5	0	0	0
	19-31	18-30	10-15	7.4-8.4	5-30	0-2	0-2	0-2
	31-60	5-35	5-20	7.4-8.4	0-15	0-2	0-4	0-4
Cabba----------	0-3	18-27	10-15	6.6-8.4	2-5	0	0-2	0
	3-15	18-35	10-20	7.4-8.4	1-15	0	1-2	0
	15-60	10-35	5-20	7.4-8.4	0-15	0-5	2-4	0-4
18E:								
Manning----------	0-5	10-18	10-20	6.1-7.3	0	0	0	0
	5-18	10-20	5-20	6.6-7.8	0	0	0	0
	18-25	10-20	5-15	7.4-8.4	5-20	0	0	0
	25-60	1-10	1-5	7.4-8.4	0-5	0	0	0
Schaller----------	0-9	10-18	5-10	6.6-7.8	0	0	0	0
	9-15	5-18	2-8	6.6-8.4	1-15	0	0	0
	15-60	1-10	2-5	6.6-8.4	1-10	0	0	0
Wabek----------	0-5	15-27	5-10	6.6-8.4	0-5	0	0	0
	5-9	10-25	1-5	7.4-8.4	1-15	0	0	0
	9-60	1-10	0-5	7.4-8.4	1-15	0	0	0
19:								
Sen----------	0-6	18-27	10-25	6.6-7.8	0	0	0-2	0
	6-17	18-35	10-25	6.6-8.4	1-3	0	0-2	0
	17-34	18-30	10-25	7.4-8.4	10-30	0	0-2	0
	34-60	15-35	5-20	7.4-8.4	0-15	0-2	0-8	0-4
Golva----------	0-5	18-27	10-30	6.6-7.3	0	0	0	0
	5-15	18-35	10-25	7.4-8.4	1-5	0	0	0
	15-21	18-35	10-25	7.4-8.4	3-15	0	0	0
	21-40	18-30	5-20	7.9-8.4	5-20	0	0	0
	40-60	18-30	5-20	7.9-8.4	3-15	0	0	0

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	*Pct*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
19B:								
Chama	0-4	15-27	10-30	6.6-8.4	0-2	0	0-2	0
	4-8	18-35	10-25	7.4-8.4	3-10	0	0-2	0
	8-34	18-35	10-25	7.4-8.4	10-30	0	0-2	0
	34-60	10-35	5-20	7.4-8.4	0-15	0-5	0-8	0-4
Sen	0-6	18-27	10-25	6.6-7.8	0	0	0-2	0
	6-17	18-35	10-25	6.6-8.4	1-3	0	0-2	0
	17-34	18-30	10-25	7.4-8.4	10-30	0	0-2	0
	34-60	15-35	5-20	7.4-8.4	0-15	0-2	0-8	0-4
Cabba	0-3	18-27	10-15	6.6-8.4	2-5	0	0-2	0
	3-15	18-35	10-20	7.4-8.4	1-15	0	1-2	0
	15-60	10-35	5-20	7.4-8.4	0-15	0-5	2-4	0-4
19C:								
Chama	0-4	15-27	10-30	6.6-8.4	0-2	0	0-2	0
	4-8	18-35	10-25	7.4-8.4	3-10	0	0-2	0
	8-34	18-35	10-25	7.4-8.4	10-30	0	0-2	0
	34-60	10-35	5-20	7.4-8.4	0-15	0-5	0-8	0-4
Cabba	0-3	18-27	10-15	6.6-8.4	2-5	0	0-2	0
	3-15	18-35	10-20	7.4-8.4	1-15	0	1-2	0
	15-60	10-35	5-20	7.4-8.4	0-15	0-5	2-4	0-4
Sen	0-6	18-27	10-25	6.6-7.8	0	0	0-2	0
	6-17	18-35	10-25	6.6-8.4	1-3	0	0-2	0
	17-34	18-30	10-25	7.4-8.4	10-30	0	0-2	0
	34-60	15-35	5-20	7.4-8.4	0-15	0-2	0-8	0-4
19D:								
Cabba	0-3	18-27	10-15	6.6-8.4	2-5	0	0-2	0
	3-15	18-35	10-20	7.4-8.4	1-15	0	1-2	0
	15-60	10-35	5-20	7.4-8.4	0-15	0-5	2-4	0-4
Chama	0-4	15-27	10-30	6.6-8.4	0-2	0	0-2	0
	4-8	18-35	10-25	7.4-8.4	3-10	0	0-2	0
	8-34	18-35	10-25	7.4-8.4	10-30	0	0-2	0
	34-60	10-35	5-20	7.4-8.4	0-15	0-5	0-8	0-4
Sen	0-6	18-27	10-25	6.6-7.8	0	0	0-2	0
	6-17	18-35	10-25	6.6-8.4	1-3	0	0-2	0
	17-34	18-30	10-25	7.4-8.4	10-30	0	0-2	0
	34-60	15-35	5-20	7.4-8.4	0-15	0-2	0-8	0-4
21B:								
Parshall	0-12	10-18	7-15	5.6-7.8	0	0	0	0
	12-29	10-18	5-13	6.1-8.4	0-3	0	0	0
	29-48	5-18	5-10	7.4-8.4	0-10	0	0	0
	48-60	5-18	2-5	6.6-8.4	0-10	0	0	0
22B:								
Regent	0-10	27-40	15-30	6.1-7.8	0	0	0	0
	10-26	35-50	20-35	7.4-8.4	1-3	0-4	0	0-1
	26-39	35-50	20-40	7.4-8.4	3-15	0-4	0-2	0-2
	39-60	10-90	10-55	7.4-8.4	0-15	0-5	0-4	0-4
Savage	0-7	27-40	20-40	6.1-7.8	0	0	0	0
	7-25	35-50	25-40	6.6-7.8	0	0	0	0
	25-51	35-45	20-35	7.4-8.4	5-15	0	0-2	0
	51-60	35-45	20-35	7.4-8.4	5-15	0-2	0-4	0

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	*Pct*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
24B:								
Janesburg----------	0-8	10-18	10-25	6.1-7.3	0	0-1	0-1	0-1
	8-10	8-18	10-25	6.1-7.3	0	0-1	0-1	0-1
	10-21	35-55	25-45	7.3-8.4	0-3	0-1	0-5	5-10
	21-26	18-45	10-40	7.9-8.4	3-15	0-5	5-15	10-20
	26-60	10-90	5-40	7.9-8.4	0-5	0-5	5-15	10-20
25B:								
Lefor----------	0-7	10-25	10-20	5.1-7.3	0	0	0	0
	7-15	10-25	5-20	5.6-7.3	0	0	0	0
	15-30	18-27	10-15	6.6-7.8	0	0	0	0
	30-36	10-25	5-10	7.4-8.4	3-15	0	0	0
	36-60	1-10	0-5	7.4-8.4	0-10	0-1	0-2	0
27F:								
Badland, outcrop-----	0-60	10-60	5-40	6.1-9.0	2-15	0-3	2-16	2-30
Lambert----------	0-5	18-27	5-25	7.4-8.4	5-25	0	0	0
	5-36	18-35	5-25	7.9-8.4	5-30	0	0-2	0
	36-60	15-35	5-25	7.9-8.4	5-30	0	0-4	0-10
Cabba----------	0-3	18-27	10-15	6.6-8.4	2-5	0	0-2	0
	3-15	18-35	10-20	7.4-8.4	1-15	0	1-2	0
	15-60	10-35	5-20	7.4-8.4	0-15	0-5	2-4	0-4
28F:								
Flasher----------	0-6	3-10	3-5	6.6-8.4	0	0	0	0
	6-10	1-10	2-5	6.6-8.4	1-10	0	0	0
	10-60	1-10	0-10	7.4-8.4	0-10	0-1	0-2	0
Rock outcrop---------	---	---	---	---	---	---	---	---
Vebar----------	0-5	10-18	10-15	6.1-7.8	0	0	0	0
	5-26	10-18	10-15	6.1-7.8	0	0	0	0
	26-32	10-18	5-10	7.4-8.4	1-10	0	0	0
	32-60	1-10	0-10	7.4-8.4	0-10	0-1	0-2	0
29F:								
Arikara----------	0-1	0-5	65-100	6.1-7.3	0	0	0	0
	1-2	18-35	10-30	6.1-7.8	0	0	0	0
	2-14	18-35	10-25	6.1-7.8	0	0	0	0
	14-39	15-35	10-25	7.4-8.4	1-10	0	0-2	0
	39-60	15-35	5-20	7.4-8.4	1-5	0	0-4	0
Shambo----------	0-9	18-27	10-25	6.1-7.8	0	0	0	0
	9-13	18-30	10-20	6.6-7.8	0	0	0	0
	13-29	18-30	10-20	6.6-8.4	0-5	0	0	0
	29-48	18-30	10-20	7.4-8.4	5-20	0	0	0
	48-60	18-35	10-15	7.4-8.4	1-15	0	0	0
Cabba----------	0-3	18-27	10-15	6.6-8.4	2-5	0	0-2	0
	3-15	18-35	10-20	7.4-8.4	1-15	0	1-2	0
	15-60	10-35	5-20	7.4-8.4	0-15	0-5	2-4	0-4
30F:								
Vebar, extremely stony----------	0-5	10-18	10-15	6.1-7.8	0	0	0	0
	5-26	10-18	10-15	6.1-7.8	0	0	0	0
	26-32	10-18	5-10	7.4-8.4	1-10	0	0	0
	32-60	1-10	0-5	7.4-8.4	0-10	0-1	0-2	0

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	*Pct*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
30F:(cont.)								
Amor, extremely stony	0-8	15-25	15-20	6.1-7.8	0	0	0	0
	8-19	18-30	15-20	6.6-7.8	0-5	0	0	0
	19-31	18-30	10-15	7.4-8.4	5-30	0-2	0-2	0-2
	31-60	---	5-20	7.4-8.4	0-15	0-2	0-4	0-4
31B:								
Sen----------	0-6	18-27	10-25	6.6-7.8	0	0	0-2	0
	6-17	18-35	10-25	6.6-8.4	1-3	0	0-2	0
	17-34	18-30	10-25	7.4-8.4	10-30	0	0-2	0
	34-60	15-35	5-20	7.4-8.4	0-15	0-2	0-8	0-4
Janesburg----------	0-8	18-27	15-25	6.1-7.3	0	0-1	0-1	0-1
	8-10	15-27	10-25	6.1-7.3	0	0-1	0-1	0-1
	10-21	35-50	25-45	7.3-8.4	0-3	0-1	0-5	5-10
	21-26	18-45	10-40	7.9-8.4	3-15	0-5	5-15	10-20
	26-60	10-90	5-40	7.9-8.4	0-5	0-5	5-15	10-20
31C:								
Sen----------	0-6	18-27	10-25	6.6-7.8	0	0	0-2	0
	6-17	18-35	10-25	6.6-8.4	1-3	0	0-2	0
	17-34	18-30	10-25	7.4-8.4	10-30	0	0-2	0
	34-60	15-35	5-20	7.4-8.4	0-15	0-2	0-8	0-4
Janesburg----------	0-8	18-27	15-25	6.1-7.3	0	0-1	0-1	0-1
	8-10	15-27	10-25	6.1-7.3	0	0-1	0-1	0-1
	10-21	35-50	25-45	7.3-8.4	0-3	0-1	0-5	5-10
	21-26	18-45	10-40	7.9-8.4	3-15	0-5	5-15	10-20
	26-60	10-90	5-40	7.9-8.4	0-5	0-5	5-15	10-20
35F:								
Flasher----------	0-6	3-10	3-5	6.6-8.4	0	0	0	0
	6-10	1-10	2-5	6.6-8.4	1-10	0	0	0
	10-60	1-10	0-10	7.4-8.4	0-10	0-1	0-2	0
Vebar----------	0-5	10-18	10-15	6.1-7.8	0	0	0	0
	5-26	10-18	10-15	6.1-7.8	0	0	0	0
	26-32	10-18	5-10	7.4-8.4	1-10	0	0	0
	32-60	1-10	0-10	7.4-8.4	0-10	0-1	0-2	0
Parshall----------	0-12	10-18	7-15	5.6-7.8	0	0	0	0
	12-29	10-18	5-13	6.1-8.4	0-3	0	0	0
	29-48	5-18	5-10	7.4-8.4	0-10	0	0	0
	48-60	5-18	2-5	6.6-8.4	0-10	0	0	0
36B:								
Ekalaka----------	0-6	10-18	5-15	5.1-7.8	0	0	0-2	0-2
	6-12	5-18	5-15	5.1-8.4	0	0	0-2	0-4
	12-17	10-18	5-15	6.6-9.0	1-5	0-2	2-8	4-30
	17-33	5-18	5-15	7.4-9.0	3-15	0-2	4-12	5-25
	33-60	5-18	5-15	7.4-9.0	1-5	0-2	8-16	20-50
Parshall----------	0-12	10-18	7-15	5.6-7.8	0	0	0	0
	12-29	10-18	5-13	6.1-8.4	0-3	0	0	0
	29-48	5-18	5-10	7.4-8.4	0-10	0	0	0
	48-60	5-18	2-5	6.6-8.4	0-10	0	0	0
Desart----------	0-20	10-18	1-10	6.1-7.8	0	0	0	0-5
	20-24	5-15	1-10	6.1-8.4	1-5	0	0	0-5
	24-31	10-18	5-15	8.5-9.0	1-5	0-2	2-8	13-25
	31-60	5-20	5-10	7.9-9.0	1-5	0-2	4-16	5-25

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	*Pct*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
37B:								
Farfeld----------	0-4	18-27	10-25	6.1-7.3	0	0	0	0
	4-15	18-27	10-20	6.6-7.8	0	0	0	0
	15-37	---	---	---	---	---	---	---
	37-53	35-50	15-30	7.4-8.4	1-10	5-10	2-8	13-25
	53-120	35-50	15-30	7.4-9.0	1-5	0-2	8-16	1-10
Cedarpan----------	0-4	18-27	15-30	6.1-7.3	0	0-1	0-1	0-1
	4-9	18-27	10-30	6.1-7.3	0-1	0-2	0	0-1
	9-15	35-60	20-40	7.4-8.4	1-3	0-1	0-5	10-25
	15-26	---	---	---	---	---	---	---
	26-45	35-60	15-35	7.4-8.4	1-5	0-10	4-16	15-30
	45-80	35-60	15-30	7.4-8.4	1-5	0-10	4-16	1-5
37F:								
Cedarpan----------	0-4	18-27	15-30	6.1-7.3	0	0-1	0-1	0-1
	4-9	18-27	10-30	6.1-7.3	0-1	0-2	0	0-1
	9-15	35-60	20-40	7.4-8.4	1-3	0-1	0-5	10-25
	15-26	---	---	---	---	---	---	---
	26-45	35-60	15-35	7.4-8.4	1-5	0-10	4-16	15-30
	45-80	35-60	15-30	7.4-8.4	1-5	0-10	4-16	1-5
Slickspots, stony----	0-2	40-60	25-35	7.4-9.0	10-25	0-5	8-16	5-20
	2-60	18-50	25-35	8.5-9.0	10-25	0-5	16-32	5-20
Farfeld----------	0-4	18-27	10-25	6.1-7.3	0	0	0	0
	4-15	18-27	10-20	6.6-7.8	0	0	0	0
	15-37	---	---	---	---	---	---	---
	37-53	35-50	15-30	7.4-8.4	1-10	5-10	2-8	13-25
	53-120	35-50	15-30	7.4-9.0	1-5	0-2	8-16	1-10
41C:								
Wayden----------	0-3	40-50	20-40	6.6-9.0	0-10	0	0-2	0
	3-7	35-50	20-40	7.4-9.0	3-25	0-2	0-8	0-2
	7-15	35-50	20-40	7.4-9.0	0-10	0-2	2-16	0-2
	15-60	30-90	10-40	7.4-8.4	0-15	0-5	0-8	0-4
Moreau----------	0-6	40-50	25-50	7.4-9.0	0-5	0	0-2	0
	6-13	35-60	20-55	7.4-9.0	1-10	0-1	0-4	0
	13-35	35-60	20-50	7.4-9.0	5-20	0-2	2-16	0-2
	35-60	30-90	10-40	7.4-8.4	0-15	0-5	0-8	0-4
42B:								
Searing----------	0-8	18-27	15-30	6.1-7.3	0	0	0	0
	8-23	18-27	10-25	6.6-8.4	1-3	0	0	0
	23-33	18-27	10-20	7.4-8.4	3-15	0	0	0
	33-60	1-5	0-5	7.4-8.4	3-15	0	0	0
Ringling----------	0-5	18-27	10-25	6.6-7.8	0	0	0	0
	5-17	18-27	5-20	6.6-7.8	1-3	0	0	0
	17-42	1-5	0-5	6.6-8.4	5-10	0	0	0
	42-60	1-5	0-5	6.6-8.4	1-5	0	0	0
43:								
Belfield----------	0-9	27-35	15-30	6.1-7.3	0	0-1	0-1	0-1
	9-12	27-35	15-30	6.1-7.3	0	0-1	0-1	0-1
	12-17	35-45	20-40	7.3-8.4	1-5	0-1	0-2	5-10
	17-24	35-45	20-30	7.3-8.4	1-5	0-1	0-2	5-10
	24-43	27-45	15-40	7.9-8.4	3-15	0-5	5-15	10-20
	43-60	27-45	15-35	7.9-8.4	3-15	0-5	5-15	10-20

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	*Pct*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
43:(cont.)								
Grail	0-10	27-35	20-30	6.1-7.3	0	0	0-2	0
	10-24	35-45	20-30	6.6-8.4	1-5	0	0-2	0-1
	24-52	27-45	15-30	7.4-8.4	1-15	0	0-2	0-1
	52-60	18-45	15-25	7.4-8.4	1-15	0-2	0-4	0-2
44:								
Shambo	0-9	18-27	10-25	6.1-7.8	0	0	0	0
	9-13	18-30	10-20	6.6-7.8	0	0	0	0
	13-29	18-30	10-20	6.6-8.4	0-5	0	0	0
	29-48	18-30	10-20	7.4-8.4	5-20	0	0	0
	48-60	18-35	10-15	7.4-8.4	1-15	0	0	0
44B:								
Shambo	0-9	18-27	10-25	6.1-7.8	0	0	0	0
	9-13	18-30	10-20	6.6-7.8	0	0	0	0
	13-29	18-30	10-20	6.6-8.4	0-5	0	0	0
	29-48	18-30	10-20	7.4-8.4	5-20	0	0	0
	48-60	18-35	10-15	7.4-8.4	1-15	0	0	0
47:								
Stady	0-6	18-27	10-20	6.6-7.3	0	0	0	0
	6-15	18-27	10-20	6.6-7.3	0	0	0	0
	15-29	18-27	10-15	7.4-8.4	1-10	0	0	0
	29-60	1-10	1-5	7.4-8.4	3-15	0	0	0
48B:								
Manning	0-5	10-18	10-20	6.1-7.3	0	0	0	0
	5-18	10-20	5-20	6.6-7.8	0	0	0	0
	18-25	10-20	5-15	7.4-8.4	5-20	0	0	0
	25-60	1-10	1-5	7.4-8.4	0-5	0	0	0
49B:								
Lihen	0-9	1-10	2-12	6.1-7.8	0	0	0	0
	9-24	1-10	2-12	6.1-8.4	0-3	0	0	0
	24-32	1-10	2-10	7.4-8.4	2-15	0	0	0
	32-60	1-10	0-7	7.4-8.4	0-12	0	0	0
Parshall	0-12	10-18	7-15	5.6-7.8	0	0	0	0
	12-29	10-18	5-13	6.1-8.4	0-3	0	0	0
	29-48	5-18	5-10	7.4-8.4	0-10	0	0	0
	48-60	5-18	2-5	6.6-8.4	0-10	0	0	0
51B:								
Janesburg	0-8	18-27	15-25	6.1-7.3	0	0-1	0-1	0-1
	8-10	15-27	10-25	6.1-7.3	0	0-1	0-1	0-1
	10-21	35-50	25-45	7.3-8.4	0-3	0-1	0-5	5-10
	21-26	18-45	10-40	7.9-8.4	3-15	0-5	5-15	10-20
	26-60	10-90	10-55	7.9-8.4	0-5	0-5	5-15	10-20
Dogtooth	0-2	18-27	15-30	6.1-7.9	0	0-1	0-1	0-5
	2-8	35-50	20-50	7.4-8.4	1-15	0-1	0-5	5-10
	8-13	35-50	20-50	7.9-8.4	3-15	0-5	5-15	10-25
	13-21	18-50	10-55	7.9-8.4	3-15	0-5	5-15	10-25
	21-60	10-90	5-40	7.9-8.4	0-15	0-5	5-15	10-25

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	*Pct*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
52:								
Heil	0-3	18-27	15-30	5.6-7.3	0	0	0-2	0
	3-24	45-60	20-35	6.1-9.0	0-5	0	4-16	13-25
	24-38	27-50	15-40	7.4-9.0	3-15	0	4-16	0-5
	38-52	27-50	15-40	7.4-9.0	3-15	0-5	4-16	0-5
	52-60	20-50	10-40	7.4-9.0	3-15	0-5	4-16	0-5
53B:								
Savage	0-7	18-40	15-40	6.1-7.8	0	0	0	0
	7-25	35-50	20-40	6.6-7.8	0	0	0-2	0
	25-51	35-45	20-40	7.4-8.4	5-15	0	2-4	0
	51-60	35-45	20-40	7.4-8.4	5-15	0-2	4-8	0
Daglum	0-7	18-27	10-30	6.1-7.3	0	0-1	0-1	0-1
	7-8	18-27	10-30	6.1-7.3	0	0-1	0-1	0-2
	8-18	35-60	20-50	7.3-8.4	0-3	0-1	0-2	5-10
	18-32	35-60	20-50	7.9-9.0	3-15	0-5	5-15	10-20
	32-47	35-60	20-50	7.9-9.0	5-25	0-5	5-15	10-20
	47-60	20-45	10-40	7.9-9.0	3-15	0-5	5-15	10-20
54:								
Channel	---	---	---	---	---	---	---	---
Straw	0-5	18-27	15-30	6.6-7.3	0-1	0	0-2	0
	5-23	18-27	15-30	6.6-7.8	0-5	0	0-2	0
	23-30	18-30	15-25	7.4-8.4	1-10	0	0-2	0
	30-36	18-35	15-25	7.4-8.4	3-10	0	0-2	0
	36-40	18-35	15-25	6.6-8.4	3-10	0	0-4	0-5
	40-66	18-35	15-25	7.4-8.4	3-10	0-2	0-4	0-5
55:								
Pits, gravel and sand	0-6	1-10	2-12	6.6-8.4	0-3	0	0	0
	6-60	1-15	1-10	6.6-8.4	5-20	0	0	0
57:								
Straw	0-5	18-27	15-30	6.6-7.3	0-1	0	0-2	0
	5-23	18-27	15-30	6.6-7.8	0-5	0	0-2	0
	23-30	18-30	15-25	7.4-8.4	1-10	0	0-2	0
	30-36	18-35	15-25	7.4-8.4	3-10	0	0-2	0
	36-40	18-35	15-25	6.6-8.4	3-10	0	0-4	0-5
	40-66	18-35	15-25	7.4-8.4	3-10	0-2	0-4	0-5
Rhoades	0-3	18-27	20-35	6.1-7.9	0	0-1	0-1	0-1
	3-8	35-50	20-45	7.4-8.4	0-5	0-1	0-5	5-10
	8-14	35-50	20-45	7.9-8.4	3-15	0-5	5-15	2-20
	14-46	20-50	15-35	7.9-8.4	3-15	0-5	5-15	5-25
	46-60	20-45	15-35	7.9-8.4	5-25	0-5	5-15	5-25
Daglum	0-7	18-27	10-30	6.1-7.3	0	0-1	0-1	0-1
	7-8	18-27	10-30	6.1-7.3	0	0-1	0-1	0-2
	8-18	35-60	20-50	7.3-8.4	0-3	0-1	0-2	5-10
	18-32	35-60	20-50	7.9-9.0	3-15	0-5	5-15	10-20
	32-47	35-60	20-50	7.9-9.0	5-25	0-5	5-15	10-20
	47-60	20-45	10-40	7.9-9.0	3-15	0-5	5-15	10-20

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	*Pct*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
58:								
Straw----------	0-5	18-27	15-30	6.6-7.3	0-1	0	0-2	0
	5-23	18-27	15-30	6.6-7.8	0-5	0	0-2	0
	23-30	18-30	15-25	7.4-8.4	1-10	0	0-2	0
	30-36	18-35	15-25	7.4-8.4	3-10	0	0-2	0
	36-40	18-35	15-25	6.6-8.4	3-10	0	0-4	0-5
	40-66	18-35	15-25	7.4-8.4	3-10	0-2	0-4	0-5
60:								
Korell----------	0-8	18-27	15-20	7.4-7.8	0	0	0	0
	8-15	18-27	15-20	7.9-8.4	1-5	0	0	0
	15-48	18-27	15-20	7.9-8.4	5-20	0-1	0-4	0-1
	48-60	18-30	10-15	7.9-8.4	5-15	0-2	0-4	0-2
62F:								
Dogtooth----------	0-2	18-27	15-30	6.1-7.9	0	0-1	0-1	0-5
	2-8	35-50	20-50	7.4-8.4	1-15	0-1	0-5	5-10
	8-13	35-50	20-50	7.9-8.4	3-15	0-5	5-15	10-25
	13-21	18-50	10-55	7.9-8.4	3-15	0-5	5-15	10-25
	21-60	10-90	5-40	7.9-8.4	0-15	0-5	5-15	10-25
Janesburg----------	0-8	18-27	15-25	6.1-7.3	0	0-1	0-1	0-1
	8-10	15-27	10-25	6.1-7.3	0	0-1	0-1	0-1
	10-21	35-50	25-45	7.3-8.4	0-3	0-1	0-5	5-10
	21-26	18-45	10-40	7.9-8.4	3-15	0-5	5-15	10-20
	26-60	10-90	5-40	7.9-8.4	0-5	0-5	5-15	10-20
Brandenburg----------	0-4	10-25	10-25	6.6-7.8	1-5	0	0	0
	4-10	5-25	0-20	6.6-8.4	3-15	0	0	0
	10-60	1-5	0-3	6.6-8.4	3-15	0	0	0
63F:								
Dogtooth----------	0-2	18-27	15-30	6.1-7.9	0	0-1	0-1	0-5
	2-8	35-50	20-50	7.4-8.4	1-15	0-1	0-5	5-10
	8-13	35-50	20-50	7.9-8.4	3-15	0-5	5-15	10-25
	13-21	18-50	10-55	7.9-8.4	3-15	0-5	5-15	10-25
	21-60	10-90	5-40	7.9-8.4	0-15	0-5	5-15	10-25
Janesburg----------	0-8	18-27	15-25	6.1-7.3	0	0-1	0-1	0-1
	8-10	15-27	10-25	6.1-7.3	0	0-1	0-1	0-1
	10-21	35-50	25-45	7.3-8.4	0-3	0-1	0-5	5-10
	21-26	18-45	10-40	7.9-8.4	3-15	0-5	5-15	10-20
	26-60	10-90	5-40	7.9-8.4	0-5	0-5	5-15	10-20
Cabba----------	0-3	18-27	10-15	6.6-8.4	2-5	0	0-2	0
	3-15	18-35	10-20	7.4-8.4	1-15	0	1-2	0
	15-60	10-35	5-20	7.4-8.4	0-15	0-5	2-4	0-4
65:								
Channel----------	---	---	---	---	---	---	---	---
Banks----------	0-4	10-18	10-15	6.6-7.8	0-3	0	0	0
	4-30	1-10	0-6	7.4-8.4	1-5	0-2	0-4	0-1
	30-60	1-10	0-6	7.4-8.4	1-5	0-2	0-4	0-1
Trembles----------	0-9	10-18	5-20	6.6-8.4	3-15	0	0-2	0
	9-59	10-18	5-10	7.4-8.4	5-30	0	0-2	0
	59-80	5-18	0-5	7.4-8.4	5-25	0	0-2	0

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	*Pct*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
66B:								
Stady	0-6	18-27	10-20	6.6-7.3	0	0	0	0
	6-15	18-27	10-20	6.6-7.3	0	0	0	0
	15-29	18-27	10-15	7.4-8.4	1-10	0	0	0
	29-60	1-10	1-5	7.4-8.4	3-15	0	0	0
67B:								
Evridge	0-12	10-18	5-15	6.1-7.3	0	0	0-2	0-5
	12-17	5-18	5-15	6.1-7.3	0	0-2	0-2	0-5
	17-21	10-18	5-15	7.9-9.0	1-5	0-2	4-8	13-25
	21-31	10-18	5-15	7.9-9.0	3-15	1-5	8-16	2-10
	31-38	1-10	0-10	6.6-9.0	0-15	0-5	8-16	2-10
	38-60	1-10	0-40	7.4-8.4	0-15	0-5	0-8	0-4
Desart	0-20	10-18	1-10	6.1-7.8	0	0	0	0-5
	20-24	5-15	1-10	6.1-8.4	1-5	0	0	0-5
	24-31	10-18	5-15	8.5-9.0	1-5	0-2	2-8	13-25
	31-60	5-20	5-10	7.9-9.0	1-5	0-2	4-16	5-25
Telfer	0-6	10-18	5-15	6.1-7.3	0-1	0	0	0
	6-60	1-10	0-5	6.6-7.8	0-3	0	0	0
68F:								
Cabbart	0-3	18-27	10-20	7.4-8.4	1-10	0	0-4	0-10
	3-18	18-35	10-25	7.4-8.4	10-25	0-5	0-8	0-10
	18-60	10-35	5-15	7.4-8.4	0-15	0-15	0-8	0-10
Badland, outcrop	0-60	10-60	5-40	6.1-9.0	2-15	0-3	2-16	2-30
69F:								
Patent	0-7	18-27	5-25	7.4-8.4	5-25	0	0	0
	7-60	15-35	5-25	7.9-8.4	5-30	0	0-4	0-10
Badland, outcrop	0-60	10-60	5-40	6.1-9.0	2-15	0-3	2-16	2-30
Cabbart	0-3	18-27	10-20	7.4-8.4	1-10	0	0-4	0-10
	3-18	18-35	10-25	7.4-8.4	10-25	0-5	0-8	0-10
	18-60	10-35	5-15	7.4-8.4	0-15	0-15	0-8	0-10
70B:								
Maltese	0-7	18-27	15-30	6.1-7.3	0	0-1	0-1	0-1
	7-10	18-27	15-30	6.1-7.3	0	0-1	0-1	0-1
	10-16	40-60	25-45	7.3-8.4	1-3	0-1	0-2	5-10
	16-20	35-50	25-45	7.9-9.0	5-20	0-5	5-15	10-20
	20-33	35-50	25-45	7.9-9.0	3-15	0-5	5-15	10-20
	33-60	15-40	10-30	7.9-9.0	3-15	0-5	5-15	10-20
Gerda	0-2	18-27	15-30	6.1-7.9	0	0-1	0-1	0-1
	2-11	35-55	25-50	7.4-8.4	1-5	0-1	0-5	5-10
	11-19	35-55	25-40	7.9-8.4	5-25	0-5	5-15	2-20
	19-29	30-45	20-40	7.9-8.4	5-25	0-5	5-15	5-20
	29-44	30-50	20-40	7.9-8.4	5-25	0-5	5-15	5-25
	44-80	15-27	10-25	7.9-8.4	3-15	0-5	5-15	5-25
71B:								
Chinook	0-6	10-18	5-15	6.6-7.8	0	0	0	0
	6-15	10-18	5-15	6.6-7.8	0	0	0	0
	15-40	10-18	5-15	6.6-7.8	3-15	0	0	0
	40-66	5-18	5-10	6.6-8.4	1-15	0	0-2	0

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	*Pct*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
71B:(cont.)								
Rhame----------	0-8	10-18	5-15	6.1-7.3	0	0	0	0
	8-26	10-18	5-10	6.6-7.8	0-3	0	0	0
	26-34	10-18	5-10	6.6-8.4	1-10	0	0	0
	34-60	1-10	0-5	7.4-8.4	1-10	0-1	0-2	0
71D:								
Rhame----------	0-8	10-18	5-15	6.1-7.3	0	0	0	0
	8-26	10-18	5-10	6.6-7.8	0-3	0	0	0
	26-34	10-18	5-10	6.6-8.4	1-10	0	0	0
	34-60	1-10	0-5	7.4-8.4	1-10	0-1	0-2	0
Chinook----------	0-6	10-18	5-15	6.6-7.8	0	0	0	0
	6-15	10-18	5-15	6.6-7.8	0	0	0	0
	15-40	10-18	5-15	6.6-7.8	3-15	0	0	0
	40-66	5-18	5-10	6.6-8.4	1-15	0	0-2	0
72F:								
Rhame----------	0-8	10-18	5-15	6.1-7.3	0	0	0	0
	8-26	10-18	5-10	6.6-7.8	0-3	0	0	0
	26-34	10-18	5-10	6.6-8.4	1-10	0	0	0
	34-60	1-10	0-5	7.4-8.4	1-10	0-1	0-2	0
Fleak----------	0-3	3-10	1-10	6.6-7.8	0	0	0	0
	3-17	1-10	1-10	6.6-8.4	1-10	0	0	0
	17-60	1-10	0-5	7.4-8.4	1-10	0-1	0-2	0
73D:								
Gerda----------	0-2	18-27	15-30	6.1-7.9	0	0-1	0-1	0-1
	2-11	35-55	25-50	7.4-8.4	1-5	0-1	0-5	5-10
	11-19	35-55	25-40	7.9-8.4	5-25	0-5	5-15	2-20
	19-29	30-45	20-40	7.9-8.4	5-25	0-5	5-15	5-20
	29-44	30-50	20-40	7.9-8.4	5-25	0-5	5-15	5-25
	44-80	15-27	10-25	7.9-8.4	3-15	0-5	5-15	5-25
Kirby----------	0-4	10-22	10-15	7.4-8.4	1-5	0	0-2	0
	4-12	10-22	5-10	7.9-8.4	5-15	0	0-2	0
	12-60	1-5	0-0	7.9-8.4	1-5	0	0-2	0
74:								
Channel----------	---	---	---	---	---	---	---	---
Glendive----------	0-5	10-18	5-15	6.6-9.0	5-30	0	0-4	0
	5-16	8-18	5-15	7.4-9.0	5-30	0	0-4	0
	16-60	5-18	5-15	7.4-9.0	5-30	0	0-8	0
Havre----------	0-10	18-27	10-15	7.4-8.4	1-10	0	0	0
	10-60	18-35	10-15	7.4-8.4	1-10	0	0-2	0
75:								
Havre----------	0-10	18-27	10-15	7.4-8.4	1-10	0	0	0
	10-60	18-35	10-15	7.4-8.4	1-10	0	0-2	0
76B:								
Lonna----------	0-2	18-27	15-20	7.4-8.4	5-10	0	0-2	0
	2-11	18-35	10-15	7.4-8.4	5-10	0	0-2	0
	11-34	18-35	10-15	7.9-9.0	5-15	0-2	2-8	1-5
	34-60	10-35	5-15	7.9-9.0	5-15	0	2-8	10-30

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	*Pct*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
76C:								
Lonna----------	0-2	18-27	15-20	7.4-8.4	5-10	0	0-2	0
	2-11	18-35	10-15	7.4-8.4	5-10	0	0-2	0
	11-34	18-35	10-15	7.9-9.0	5-15	0-2	2-8	1-5
	34-60	10-35	5-15	7.9-9.0	5-15	0	2-8	10-30
77:								
Glendive----------	0-5	10-18	5-15	6.6-9.0	5-30	0	0-4	0
	5-16	8-18	5-15	7.4-9.0	5-30	0	0-4	0
	16-60	5-18	5-15	7.4-9.0	5-30	0	0-8	0
78B:								
Hanly----------	0-5	10-18	5-15	6.6-8.4	0	0	0	0
	5-60	1-10	1-5	6.6-8.4	1-5	0	0-2	0
79C:								
Zeona----------	0-3	1-10	4-5	5.6-7.3	0	0	0	0
	3-60	1-10	2-5	5.6-8.4	0-5	0	0	0
80:								
Ethridge----------	0-3	18-27	15-30	6.1-7.8	0	0	0	0
	3-10	35-50	25-40	6.6-8.4	0	0	0	0
	10-23	35-50	25-40	7.4-9.0	5-15	1-5	0	0
	23-38	27-45	20-40	7.4-9.0	5-15	1-5	0	1-5
	38-60	20-35	15-35	7.4-9.0	5-15	1-3	2-4	1-5
81B:								
Vebar----------	0-5	10-18	10-15	6.1-7.8	0	0	0	0
	5-26	10-18	10-15	6.1-7.8	0	0	0	0
	26-32	10-18	5-10	7.4-8.4	1-10	0	0	0
	32-60	1-10	0-10	7.4-8.4	0-10	0-1	0-2	0
Parshall----------	0-12	10-18	7-15	5.6-7.8	0	0	0	0
	12-29	10-18	5-13	6.1-8.4	0-3	0	0	0
	29-48	5-18	5-10	7.4-8.4	0-10	0	0	0
	48-60	5-18	2-5	6.6-8.4	0-10	0	0	0
81C:								
Vebar----------	0-5	10-18	10-15	6.1-7.8	0	0	0	0
	5-26	10-18	10-15	6.1-7.8	0	0	0	0
	26-32	10-18	5-10	7.4-8.4	1-10	0	0	0
	32-60	1-10	0-5	7.4-8.4	0-10	0-1	0-2	0
Tally----------	0-6	10-18	5-20	6.1-7.8	0	0	0	0
	6-32	10-18	5-10	6.6-8.4	0	0	0	0
	32-60	5-18	5-10	7.4-8.4	5-15	0	0	0
81D:								
Vebar----------	0-5	10-18	10-15	6.1-7.8	0	0	0	0
	5-26	10-18	10-15	6.1-7.8	0	0	0	0
	26-32	10-18	5-10	7.4-8.4	1-10	0	0	0
	32-60	1-10	0-10	7.4-8.4	0-10	0-1	0-2	0
Flasher----------	0-6	3-10	3-5	6.6-8.4	0	0	0	0
	6-10	1-10	2-5	6.6-8.4	1-10	0	0	0
	10-60	1-10	0-10	7.4-8.4	0-10	0-1	0-2	0
Tally----------	0-6	10-18	5-20	6.1-7.8	0	0	0	0
	6-32	10-18	5-10	6.6-8.4	0	0	0	0
	32-60	5-18	5-10	7.4-8.4	5-15	0	0	0

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	*Pct*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
82E:								
Badland, outcrop-----	0-60	10-60	5-40	6.1-9.0	2-15	0-3	2-16	2-30
Patent----------	0-7	18-27	5-25	7.4-8.4	5-25	0	0	0
	7-60	15-35	5-25	7.9-8.4	5-30	0	0-4	0-19
83:								
Badland----------	0-60	10-60	5-40	6.1-9.0	2-15	0-3	2-16	2-30
85F:								
Lonna----------	0-2	18-27	15-20	7.4-8.4	5-10	0	0-2	0
	2-11	18-35	10-15	7.4-8.4	5-10	0	0-2	0
	11-34	18-35	10-15	7.9-9.0	5-15	0-2	2-8	1-5
	34-60	10-35	5-15	7.9-9.0	5-15	0	2-8	10-30
Cabbart----------	0-3	18-27	10-20	7.4-8.4	1-10	0	0-4	0-10
	3-18	18-35	10-25	7.4-8.4	10-25	0-5	0-8	0-10
	18-60	10-35	5-15	7.4-8.4	0-15	0-15	0-8	0-10
86F:								
Kirby----------	0-4	10-22	10-15	7.4-8.4	1-5	0	0-2	0
	4-12	10-22	5-10	7.9-8.4	5-15	0	0-2	0
	12-60	1-5	0-0	7.9-8.4	1-5	0	0-2	0
Badland, outcrop-----	0-60	10-60	5-40	6.1-9.0	2-15	0-3	2-16	2-30
Patent----------	0-7	18-27	5-25	7.4-8.4	5-25	0	0	0
	7-60	15-35	5-25	7.9-8.4	5-30	0	0-4	0-10
88:								
Littlemo----------	0-6	18-27	10-25	5.6-7.3	0	0	0	0
	6-17	18-27	10-25	6.1-7.8	0	0	0	0
	17-28	18-30	10-25	7.4-8.4	5-30	0	0	0
	28-60	10-30	0-15	7.4-8.4	5-30	0	0	0
Chanta----------	0-6	18-27	10-25	6.1-7.3	0	0	0	0
	6-22	18-30	10-25	6.1-7.8	0	0	0	0
	22-26	10-20	5-15	6.6-8.4	1-3	0	0	0
	26-60	1-10	1-5	7.4-8.4	1-15	0	0	0
89B:								
Patent----------	0-7	18-27	5-25	7.4-8.4	5-25	0	0	0
	7-60	15-35	5-25	7.9-8.4	5-30	0	0-4	0-10
91F:								
Lonna----------	0-2	18-27	15-20	7.4-8.4	5-10	0	0-2	0
	2-11	18-35	10-15	7.4-8.4	5-10	0	0-2	0
	11-34	18-35	10-15	7.9-9.0	5-15	0-2	2-8	1-5
	34-60	10-35	5-15	7.9-9.0	5-15	0	2-8	10-30
Kirby----------	0-4	10-22	10-15	7.4-8.4	1-5	0	0-2	0
	4-12	10-22	5-10	7.9-8.4	5-15	0	0-2	0
	12-60	1-5	0-0	7.9-8.4	1-5	0	0-2	0
Cabbart----------	0-3	18-27	10-20	7.4-8.4	1-10	0	0-4	0-10
	3-18	18-35	10-25	7.4-8.4	10-25	0-5	0-8	0-10
	18-60	10-35	5-15	7.4-8.4	0-15	0-15	0-8	0-10

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	*Pct*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
92B:								
Kremlin----------	0-11	18-27	10-25	6.1-7.8	0	0	0	0
	11-19	18-30	5-20	6.6-7.8	0	0	0	0
	19-60	18-30	5-20	7.4-8.4	5-30	0	0-2	0
Ethridge----------	0-3	18-27	15-30	6.1-7.8	0	0	0	0
	3-10	35-50	25-40	6.6-8.4	0	0	0	0
	10-23	35-50	25-40	7.4-9.0	5-15	1-5	0	0
	23-38	27-45	20-40	7.4-9.0	5-15	1-5	0	1-5
	38-60	20-35	15-35	7.4-9.0	5-15	1-3	2-4	1-5
Gerda----------	0-2	18-27	15-30	6.1-7.9	0	0-1	0-1	0-1
	2-11	35-55	25-50	7.4-8.4	1-5	0-1	0-5	5-10
	11-19	35-55	25-40	7.9-8.4	5-25	0-5	5-15	2-20
	19-29	30-45	20-40	7.9-8.4	5-25	0-5	5-15	5-20
	29-44	30-50	20-40	7.9-8.4	5-25	0-5	5-15	5-25
	44-80	15-27	10-25	7.9-8.4	3-15	0-5	5-15	5-25
94F:								
Kirby----------	0-4	10-22	10-15	7.4-8.4	1-5	0	0-2	0
	4-12	10-22	5-10	7.9-8.4	5-15	0	0-2	0
	12-60	1-5	0-0	7.9-8.4	1-5	0	0-2	0
Arikara----------	0-1	0-5	65-100	6.1-7.3	0	0	0	0
	1-2	18-35	10-30	6.1-7.8	0	0	0	0
	2-14	18-35	10-25	6.1-7.8	0	0	0	0
	14-39	15-35	10-25	7.4-8.4	1-10	0	0-2	0
	39-60	15-35	5-20	7.4-8.4	1-5	0	0-4	0
Badland, outcrop-----	0-60	10-60	5-40	6.1-9.0	2-15	0-3	2-16	2-30
95F:								
Tinsley----------	0-3	5-15	5-10	6.6-7.8	1-3	0	0	0
	3-60	0-10	1-5	6.6-8.4	1-10	0	0-2	0
Chanta----------	0-6	18-27	10-25	6.1-7.3	0	0	0	0
	6-22	18-30	10-25	6.1-7.8	0	0	0	0
	22-26	10-20	5-15	6.6-8.4	1-3	0	0	0
	26-60	1-10	1-5	7.4-8.4	1-15	0	0	0
97:								
Kremlin----------	0-11	18-27	10-25	6.1-7.8	0	0	0	0
	11-19	18-30	5-20	6.6-7.8	0	0	0	0
	19-60	18-30	5-20	7.4-8.4	5-30	0	0-2	0
98:								
Wolf Point----------	0-1	27-40	15-35	6.6-7.3	1-10	0	0-2	0
	1-10	35-50	20-40	6.6-7.8	1-10	0	0-2	0
	10-60	30-60	15-50	7.4-8.4	3-25	1-5	2-8	0-2
99F:								
Badland, outcrop-----	0-60	10-60	5-40	6.1-9.0	2-15	0-3	2-16	2-30
Cabbart----------	0-3	18-27	10-20	7.4-8.4	1-10	0	0-4	0-10
	3-18	18-35	10-25	7.4-8.4	10-25	0-5	0-8	0-10
	18-60	10-35	5-15	7.4-8.4	0-15	0-15	0-8	0-10
100C:								
Patent----------	0-7	18-27	5-25	7.4-8.4	5-25	0	0	0
	7-60	15-35	5-25	7.9-8.4	5-30	0	0-4	0-10

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	*Pct*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
100C:(cont.)								
Gullied land---------	0-60	10-40	---	6.1-9.0	0	0	2-16	2-20
Glendive----------	0-5	10-18	5-15	6.6-9.0	5-30	0	0-4	0
	5-16	8-18	5-15	7.4-9.0	5-30	0	0-4	0
	16-60	5-18	5-15	7.4-9.0	5-30	0	0-8	0
101F:								
Boxwell----------	0-5	18-27	10-20	6.1-7.3	0	0	0	0
	5-14	18-30	10-25	6.6-7.8	0	0	0-2	0
	14-28	18-27	5-20	7.4-8.4	15-30	0	0-4	0
	28-60	5-35	5-20	7.4-8.4	0-15	0-2	0-4	0-4
Cabbart----------	0-3	18-27	10-20	7.4-8.4	1-10	0	0-4	0-10
	3-18	18-35	10-25	7.4-8.4	10-25	0-5	0-8	0-10
	18-60	10-35	5-15	7.4-8.4	0-15	0-15	0-8	0-10
Arikara----------	0-1	0-5	65-100	6.1-7.3	0	0	0	0
	1-2	18-35	10-30	6.1-7.8	0	0	0	0
	2-14	18-35	10-25	6.1-7.8	0	0	0	0
	14-39	15-35	10-25	7.4-8.4	1-10	0	0-2	0
	39-60	15-35	5-20	7.4-8.4	1-5	0	0-4	0
102B:								
Boxwell----------	0-5	18-27	10-20	6.1-7.3	0	0	0	0
	5-14	18-30	10-25	6.6-7.8	0	0	0-2	0
	14-28	18-27	5-20	7.4-8.4	15-30	0	0-4	0
	28-60	5-35	5-20	7.4-8.4	0-15	0-2	0-4	0-4
Kremlin----------	0-11	18-27	10-25	6.1-7.8	0	0	0	0
	11-19	18-30	5-20	6.6-7.8	0	0	0	0
	19-60	18-30	5-20	7.4-8.4	5-30	0	0-2	0
102D:								
Boxwell----------	0-5	18-27	10-20	6.1-7.3	0	0	0	0
	5-14	18-30	10-25	6.6-7.8	0	0	0-2	0
	14-28	18-27	5-20	7.4-8.4	15-30	0	0-4	0
	28-60	5-35	5-20	7.4-8.4	0-15	0-2	0-4	0-4
Kremlin----------	0-11	18-27	10-25	6.1-7.8	0	0	0	0
	11-19	18-30	5-20	6.6-7.8	0	0	0	0
	19-60	18-30	5-20	7.4-8.4	5-30	0	0-2	0
103F:								
Badland, outcrop-----	0-60	10-60	5-40	6.1-9.0	2-15	0-3	2-16	2-30
Arikara----------	0-1	0-5	65-100	6.1-7.3	0	0	0	0
	1-2	18-35	10-30	6.1-7.8	0	0	0	0
	2-14	18-35	10-25	6.1-7.8	0	0	0	0
	14-39	15-35	10-25	7.4-8.4	1-10	0	0-2	0
	39-60	15-35	5-20	7.4-8.4	1-5	0	0-4	0
Cabbart----------	0-3	18-27	10-20	7.4-8.4	1-10	0	0-4	0-10
	3-18	18-35	10-25	7.4-8.4	10-25	0-5	0-8	0-10
	18-60	10-35	5-15	7.4-8.4	0-15	0-15	0-8	0-10

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	*Pct*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
105:								
Harriet----------	0-2	12-27	13-23	6.6-8.4	0-5	0	0-2	0
	2-18	35-50	17-26	7.4-9.0	1-15	0-5	4-16	13-25
	18-28	18-40	12-17	7.9-9.0	5-25	0-5	4-16	2-10
	28-38	10-18	5-15	7.9-9.0	3-15	0-5	8-16	2-10
	38-40	23-35	15-30	7.9-9.0	3-15	0-5	8-16	0-5
	40-60	15-45	13-19	7.9-9.0	3-15	0-5	8-16	0-5
106:								
Riverwash----------	0-6	1-5	---	6.1-7.8	---	---	0	---
	6-60	1-10	---	6.1-7.8	---	---	0	---
107D:								
Rhame----------	0-8	10-18	5-15	6.1-7.3	0	0	0	0
	8-26	10-18	5-10	6.6-7.8	0-3	0	0	0
	26-34	10-18	5-10	6.6-8.4	1-10	0	0	0
	34-60	1-10	0-5	7.4-8.4	1-10	0-1	0-2	0
Kremlin----------	0-11	18-27	10-25	6.1-7.8	0	0	0	0
	11-19	18-30	5-20	6.6-7.8	0	0	0	0
	19-60	18-30	5-20	7.4-8.4	5-30	0	0-2	0
Maltese----------	0-7	18-27	15-30	6.1-7.3	0	0-1	0-1	0-1
	7-10	18-27	15-30	6.1-7.3	0	0-1	0-1	0-2
	10-16	40-60	25-45	7.3-8.4	1-3	0-1	0-2	5-10
	16-20	35-50	25-45	7.9-9.0	5-20	0-5	5-15	10-20
	20-33	35-50	25-45	7.9-9.0	3-15	0-5	5-15	10-20
	33-60	15-40	10-30	7.9-9.0	3-15	0-5	5-15	10-20
108D:								
Boxwell----------	0-5	18-27	10-20	6.1-7.3	0	0	0	0
	5-14	18-30	10-25	6.6-7.8	0	0	0-2	0
	14-28	18-27	5-20	7.4-8.4	15-30	0	0-4	0
	28-60	5-35	5-20	7.4-8.4	0-15	0-2	0-4	0-4
Scairt----------	0-2	18-27	15-30	6.1-7.9	0	0-1	0-1	0-5
	2-6	35-55	25-50	7.4-8.4	1-5	0-1	0-5	5-10
	6-13	35-55	25-45	7.9-8.4	1-5	0-5	5-15	10-25
	13-22	18-50	10-40	7.9-8.4	3-15	0-5	5-15	10-25
	22-28	18-50	10-40	7.9-8.4	5-25	0-5	5-15	10-25
	28-60	10-90	5-40	7.9-8.4	1-15	0-5	5-15	10-25
Maltese----------	0-7	18-27	15-30	6.1-7.3	0	0-1	0-1	0-1
	7-10	18-27	15-30	6.1-7.3	0	0-1	0-1	0-2
	10-16	40-60	25-45	7.3-8.4	1-3	0-1	0-2	5-10
	16-20	35-50	25-45	7.9-9.0	5-20	0-5	5-15	10-20
	20-33	35-50	25-45	7.9-9.0	3-15	0-5	5-15	10-20
	33-60	15-40	10-30	7.9-9.0	3-15	0-5	5-15	10-20
109F:								
Rhame----------	0-8	10-18	5-15	6.1-7.3	0	0	0	0
	8-26	10-18	5-10	6.6-7.8	0-3	0	0	0
	26-34	10-18	5-10	6.6-8.4	1-10	0	0	0
	34-60	1-10	0-5	7.4-8.4	1-10	0-1	0-2	0
Arikara----------	0-1	0-5	65-100	6.1-7.3	0	0	0	0
	1-2	18-35	10-30	6.1-7.8	0	0	0	0
	2-14	18-35	10-25	6.1-7.8	0	0	0	0
	14-39	15-35	10-25	7.4-8.4	1-10	0	0-2	0
	39-60	15-35	5-20	7.4-8.4	1-5	0	0-4	0

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	*Pct*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
109F:(cont.)								
Fleak----------	0-3	3-10	1-10	6.6-7.8	0	0	0	0
	3-17	1-10	1-10	6.6-8.4	1-10	0	0	0
	17-60	1-10	0-5	7.4-8.4	1-10	0-1	0-2	0
110C:								
Patent----------	0-7	18-27	5-25	7.4-8.4	5-25	0	0	0
	7-60	15-35	5-25	7.9-8.4	5-30	0	0-4	0-10
Gerda----------	0-2	18-27	15-30	6.1-7.9	0	0-1	0-1	0-1
	2-11	35-55	25-50	7.4-8.4	1-5	0-1	0-5	5-10
	11-19	35-55	25-40	7.9-8.4	5-25	0-5	5-15	2-20
	19-29	30-45	20-40	7.9-8.4	5-25	0-5	5-15	5-20
	29-44	30-50	20-40	7.9-8.4	5-25	0-5	5-15	5-25
	44-80	15-27	10-25	7.9-8.4	3-15	0-5	5-15	5-25
Slickspots----------	0-1	40-60	25-35	7.4-8.4	10-25	0-5	0	0
	1-60	18-50	25-35	7.9-8.4	10-25	0-5	0-10	5-15
111F:								
Lonna----------	0-2	18-27	15-20	7.4-8.4	5-10	0	0-2	0
	2-11	18-35	10-15	7.4-8.4	5-10	0	0-2	0
	11-34	18-35	10-15	7.9-9.0	5-15	0-2	2-8	1-5
	34-60	10-35	5-15	7.9-9.0	5-15	0	2-8	10-30
Arikara----------	0-1	0-5	65-100	6.1-7.3	0	0	0	0
	1-2	18-35	10-30	6.1-7.8	0	0	0	0
	2-14	18-35	10-25	6.1-7.8	0	0	0	0
	14-39	15-35	10-25	7.4-8.4	1-10	0	0-2	0
	39-60	15-35	5-20	7.4-8.4	1-5	0	0-4	0
Cabbart----------	0-3	18-27	10-20	7.4-8.4	1-10	0	0-4	0-10
	3-18	18-35	10-25	7.4-8.4	10-25	0-5	0-8	0-10
	18-60	10-35	5-15	7.4-8.4	0-15	0-15	0-8	0-10
112:								
Wolf Point, wooded---	0-1	27-40	15-35	6.6-7.3	1-10	0	0-2	0
	1-10	35-50	20-40	6.6-7.8	1-10	0	0-2	0
	10-60	30-60	15-50	7.4-8.4	3-25	1-5	2-8	0-2
113:								
Havre, wooded--------	0-10	18-27	10-15	7.4-8.4	1-10	0	0	0
	10-60	18-35	10-15	7.4-8.4	1-10	0	0-2	0
114B:								
Haplustolls----------	0-12	15-27	10-25	6.6-7.8	0-3	0	0	0
	12-19	10-27	5-15	7.4-8.4	1-10	0	0	0
	19-60	10-27	5-15	6.6-7.8	1-3	0	0	0-5
Ustorthents----------	0-3	10-18	5-15	5.6-8.4	0	0	0	0
	3-60	10-18	5-10	6.6-8.4	1-3	0	0	0
115B:								
Cozberg----------	0-7	15-25	10-25	6.6-7.8	0	0	0	0
	7-20	10-18	5-15	6.6-8.4	0	0	0	0
	20-26	10-18	5-15	7.4-8.4	5-15	0	0	0
	26-30	1-10	1-5	7.4-8.4	15-35	0	0-2	0
	30-60	1-10	1-5	7.4-8.4	1-15	0	0-2	0

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	*Pct*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
115B:(cont.)								
Chanta----------	0-6	18-27	10-25	6.1-7.3	0	0	0	0
	6-22	18-30	10-25	6.1-7.8	0	0	0	0
	22-26	10-20	5-15	6.6-8.4	1-3	0	0	0
	26-60	1-10	1-5	7.4-8.4	1-15	0	0	0
116F:								
Kremlin----------	0-11	18-27	10-25	6.1-7.8	0	0	0	0
	11-19	18-30	5-20	6.6-7.8	0	0	0	0
	19-60	18-30	5-20	7.4-8.4	5-30	0	0-2	0
Shibah----------	0-4	18-27	10-25	6.1-7.3	0	0	0	0
	4-8	18-27	10-20	6.6-7.8	1-3	0	0	0
	8-18	18-27	10-20	7.4-8.4	5-20	0	0	0
	18-80	10-30	5-20	7.4-8.4	5-20	0	0	0
117B:								
Kremlin----------	0-11	18-27	10-25	6.1-7.8	0	0	0	0
	11-19	18-30	5-20	6.6-7.8	0	0	0	0
	19-60	18-30	5-20	7.4-8.4	5-30	0	0-2	0
Chanta----------	0-6	18-27	10-25	6.1-7.3	0	0	0	0
	6-22	18-30	10-25	6.1-7.8	0	0	0	0
	22-26	10-20	5-15	6.6-8.4	1-3	0	0	0
	26-60	1-10	1-5	7.4-8.4	1-15	0	0	0
118F:								
Shibah----------	0-4	18-27	10-25	6.1-7.3	0	0	0	0
	4-8	18-27	10-20	6.6-7.8	1-3	0	0	0
	8-18	18-27	10-20	7.4-8.4	5-20	0	0	0
	18-80	10-30	5-20	7.4-8.4	5-20	0	0	0
Rubbleland----------	---	---	---	---	---	---	---	---
Arikara----------	0-1	0-5	65-100	6.1-7.3	0	0	0	0
	1-2	18-35	10-30	6.1-7.8	0	0	0	0
	2-14	18-35	10-25	6.1-7.8	0	0	0	0
	14-39	15-35	10-25	7.4-8.4	1-10	0	0-2	0
	39-60	15-35	5-20	7.4-8.4	1-5	0	0-4	0
119:								
Glendive, wooded-----	0-5	10-18	5-15	6.6-9.0	5-30	0	0-4	0
	5-16	8-18	5-15	7.4-9.0	5-30	0	0-4	0
	16-60	5-18	5-15	7.4-9.0	5-30	0	0-8	0
120B:								
Hanly, wooded--------	0-5	10-18	5-15	6.6-8.4	0	0	0	0
	5-60	1-10	1-5	6.6-8.4	1-5	0	0-2	0
121F:								
Maltese----------	0-7	18-27	15-30	6.1-7.3	0	0-1	0-1	0-1
	7-10	18-27	15-30	6.1-7.3	0	0-1	0-1	0-2
	10-16	40-60	25-45	7.3-8.4	1-3	0-1	0-2	5-10
	16-20	35-50	25-45	7.9-9.0	5-20	0-5	5-15	10-20
	20-33	35-50	25-45	7.9-9.0	3-15	0-5	5-15	10-20
	33-60	15-40	10-30	7.9-9.0	3-15	0-5	5-15	10-20
Lonna----------	0-2	18-27	15-20	7.4-8.4	5-10	0	0-2	0
	2-11	18-35	10-15	7.4-8.4	5-10	0	0-2	0
	11-34	18-35	10-15	7.9-9.0	5-15	0-2	2-8	1-5
	34-60	10-35	5-15	7.9-9.0	5-15	0	2-8	10-30

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	*Pct*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
121F:(cont.)								
Arikara----------	0-1	---	65-100	6.1-7.3	0	0	0	0
	1-2	18-35	10-30	6.1-7.8	0	0	0	0
	2-14	18-35	10-25	6.1-7.8	0	0	0	0
	14-39	15-35	10-25	7.4-8.4	1-10	0	0-2	0
	39-60	15-35	5-20	7.4-8.4	1-5	0	0-4	0
122C:								
Bulltop----------	0-4	18-27	10-25	6.1-7.3	0	0	0	0
	4-15	15-27	10-20	6.6-7.8	1-3	0	0	0
	15-19	15-27	10-20	7.4-7.8	3-15	0	0	0
	19-80	15-27	5-20	7.4-7.8	3-15	0	0	0
Shibah----------	0-4	18-27	10-25	6.1-7.3	0	0	0	0
	4-8	18-27	10-20	6.6-7.8	1-3	0	0	0
	8-18	18-27	10-20	7.4-8.4	5-20	0	0	0
	18-80	10-30	5-20	7.4-8.4	5-20	0	0	0
123E:								
Scairt----------	0-2	18-27	15-30	6.1-7.9	0	0-1	0-1	0-5
	2-6	35-55	25-50	7.4-8.4	1-5	0-1	0-5	5-10
	6-13	35-55	25-45	7.9-8.4	1-5	0-5	5-15	10-25
	13-22	18-50	10-40	7.9-8.4	3-15	0-5	5-15	10-25
	22-28	18-50	10-40	7.9-8.4	5-25	0-5	5-15	10-25
	28-60	10-90	5-40	7.9-8.4	1-15	0-5	5-15	10-25
Maltese----------	0-7	18-27	15-30	6.1-7.3	0	0-1	0-1	0-1
	7-10	18-27	15-30	6.1-7.3	0	0-1	0-1	0-2
	10-16	40-60	25-45	7.3-8.4	1-3	0-1	0-2	5-10
	16-20	35-50	25-45	7.9-9.0	5-20	0-5	5-15	10-20
	20-33	35-50	25-45	7.9-9.0	3-15	0-5	5-15	10-20
	33-60	15-40	10-30	7.9-9.0	3-15	0-5	5-15	10-20
Boxwell----------	0-5	18-27	10-20	6.1-7.3	0	0	0	0
	5-14	18-30	10-25	6.6-7.8	0	0	0-2	0
	14-28	18-27	5-20	7.4-8.4	15-30	0	0-4	0
	28-60	5-35	5-20	7.4-8.4	0-15	0-2	0-4	0-4
152:								
Heil----------	0-3	18-27	15-30	5.6-7.3	0	0	0-2	0
	3-24	45-60	20-35	6.1-9.0	0-5	0	4-16	13-25
	24-38	27-50	15-40	7.4-9.0	3-15	0	4-16	0-5
	38-52	27-50	15-40	7.4-9.0	3-15	0-5	4-16	0-5
	52-60	20-50	10-40	7.4-9.0	3-15	0-5	4-16	0-5
155:								
Dumps and pits, mine-	0-4	27-35	10-25	6.6-8.4	5-20	0-5	0-4	2-10
	4-60	18-35	5-25	6.6-8.4	10-30	1-5	4-16	2-20
159:								
Channel----------	---	---	---	---	---	---	---	---
Straw----------	0-5	18-27	15-30	6.6-7.3	0-1	0	0-2	0
	5-23	18-27	15-30	6.6-7.8	0-5	0	0-2	0
	23-30	18-30	15-25	7.4-8.4	1-10	0	0-2	0
	30-36	18-35	15-25	7.4-8.4	3-10	0	0-2	0
	36-40	18-35	15-25	6.6-8.4	3-10	0	0-4	0-5
	40-66	18-35	15-25	7.4-8.4	3-10	0-2	0-4	0-5

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	*Pct*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
159:(cont.)								
Daglum----------	0-7	18-27	10-30	6.1-7.3	0	0-1	0-1	0-1
	7-8	18-27	10-30	6.1-7.3	0	0-1	0-1	0-2
	8-18	35-60	20-50	7.3-8.4	0-3	0-1	0-2	5-10
	18-32	35-60	20-50	7.9-9.0	3-15	0-5	5-15	10-20
	32-47	35-60	20-50	7.9-9.0	5-25	0-5	5-15	10-20
	47-60	20-45	10-40	7.9-9.0	3-15	0-5	5-15	10-20
175:								
Havre, rarely flooded	0-10	18-27	10-15	7.4-8.4	1-10	0	0	0
	10-60	18-35	10-15	7.4-8.4	1-10	0	0-2	0
177:								
Glendive, rarely flooded----------	0-5	10-18	5-15	6.6-9.0	5-30	0	0-4	0
	5-16	8-18	5-15	7.4-9.0	5-30	0	0-4	0
	16-60	5-18	5-15	7.4-9.0	5-30	0	0-8	0
183:								
Badland, high precipitation-------	0-60	10-60	5-40	6.1-9.0	2-15	0-3	2-16	2-30
205:								
Harriet, low precipitation-------	0-2	12-27	13-23	6.6-8.4	0-5	0	0-2	0
	2-18	35-50	17-26	7.4-9.0	1-15	0-5	4-16	13-25
	18-28	18-40	12-17	7.9-9.0	5-25	0-5	4-16	2-10
	28-38	10-18	5-15	7.9-9.0	3-15	0-5	8-16	2-10
	38-40	23-35	15-30	7.9-9.0	3-15	0-5	8-16	0-5
	40-60	15-45	13-19	7.9-9.0	3-15	0-5	8-16	0-5
210C:								
Lambert----------	0-5	18-27	5-25	7.4-8.4	5-25	0	0	0
	5-36	18-35	5-25	7.9-8.4	5-30	0	0-2	0
	36-60	15-35	5-25	7.9-8.4	5-30	0	0-4	0-10
Slickspots----------	0-1	40-60	25-35	7.4-8.4	10-25	0-5	0	0
	1-60	18-50	25-35	7.9-8.4	10-25	0-5	0-10	5-15
Rhoades----------	0-3	18-27	20-35	6.1-7.9	0	0-1	0-1	0-1
	3-8	35-50	20-45	7.4-8.4	0-5	0-1	0-5	5-10
	8-14	35-50	20-45	7.9-8.4	3-15	0-5	5-15	2-20
	14-46	20-50	15-35	7.9-8.4	3-15	0-5	5-15	5-25
	46-60	20-45	15-35	7.9-8.4	5-25	0-5	5-15	5-25
255:								
Pits, gravel and sand, low precipitation-------	0-6	1-10	2-12	6.6-8.4	0-3	0	0	0
	6-60	1-15	1-10	6.6-8.4	5-20	0	0	0
M-W:								
Miscellaneous water--	---	---	---	---	---	---	---	---
W:								
Water----------	---	---	---	---	---	---	---	---

Water Features

(Dashes (—) indicate that an assignment has not been made. Depths of layers are in feet.)

Map symbol and soil name	Hydro-logic group	Month	Water Table: Upper limit	Water Table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
3:									
Peta	B								
		January	3.5-5.0	> 6.0	—	—	—	—	—
		February	3.5-5.0	> 6.0	—	—	—	—	—
		March	1.5-3.5	> 6.0	—	—	—	—	—
		April	1.5-3.5	> 6.0	—	—	—	—	—
		May	1.5-3.5	> 6.0	—	—	—	—	—
		June	1.5-3.5	> 6.0	—	—	—	—	—
		July	3.5-5.0	> 6.0	—	—	—	—	—
		October	3.5-5.0	> 6.0	—	—	—	—	—
		November	3.5-5.0	> 6.0	—	—	—	—	—
		December	3.5-5.0	> 6.0	—	—	—	—	—
5:									
Savage	C								
		All months	—	—	—	—	—	—	—
5B:									
Savage	C								
		All months	—	—	—	—	—	—	—
6:									
Regan	C/D								
		January	1.5-3.5	> 6.0	—	—	—	—	—
		February	1.5-3.5	> 6.0	—	—	—	—	—
		March	0.0-1.5	> 6.0	—	—	—	Brief	Occasional
		April	0.0-1.5	> 6.0	—	—	—	Brief	Occasional
		May	0.0-1.5	> 6.0	—	—	—	Brief	Occasional
		June	0.0-1.5	> 6.0	—	—	—	Brief	Occasional
		July	1.5-3.5	> 6.0	—	—	—	—	—
		August	3.5-5.0	> 6.0	—	—	—	—	—
		September	3.5-5.0	> 6.0	—	—	—	—	—
		October	1.5-3.5	> 6.0	—	—	—	—	—
		November	1.5-3.5	> 6.0	—	—	—	—	—
		December	1.5-3.5	> 6.0	—	—	—	—	—
7:									
Arnegard	B								
		All months	—	—	—	—	—	—	—
9F:									
Cabba	D								
		All months	—	—	—	—	—	—	—

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water Table: Upper limit	Water Table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
9F:(cont.)									
Sen	B								
		All months	–	–	–	–	–	–	–
Chama	B								
		All months	–	–	–	–	–	–	–
12B:									
Rhoades	D								
		April	3.5-5.0	> 6.0	–	–	–	–	–
		May	3.5-5.0	> 6.0	–	–	–	–	–
		June	3.5-5.0	> 6.0	–	–	–	–	–
Daglum	D								
		April	3.5-5.0	> 6.0	–	–	–	–	–
		May	3.5-5.0	> 6.0	–	–	–	–	–
		June	3.5-5.0	> 6.0	–	–	–	–	–
13B:									
Dogtooth	D								
		All months	–	–	–	–	–	–	–
Janesburg	D								
		All months	–	–	–	–	–	–	–
13D:									
Dogtooth	D								
		All months	–	–	–	–	–	–	–
Janesburg	D								
		All months	–	–	–	–	–	–	–
14E:									
Amor	B								
		All months	–	–	–	–	–	–	–
Brandenburg	A								
		All months	–	–	–	–	–	–	–
15B:									
Daglum	D								
		April	3.5-5.0	> 6.0	–	–	–	–	–
		May	3.5-5.0	> 6.0	–	–	–	–	–
		June	3.5-5.0	> 6.0	–	–	–	–	–

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water Table: Upper limit	Water Table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
15B:(cont.)									
Rhoades	D								
		April	3.5-5.0	> 6.0	–	–	–	–	–
		May	3.5-5.0	> 6.0	–	–	–	–	–
		June	3.5-5.0	> 6.0	–	–	–	–	–
17:									
Amor	B								
		All months	–	–	–	–	–	–	–
Arnegard	B								
		All months	–	–	–	–	–	–	–
17B:									
Amor	B								
		All months	–	–	–	–	–	–	–
Shambo	B								
		All months	–	–	–	–	–	–	–
17C:									
Amor	B								
		All months	–	–	–	–	–	–	–
Cabba	D								
		All months	–	–	–	–	–	–	–
17D:									
Amor	B								
		All months	–	–	–	–	–	–	–
Cabba	D								
		All months	–	–	–	–	–	–	–
18E:									
Manning	B								
		All months	–	–	–	–	–	–	–
Schaller	A								
		All months	–	–	–	–	–	–	–
Wabek	A								
		All months	–	–	–	–	–	–	–
19:									
Sen	B								
		All months	–	–	–	–	–	–	–

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water Table: Upper limit	Water Table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
19:(cont.)									
Golva	B								
		All months	–	–	–	–	–	–	–
19B:									
Chama	B								
		All months	–	–	–	–	–	–	–
Sen	B								
		All months	–	–	–	–	–	–	–
Cabba	D								
		All months	–	–	–	–	–	–	–
19C:									
Chama	B								
		All months	–	–	–	–	–	–	–
Cabba	D								
		All months	–	–	–	–	–	–	–
Sen	B								
		All months	–	–	–	–	–	–	–
19D:									
Cabba	D								
		All months	–	–	–	–	–	–	–
Chama	B								
		All months	–	–	–	–	–	–	–
Sen	B								
		All months	–	–	–	–	–	–	–
21B:									
Parshall	B								
		All months	–	–	–	–	–	–	–
22B:									
Regent	C								
		All months	–	–	–	–	–	–	–
Savage	C								
		All months	–	–	–	–	–	–	–

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water Table: Upper limit	Water Table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
24B:									
Janesburg	D								
		All months	–	–	–	–	–	–	–
25B:									
Lefor	C								
		All months	–	–	–	–	–	–	–
27F:									
Badland, outcrop	D								
		All months	–	–	–	–	–	–	–
Lambert	B								
		March	–	–	–	–	–	Very brief	Occasional
		April	–	–	–	–	–	Very brief	Occasional
		May	–	–	–	–	–	Very brief	Occasional
		June	–	–	–	–	–	Very brief	Occasional
		July	–	–	–	–	–	Very brief	Occasional
		August	–	–	–	–	–	Very brief	Occasional
		September	–	–	–	–	–	Very brief	Occasional
		October	–	–	–	–	–	Very brief	Occasional
		November	–	–	–	–	–	Very brief	Occasional
Cabba	D								
		All months	–	–	–	–	–	–	–
28F:									
Flasher	D								
		All months	–	–	–	–	–	–	–
Rock outcrop	D								
		All months	–	–	–	–	–	–	–
Vebar	B								
		All months	–	–	–	–	–	–	–
29F:									
Arikara	B								
		All months	–	–	–	–	–	–	–
Shambo	B								
		All months	–	–	–	–	–	–	–
Cabba	D								
		All months	–	–	–	–	–	–	–

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water Table: Upper limit	Water Table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
30F:									
Vebar, extremely stony----	B								
		All months	–	–	–	–	–	–	–
Amor, extremely stony-----	B								
		All months	–	–	–	–	–	–	–
31B:									
Sen----------	B								
		All months	–	–	–	–	–	–	–
Janesburg----------	D								
		All months	–	–	–	–	–	–	–
31C:									
Sen----------	B								
		All months	–	–	–	–	–	–	–
Janesburg----------	D								
		All months	–	–	–	–	–	–	–
35F:									
Flasher----------	D								
		All months	–	–	–	–	–	–	–
Vebar----------	B								
		All months	–	–	–	–	–	–	–
Parshall----------	B								
		All months	–	–	–	–	–	–	–
36B:									
Ekalaka----------	D								
		All months	–	–	–	–	–	–	–
Parshall----------	B								
		All months	–	–	–	–	–	–	–
Desart----------	C								
		All months	–	–	–	–	–	–	–
37B:									
Farfeld----------	D								
		All months	–	–	–	–	–	–	–
Cedarpan----------	D								
		All months	–	–	–	–	–	–	–

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water Table: Upper limit	Water Table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
37F:									
Cedarpan	D								
		All months	–	–	–	–	–	–	–
Slickspots, stony	D								
		March	–	–	–	–	–	Very brief	Occasional
		April	–	–	–	–	–	Very brief	Occasional
		May	–	–	–	–	–	Very brief	Occasional
		June	–	–	–	–	–	Very brief	Occasional
		July	–	–	–	–	–	Very brief	Occasional
		August	–	–	–	–	–	Very brief	Occasional
		September	–	–	–	–	–	Very brief	Occasional
		October	–	–	–	–	–	Very brief	Occasional
		November	–	–	–	–	–	Very brief	Occasional
Farfeld	D								
		All months	–	–	–	–	–	–	–
41C:									
Wayden	D								
		All months	–	–	–	–	–	–	–
Moreau	D								
		All months	–	–	–	–	–	–	–
42B:									
Searing	B								
		All months	–	–	–	–	–	–	–
Ringling	A								
		All months	–	–	–	–	–	–	–
43:									
Belfield	C								
		April	3.5-5.0	> 6.0	–	–	–	–	–
		May	3.5-5.0	> 6.0	–	–	–	–	–
		June	3.5-5.0	> 6.0	–	–	–	–	–
Grail	C								
		April	3.5-5.0	> 6.0	–	–	–	–	–
		May	3.5-5.0	> 6.0	–	–	–	–	–
		June	3.5-5.0	> 6.0	–	–	–	–	–
44:									
Shambo	B								
		All months	–	–	–	–	–	–	–

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water Table: Upper limit	Water Table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
44B:									
Shambo	B								
		All months	–	–	–	–	–	–	–
47:									
Stady	B								
		All months	–	–	–	–	–	–	–
48B:									
Manning	B								
		All months	–	–	–	–	–	–	–
49B:									
Lihen	A								
		All months	–	–	–	–	–	–	–
Parshall	B								
		All months	–	–	–	–	–	–	–
51B:									
Janesburg	D								
		All months	–	–	–	–	–	–	–
Dogtooth	D								
		All months	–	–	–	–	–	–	–
52:									
Heil	D								
		January	1.5-3.5	> 6.0	–	–	None	–	–
		February	1.5-3.5	> 6.0	–	–	None	–	–
		March	0.0-1.5	> 6.0	0.0-1.0	Very long	Frequent	–	–
		April	0.0-1.5	> 6.0	0.0-1.0	Very long	Frequent	–	–
		May	0.0-1.5	> 6.0	0.0-1.0	Very long	Frequent	–	–
		June	0.0-1.5	> 6.0	0.0-1.0	Very long	Frequent	–	–
		July	1.5-3.5	> 6.0	–	–	None	–	–
		August	3.5-5.0	> 6.0	–	–	None	–	–
		September	3.5-5.0	> 6.0	–	–	None	–	–
		October	1.5-3.5	> 6.0	–	–	None	–	–
		November	1.5-3.5	> 6.0	–	–	None	–	–
		December	1.5-3.5	> 6.0	–	–	None	–	–
53B:									
Savage	C								
		All months	–	–	–	–	–	–	–

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water Table: Upper limit	Water Table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
53B:(cont.)									
Daglum	D								
		April	3.5-5.0	> 6.0	—	—	—	—	—
		May	3.5-5.0	> 6.0	—	—	—	—	—
		June	3.5-5.0	> 6.0	—	—	—	—	—
54:									
Channel	—								
		March	—	—	—	—	—	Long	Very frequent
		April	3.5-5.0	> 6.0	—	—	—	Brief	Very frequent
		May	3.5-5.0	> 6.0	—	—	—	Brief	Very frequent
		June	3.5-5.0	> 6.0	—	—	—	Brief	Frequent
		July	—	—	—	—	—	Very brief	Rare
		August	—	—	—	—	—	Very brief	Rare
		September	—	—	—	—	—	Very brief	Occasional
		October	—	—	—	—	—	Very brief	Occasional
Straw	B								
		March	—	—	—	—	—	Brief	Frequent
		April	3.5-5.0	> 6.0	—	—	—	Brief	Frequent
		May	3.5-5.0	> 6.0	—	—	—	Brief	Frequent
		June	3.5-5.0	> 6.0	—	—	—	Brief	Occasional
55:									
Pits, gravel and sand	A								
		All months	—	—	—	—	—	—	—
57:									
Straw	B								
		March	—	—	—	—	—	Brief	Rare
		April	—	—	—	—	—	Brief	Rare
		May	—	—	—	—	—	Brief	Rare
		June	—	—	—	—	—	Brief	Rare
Rhoades	D								
		April	3.5-5.0	> 6.0	—	—	—	—	—
		May	3.5-5.0	> 6.0	—	—	—	—	—
		June	3.5-5.0	> 6.0	—	—	—	—	—
Daglum	D								
		April	3.5-5.0	> 6.0	—	—	—	—	—
		May	3.5-5.0	> 6.0	—	—	—	—	—
		June	3.5-5.0	> 6.0	—	—	—	—	—

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water Table: Upper limit	Water Table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
58:									
Straw	B								
		March	–	–	–	–	–	Brief	Rare
		April	–	–	–	–	–	Brief	Rare
		May	–	–	–	–	–	Brief	Rare
		June	–	–	–	–	–	Brief	Rare
60:									
Korell	B								
		March	–	–	–	–	–	Brief	Rare
		April	–	–	–	–	–	Brief	Rare
		May	–	–	–	–	–	Brief	Rare
		June	–	–	–	–	–	Brief	Rare
62F:									
Dogtooth	D								
		All months	–	–	–	–	–	–	–
Janesburg	D								
		All months	–	–	–	–	–	–	–
Brandenburg	A								
		All months	–	–	–	–	–	–	–
63F:									
Dogtooth	D								
		All months	–	–	–	–	–	–	–
Janesburg	D								
		All months	–	–	–	–	–	–	–
Cabba	D								
		All months	–	–	–	–	–	–	–
65:									
Channel	–								
		March	–	–	–	–	–	Brief	Frequent
		April	3.5-5.0	> 6.0	–	–	–	Very brief	Frequent
		May	3.5-5.0	> 6.0	–	–	–	Very brief	Frequent
		June	3.5-5.0	> 6.0	–	–	–	Very brief	Occasional
		July	–	–	–	–	–	Very brief	Very rare
		August	–	–	–	–	–	Very brief	Very rare
		September	–	–	–	–	–	Very brief	Very rare
		October	–	–	–	–	–	Very brief	Very rare

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water Table: Upper limit	Water Table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
65:(cont.)									
Banks	A								
		March	–	–	–	–	–	Brief	Frequent
		April	–	–	–	–	–	Brief	Frequent
		May	–	–	–	–	–	Brief	Frequent
		June	–	–	–	–	–	Brief	Frequent
Trembles	B								
		March	–	–	–	–	–	Brief	Frequent
		April	–	–	–	–	–	Brief	Frequent
		May	–	–	–	–	–	Brief	Frequent
		June	–	–	–	–	–	Brief	Frequent
66B:									
Stady	B								
		All months	–	–	–	–	–	–	–
67B:									
Evridge	D								
		All months	–	–	–	–	–	–	–
Desart	C								
		All months	–	–	–	–	–	–	–
Telfer	A								
		All months	–	–	–	–	–	–	–
68F:									
Cabbart	D								
		All months	–	–	–	–	–	–	–
Badland, outcrop	D								
		All months	–	–	–	–	–	–	–
69F:									
Patent	B								
		March	–	–	–	–	–	Very brief	Occasional
		April	–	–	–	–	–	Very brief	Occasional
		May	–	–	–	–	–	Very brief	Occasional
		June	–	–	–	–	–	Very brief	Occasional
		July	–	–	–	–	–	Very brief	Occasional
		August	–	–	–	–	–	Very brief	Occasional
		September	–	–	–	–	–	Very brief	Occasional
		October	–	–	–	–	–	Very brief	Occasional
		November	–	–	–	–	–	Very brief	Occasional

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water Table: Upper limit	Water Table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
69F:(cont.)									
Badland, outcrop	D								
		All months	–	–	–	–	–	–	–
Cabbart	D								
		All months	–	–	–	–	–	–	–
70B:									
Maltese	D								
		All months	–	–	–	–	–	–	–
Gerda	D								
		All months	–	–	–	–	–	–	–
71B:									
Chinook	B								
		All months	–	–	–	–	–	–	–
Rhame	B								
		All months	–	–	–	–	–	–	–
71D:									
Rhame	B								
		All months	–	–	–	–	–	–	–
Chinook	B								
		All months	–	–	–	–	–	–	–
72F:									
Rhame	B								
		All months	–	–	–	–	–	–	–
Fleak	D								
		All months	–	–	–	–	–	–	–
73D:									
Gerda	D								
		All months	–	–	–	–	–	–	–
Kirby	A								
		All months	–	–	–	–	–	–	–

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water Table: Upper limit	Water Table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
74:									
Channel	–								
		March	–	–	–	–	–	Long	Very frequent
		April	3.5-5.0	> 6.0	–	–	–	Brief	Very frequent
		May	3.5-5.0	> 6.0	–	–	–	Brief	Very frequent
		June	3.5-5.0	> 6.0	–	–	–	Brief	Frequent
		July	–	–	–	–	–	Very brief	Occasional
		August	–	–	–	–	–	Very brief	Occasional
		September	–	–	–	–	–	Very brief	Occasional
		October	–	–	–	–	–	Very brief	Occasional
Glendive	B								
		March	–	–	–	–	–	Brief	Rare
		April	–	–	–	–	–	Brief	Rare
		May	–	–	–	–	–	Brief	Rare
		June	–	–	–	–	–	Brief	Rare
Havre	B								
		March	–	–	–	–	–	Brief	Rare
		April	–	–	–	–	–	Brief	Rare
		May	–	–	–	–	–	Brief	Rare
		June	–	–	–	–	–	Brief	Rare
75:									
Havre	B								
		March	–	–	–	–	–	Brief	Occasional
		April	–	–	–	–	–	Brief	Occasional
		May	–	–	–	–	–	Brief	Occasional
		June	–	–	–	–	–	Brief	Occasional
76B:									
Lonna	B								
		All months	–	–	–	–	–	–	–
76C:									
Lonna	B								
		All months	–	–	–	–	–	–	–
77:									
Glendive	B								
		March	–	–	–	–	–	Brief	Occasional
		April	–	–	–	–	–	Brief	Occasional
		May	–	–	–	–	–	Brief	Occasional
		June	–	–	–	–	–	Brief	Occasional

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water Table: Upper limit	Water Table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
78B:									
Hanly	A								
		March	–	–	–	–	–	Brief	Occasional
		April	–	–	–	–	–	Brief	Occasional
		May	–	–	–	–	–	Brief	Occasional
		June	–	–	–	–	–	Brief	Occasional
79C:									
Zeona	A								
		All months	–	–	–	–	–	–	–
80:									
Ethridge	C								
		All months	–	–	–	–	–	–	–
81B:									
Vebar	B								
		All months	–	–	–	–	–	–	–
Parshall	B								
		All months	–	–	–	–	–	–	–
81C:									
Vebar	B								
		All months	–	–	–	–	–	–	–
Tally	B								
		All months	–	–	–	–	–	–	–
81D:									
Vebar	B								
		All months	–	–	–	–	–	–	–
Flasher	D								
		All months	–	–	–	–	–	–	–
Tally	B								
		All months	–	–	–	–	–	–	–
82E:									
Badland, outcrop	D								
		All months	–	–	–	–	–	–	–

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water Table: Upper limit	Water Table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
82E:(cont.)									
Patent	B								
		March	–	–	–	–	–	Very brief	Occasional
		April	–	–	–	–	–	Very brief	Occasional
		May	–	–	–	–	–	Very brief	Occasional
		June	–	–	–	–	–	Very brief	Occasional
		July	–	–	–	–	–	Very brief	Occasional
		August	–	–	–	–	–	Very brief	Occasional
		September	–	–	–	–	–	Very brief	Occasional
		October	–	–	–	–	–	Very brief	Occasional
		November	–	–	–	–	–	Very brief	Occasional
83:									
Badland	D								
		All months	–	–	–	–	–	–	–
85F:									
Lonna	B								
		All months	–	–	–	–	–	–	–
Cabbart	D								
		All months	–	–	–	–	–	–	–
86F:									
Kirby	A								
		All months	–	–	–	–	–	–	–
Badland, outcrop	D								
		All months	–	–	–	–	–	–	–
Patent	B								
		March	–	–	–	–	–	Very brief	Occasional
		April	–	–	–	–	–	Very brief	Occasional
		May	–	–	–	–	–	Very brief	Occasional
		June	–	–	–	–	–	Very brief	Occasional
		July	–	–	–	–	–	Very brief	Occasional
		August	–	–	–	–	–	Very brief	Occasional
		September	–	–	–	–	–	Very brief	Occasional
		October	–	–	–	–	–	Very brief	Occasional
		November	–	–	–	–	–	Very brief	Occasional
88:									
Littlemo	B								
		All months	–	–	–	–	–	–	–
Chanta	B								
		All months	–	–	–	–	–	–	–

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water Table: Upper limit	Water Table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
89B:									
Patent	B								
		March	–	–	–	–	–	Very brief	Occasional
		April	–	–	–	–	–	Very brief	Occasional
		May	–	–	–	–	–	Very brief	Occasional
		June	–	–	–	–	–	Very brief	Occasional
		July	–	–	–	–	–	Very brief	Occasional
		August	–	–	–	–	–	Very brief	Occasional
		September	–	–	–	–	–	Very brief	Occasional
		October	–	–	–	–	–	Very brief	Occasional
		November	–	–	–	–	–	Very brief	Occasional
91F:									
Lonna	B								
		All months	–	–	–	–	–	–	–
Kirby	A								
		All months	–	–	–	–	–	–	–
Cabbart	D								
		All months	–	–	–	–	–	–	–
92B:									
Kremlin	B								
		All months	–	–	–	–	–	–	–
Ethridge	C								
		All months	–	–	–	–	–	–	–
Gerda	D								
		All months	–	–	–	–	–	–	–
94F:									
Kirby	A								
		All months	–	–	–	–	–	–	–
Arikara	B								
		All months	–	–	–	–	–	–	–
Badland, outcrop	D								
		All months	–	–	–	–	–	–	–
95F:									
Tinsley	A								
		All months	–	–	–	–	–	–	–

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water Table: Upper limit	Water Table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
95F:(cont.)									
Chanta	B								
		All months	–	–	–	–	–	–	–
97:									
Kremlin	B								
		All months	–	–	–	–	–	–	–
98:									
Wolf Point	C								
		March	–	–	–	–	–	Brief	Occasional
		April	–	–	–	–	–	Brief	Occasional
		May	–	–	–	–	–	Brief	Occasional
		June	–	–	–	–	–	Brief	Occasional
99F:									
Badland, outcrop	D								
		All months	–	–	–	–	–	–	–
Cabbart	D								
		All months	–	–	–	–	–	–	–
100C:									
Patent	B								
		March	–	–	–	–	–	Very brief	Occasional
		April	–	–	–	–	–	Very brief	Occasional
		May	–	–	–	–	–	Very brief	Occasional
		June	–	–	–	–	–	Very brief	Occasional
		July	–	–	–	–	–	Very brief	Occasional
		August	–	–	–	–	–	Very brief	Occasional
		September	–	–	–	–	–	Very brief	Occasional
		October	–	–	–	–	–	Very brief	Occasional
		November	–	–	–	–	–	Very brief	Occasional
Gullied land	D								
		All months	–	–	–	–	–	–	–
Glendive	B								
		March	–	–	–	–	–	Brief	Occasional
		April	–	–	–	–	–	Brief	Occasional
		May	–	–	–	–	–	Brief	Occasional
		June	–	–	–	–	–	Brief	Occasional
101F:									
Boxwell	B								
		All months	–	–	–	–	–	–	–

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water Table: Upper limit	Water Table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
101F:(cont.)									
Cabbart	D								
		All months	–	–	–	–	–	–	–
Arikara	B								
		All months	–	–	–	–	–	–	–
102B:									
Boxwell	B								
		All months	–	–	–	–	–	–	–
Kremlin	B								
		All months	–	–	–	–	–	–	–
102D:									
Boxwell	B								
		All months	–	–	–	–	–	–	–
Kremlin	B								
		All months	–	–	–	–	–	–	–
103F:									
Badland, outcrop	D								
		All months	–	–	–	–	–	–	–
Arikara	B								
		All months	–	–	–	–	–	–	–
Cabbart	D								
		All months	–	–	–	–	–	–	–
105:									
Harriet	D								
		January	1.5-3.5	> 6.0	–	–	–	–	–
		February	1.5-3.5	> 6.0	–	–	–	–	–
		March	0.0-1.5	> 6.0	–	–	–	Brief	Occasional
		April	0.0-1.5	> 6.0	–	–	–	Brief	Occasional
		May	0.0-1.5	> 6.0	–	–	–	Brief	Occasional
		June	0.0-1.5	> 6.0	–	–	–	Very brief	Occasional
		July	1.5-3.5	> 6.0	–	–	–	–	–
		August	3.5-5.0	> 6.0	–	–	–	–	–
		September	3.5-5.0	> 6.0	–	–	–	–	–
		October	1.5-3.5	> 6.0	–	–	–	–	–
		November	1.5-3.5	> 6.0	–	–	–	–	–
		December	1.5-3.5	> 6.0	–	–	–	–	–

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water Table: Upper limit	Water Table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
106:									
Riverwash	D								
		January	0.0-2.0	> 6.0	—	—	—	—	—
		February	0.0-2.0	> 6.0	—	—	—	—	—
		March	0.0-2.0	> 6.0	—	—	—	Very long	Frequent
		April	0.0-2.0	> 6.0	—	—	—	Very long	Frequent
		May	0.0-2.0	> 6.0	—	—	—	Very long	Frequent
		June	0.0-2.0	> 6.0	—	—	—	Very long	Frequent
		July	0.0-2.0	> 6.0	—	—	—	Very long	Frequent
		August	0.0-2.0	> 6.0	—	—	—	Very long	Frequent
		September	0.0-2.0	> 6.0	—	—	—	Very long	Frequent
		October	0.0-2.0	> 6.0	—	—	—	Very long	Frequent
		November	0.0-2.0	> 6.0	—	—	—	Very long	Frequent
		December	0.0-2.0	> 6.0	—	—	—	—	—
107D:									
Rhame	B								
		All months	—	—	—	—	—	—	—
Kremlin	B								
		All months	—	—	—	—	—	—	—
Maltese	D								
		All months	—	—	—	—	—	—	—
108D:									
Boxwell	B								
		All months	—	—	—	—	—	—	—
Scairt	D								
		All months	—	—	—	—	—	—	—
Maltese	D								
		All months	—	—	—	—	—	—	—
109F:									
Rhame	B								
		All months	—	—	—	—	—	—	—
Arikara	B								
		All months	—	—	—	—	—	—	—
Fleak	D								
		All months	—	—	—	—	—	—	—

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water Table: Upper limit	Water Table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
110C:									
Patent	B								
		March	–	–	–	–	–	Very brief	Occasional
		April	–	–	–	–	–	Very brief	Occasional
		May	–	–	–	–	–	Very brief	Occasional
		June	–	–	–	–	–	Very brief	Occasional
		July	–	–	–	–	–	Very brief	Occasional
		August	–	–	–	–	–	Very brief	Occasional
		September	–	–	–	–	–	Very brief	Occasional
		October	–	–	–	–	–	Very brief	Occasional
		November	–	–	–	–	–	Very brief	Occasional
Gerda	D								
		All months	–	–	–	–	–	–	–
Slickspots	D								
		March	–	–	–	–	–	Very brief	Occasional
		April	–	–	–	–	–	Very brief	Occasional
		May	–	–	–	–	–	Very brief	Occasional
		June	–	–	–	–	–	Very brief	Occasional
		July	–	–	–	–	–	Very brief	Occasional
		August	–	–	–	–	–	Very brief	Occasional
		September	–	–	–	–	–	Very brief	Occasional
		October	–	–	–	–	–	Very brief	Occasional
		November	–	–	–	–	–	Very brief	Occasional
111F:									
Lonna	B								
		All months	–	–	–	–	–	–	–
Arikara	B								
		All months	–	–	–	–	–	–	–
Cabbart	D								
		All months	–	–	–	–	–	–	–
112:									
Wolf Point, wooded	C								
		March	4.0-6.0	> 6.0	–	–	–	Brief	Occasional
		April	4.0-6.0	> 6.0	–	–	–	Brief	Occasional
		May	4.0-6.0	> 6.0	–	–	–	Brief	Occasional
		June	4.0-6.0	> 6.0	–	–	–	Brief	Occasional

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water Table: Upper limit	Water Table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
113:									
Havre, wooded	B								
		March	4.0-6.0	> 6.0	—	—	—	Brief	Occasional
		April	4.0-6.0	> 6.0	—	—	—	Brief	Occasional
		May	4.0-6.0	> 6.0	—	—	—	Brief	Occasional
		June	4.0-6.0	> 6.0	—	—	—	Brief	Occasional
114B:									
Haplustolls	B								
		All months	—	—	—	—	—	—	—
Ustorthents	B								
		All months	—	—	—	—	—	—	—
115B:									
Cozberg	B								
		All months	—	—	—	—	—	—	—
Chanta	B								
		All months	—	—	—	—	—	—	—
116F:									
Kremlin	B								
		All months	—	—	—	—	—	—	—
Shibah	B								
		All months	—	—	—	—	—	—	—
117B:									
Kremlin	B								
		All months	—	—	—	—	—	—	—
Chanta	B								
		All months	—	—	—	—	—	—	—
118F:									
Shibah	B								
		All months	—	—	—	—	—	—	—
Rubbleland	D								
		All months	—	—	—	—	—	—	—
Arikara	B								
		All months	—	—	—	—	—	—	—

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water Table: Upper limit	Water Table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
119:									
Glendive, wooded----------	B								
		March	4.0-6.0	> 6.0	—	—	—	Brief	Occasional
		April	4.0-6.0	> 6.0	—	—	—	Brief	Occasional
		May	4.0-6.0	> 6.0	—	—	—	Brief	Occasional
		June	4.0-6.0	> 6.0	—	—	—	Brief	Occasional
120B:									
Hanly, wooded----------	A								
		March	4.0-6.0	> 6.0	—	—	—	Brief	Occasional
		April	4.0-6.0	> 6.0	—	—	—	Brief	Occasional
		May	4.0-6.0	> 6.0	—	—	—	Brief	Occasional
		June	4.0-6.0	> 6.0	—	—	—	Brief	Occasional
121F:									
Maltese----------	D								
		All months	—	—	—	—	—	—	—
Lonna----------	B								
		All months	—	—	—	—	—	—	—
Arikara----------	B								
		All months	—	—	—	—	—	—	—
122C:									
Bulltop----------	B								
		All months	—	—	—	—	—	—	—
Shibah----------	B								
		All months	—	—	—	—	—	—	—
123E:									
Scairt----------	D								
		All months	—	—	—	—	—	—	—
Maltese----------	D								
		All months	—	—	—	—	—	—	—
Boxwell----------	B								
		All months	—	—	—	—	—	—	—

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water Table: Upper limit	Water Table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
152:									
Heil	D								
		January	1.5-3.5	> 6.0	—	—	None	—	—
		February	1.5-3.5	> 6.0	—	—	None	—	—
		March	1.5-3.5	> 6.0	0.0-1.0	Very long	Frequent	—	—
			0.0	0.1-0.3					
		April	0.0-1.5	> 6.0	0.0-1.0	Very long	Frequent	—	—
		May	0.0-1.5	> 6.0	0.0-1.0	Very long	Frequent	—	—
		June	0.0-1.5	> 6.0	0.0-1.0	Very long	Frequent	—	—
		July	1.5-3.5	> 6.0	—	—	None	—	—
		August	3.5-5.0	> 6.0	—	—	None	—	—
		September	3.5-5.0	> 6.0	—	—	None	—	—
		October	1.5-3.5	> 6.0	—	—	None	—	—
		November	1.5-3.5	> 6.0	—	—	None	—	—
		December	1.5-3.5	> 6.0	—	—	None	—	—
155:									
Dumps and pits, mine	C								
		All months	—	—	—	—	—	—	—
159:									
Channel	—								
		March	—	—	—	—	—	Long	Very frequent
		April	3.5-5.0	> 6.0	—	—	—	Brief	Very frequent
		May	3.5-5.0	> 6.0	—	—	—	Brief	Very frequent
		June	3.5-5.0	> 6.0	—	—	—	Brief	Frequent
		July	—	—	—	—	—	Very brief	Rare
		August	—	—	—	—	—	Very brief	Rare
		September	—	—	—	—	—	Very brief	Occasional
		October	—	—	—	—	—	Very brief	Occasional
Straw	B								
		March	—	—	—	—	—	Brief	Frequent
		April	3.5-5.0	> 6.0	—	—	—	Brief	Frequent
		May	3.5-5.0	> 6.0	—	—	—	Brief	Frequent
		June	3.5-5.0	> 6.0	—	—	—	Brief	Occasional
Daglum	D								
		April	3.5-5.0	> 6.0	—	—	—	—	—
		May	3.5-5.0	> 6.0	—	—	—	—	—
		June	3.5-5.0	> 6.0	—	—	—	—	—

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water Table: Upper limit	Water Table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
175:									
Havre, rarely flooded-----	B								
		March	–	–	–	–	–	Brief	Rare
		April	–	–	–	–	–	Brief	Rare
		May	–	–	–	–	–	Brief	Rare
		June	–	–	–	–	–	Brief	Rare
177:									
Glendive, rarely flooded--	B								
		March	–	–	–	–	–	Brief	Rare
		April	–	–	–	–	–	Brief	Rare
		May	–	–	–	–	–	Brief	Rare
		June	–	–	–	–	–	Brief	Rare
183:									
Badland, high precipitation----------	D								
		All months	–	–	–	–	–	–	–
205:									
Harriet, low precipitation----------	D								
		January	0.0-1.0	> 6.0	–	–	–	–	–
		February	0.0-1.0	> 6.0	–	–	–	–	–
		March	0.0-1.0	> 6.0	–	–	–	–	–
		April	0.0-1.0	> 6.0	–	–	–	Long	Occasional
		May	0.0-1.0	> 6.0	–	–	–	Long	Occasional
		June	0.0-1.0	> 6.0	–	–	–	Long	Occasional
		September	0.0-1.0	> 6.0	–	–	–	–	–
		October	0.0-1.0	> 6.0	–	–	–	–	–
		November	0.0-1.0	> 6.0	–	–	–	–	–
		December	0.0-1.0	> 6.0	–	–	–	–	–
210C:									
Lambert----------	B								
		March	–	–	–	–	–	Very brief	Occasional
		April	–	–	–	–	–	Very brief	Occasional
		May	–	–	–	–	–	Very brief	Occasional
		June	–	–	–	–	–	Very brief	Occasional
		July	–	–	–	–	–	Very brief	Occasional
		August	–	–	–	–	–	Very brief	Occasional
		September	–	–	–	–	–	Very brief	Occasional
		October	–	–	–	–	–	Very brief	Occasional
		November	–	–	–	–	–	Very brief	Occasional

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water Table: Upper limit	Water Table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
210C:(cont.)									
Slickspots----------	D								
		January	–	–	–	–	–	–	–
		February	–	–	–	–	–	–	–
		March	–	–	–	–	–	Very brief	Occasional
		April	–	–	–	–	–	Very brief	Occasional
		May	–	–	–	–	–	Very brief	Occasional
		June	–	–	–	–	–	Very brief	Occasional
		July	–	–	–	–	–	Very brief	Occasional
		August	–	–	–	–	–	Very brief	Occasional
		September	–	–	–	–	–	Very brief	Occasional
		October	–	–	–	–	–	Very brief	Occasional
		November	–	–	–	–	–	Very brief	Occasional
		December	–	–	–	–	–	–	–
Rhoades----------	D								
		April	4.0-6.0	> 6.0	–	–	–	–	–
		May	4.0-6.0	> 6.0	–	–	–	–	–
		June	4.0-6.0	> 6.0	–	–	–	–	–
255:									
Pits, gravel and sand, low precipitation----------	A								
		All months	–	–	–	–	–	–	–
M-W:									
Miscellaneous water-------	–								
		All months	0.0	0.0-0.0	0.0-6.0	Very long	Frequent	–	–
W:									
Water----------	–								
		All months	0.0	0.0-0.0	0.0-6.0	Very long	Frequent	–	–

Soil Features

(Dashes (—) indicate that an assignment has not been made.)

Map symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated steel	Concrete
		In	*In*				
3:							
Peta	---	---	---	---	Moderate	Moderate	Low
5:							
Savage	---	---	---	---	Low	High	Low
5B:							
Savage	---	---	---	---	Low	High	Low
6:							
Regan	---	---	---	---	High	High	Low
7:							
Arnegard	---	---	---	---	Moderate	High	Low
9F:							
Cabba	Bedrock (paralithic)	10-20	---	---	Moderate	High	Low
Sen	Bedrock (paralithic)	20-40	---	---	Moderate	High	Moderate
Chama	Bedrock (paralithic)	20-40	---	---	Moderate	High	Low
12B:							
Rhoades	Natric	1-5	---	Noncemented	Low	High	Moderate
Daglum	Natric	4-20	---	Noncemented	Moderate	High	Moderate
13B:							
Dogtooth	Natric Bedrock (paralithic)	2-4 20-40	---	Noncemented	Low	High	Moderate
Janesburg	Natric Bedrock (paralithic)	2-13 20-40	---	Noncemented	Moderate	High	Moderate
13D:							
Dogtooth	Natric Bedrock (paralithic)	2-4 20-40	---	Noncemented	Low	High	Moderate

Soil Features--Continued

Map symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated steel	Concrete
		In	*In*				
13D:(cont.)							
Janesburg	Natric Bedrock (paralithic)	2-13 20-40	---	Noncemented	Moderate	High	Moderate
14E:							
Amor	Bedrock (paralithic)	20-40	---	---	Moderate	High	Moderate
Brandenburg	Strongly contrasting textural stratification	10-20	---	---	Low	High	Moderate
15B:							
Daglum	Natric	4-20	---	Noncemented	Moderate	High	Moderate
Rhoades	Natric	1-5	---	Noncemented	Low	High	Moderate
17:							
Amor	Bedrock (paralithic)	20-40	---	---	Moderate	High	Moderate
Arnegard	---	---	---	---	Moderate	High	Low
17B:							
Amor	Bedrock (paralithic)	20-40	---	---	Moderate	High	Moderate
Shambo	---	---	---	---	Moderate	Moderate	Low
17C:							
Amor	Bedrock (paralithic)	20-40	---	---	Moderate	High	Moderate
Cabba	Bedrock (paralithic)	10-20	---	---	Moderate	High	Low
17D:							
Amor	Bedrock (paralithic)	20-40	---	---	Moderate	High	Moderate
Cabba	Bedrock (paralithic)	10-20	---	---	Moderate	High	Low

Soil Features--Continued

Map symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated steel	Concrete
		In	*In*				
18E:							
Manning	Strongly contrasting textural stratification	24-40	---	---	Low	Moderate	Low
Schaller	---	---	---	---	Low	Moderate	Low
Wabek	Strongly contrasting textural stratification	7-14	---	---	Low	Moderate	Low
19:							
Sen	Bedrock (paralithic)	20-40	---	---	Moderate	High	Moderate
Golva	---	---	---	---	Moderate	High	Moderate
19B:							
Chama	Bedrock (paralithic)	20-40	---	---	Moderate	High	Low
Sen	Bedrock (paralithic)	20-40	---	---	Moderate	High	Moderate
Cabba	Bedrock (paralithic)	10-20	---	---	Moderate	High	Low
19C:							
Chama	Bedrock (paralithic)	20-40	---	---	Moderate	High	Low
Cabba	Bedrock (paralithic)	10-20	---	---	Moderate	High	Low
Sen	Bedrock (paralithic)	20-40	---	---	Moderate	High	Moderate
19D:							
Cabba	Bedrock (paralithic)	10-20	---	---	Moderate	High	Low
Chama	Bedrock (paralithic)	20-40	---	---	Moderate	High	Low

Soil Features--Continued

Map symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated steel	Concrete
		In	In				
19D:(cont.)							
Sen	Bedrock (paralithic)	20-40	---	---	Moderate	High	Moderate
21B:							
Parshall	---	---	---	---	Moderate	Moderate	Low
22B:							
Regent	Bedrock (paralithic)	20-40	---	---	Low	High	Moderate
Savage	---	---	---	---	Low	High	Low
24B:							
Janesburg	Natric Bedrock (paralithic)	2-13 20-40	---	Noncemented	Moderate	High	Moderate
25B:							
Lefor	Bedrock (paralithic)	20-40	---	---	Moderate	Moderate	Low
27F:							
Badland, outcrop	Bedrock (paralithic)	0-5	---	---	Low	High	High
Lambert	---	---	---	---	Moderate	High	Low
Cabba	Bedrock (paralithic)	10-20	---	---	Moderate	High	Low
28F:							
Flasher	Bedrock (paralithic)	7-20	---	---	Low	Moderate	Low
Rock outcrop	Bedrock (lithic)	0-1	---	---	Low	Moderate	Low
Vebar	Bedrock (paralithic)	20-40	---	---	Moderate	Moderate	Low
29F:							
Arikara	---	---	---	---	Moderate	High	Moderate
Shambo	---	---	---	---	Moderate	Moderate	Low

Soil Features--Continued

Map symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated steel	Concrete
		In	*In*				
29F:(cont.)							
Cabba	Bedrock (paralithic)	10-20	---	---	Moderate	High	Low
30F:							
Vebar, extremely stony	Bedrock (paralithic)	20-40	---	---	Moderate	Moderate	Low
Amor, extremely stony	Bedrock (paralithic)	20-40	---	---	Moderate	High	Moderate
31B:							
Sen	Bedrock (paralithic)	20-40	---	---	Moderate	High	Moderate
Janesburg	Natric Bedrock (paralithic)	2-13 20-40	---	Noncemented	Moderate	High	Moderate
31C:							
Sen	Bedrock (paralithic)	20-40	---	---	Moderate	High	Moderate
Janesburg	Natric Bedrock (paralithic)	2-13 20-40	---	Noncemented	Moderate	High	Moderate
35F:							
Flasher	Bedrock (paralithic)	7-20	---	---	Low	Moderate	Low
Vebar	Bedrock (paralithic)	20-40	---	---	Moderate	Moderate	Low
Parshall	---	---	---	---	Moderate	Moderate	Low
36B:							
Ekalaka	Natric	5-20	---	Noncemented	Moderate	High	Moderate
Parshall	---	---	---	---	Moderate	Moderate	Low
Desart	Natric	15-30	---	Noncemented	Moderate	High	Moderate

Soil Features--Continued

Map symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated steel	Concrete
		In	*In*				
37B:							
Farfeld	Duripan	10-20	---	Strongly cemented	Moderate	High	Moderate
Cedarpan	Natric Duripan	5-15 10-20	---	Noncemented Indurated	Moderate	High	Moderate
37F:							
Cedarpan	Natric Duripan	5-15 10-20	---	Noncemented Indurated	Moderate	High	Moderate
Slickspots, stony	Natric	0-0	---	---	Low	High	Moderate
Farfeld	Duripan	10-20	---	Strongly cemented	Moderate	High	Moderate
41C:							
Wayden	Bedrock (paralithic)	10-20	---	---	Low	High	Moderate
Moreau	Bedrock (paralithic)	20-40	---	---	Low	Moderate	Low
42B:							
Searing	Strongly contrasting textural stratification	20-40	---	---	Moderate	High	Moderate
Ringling	Strongly contrasting textural stratification	12-20	---	---	Low	Moderate	Low
43:							
Belfield	---	---	---	---	Low	High	Moderate
Grail	---	---	---	---	Moderate	High	Low
44:							
Shambo	---	---	---	---	Moderate	Moderate	Low

Soil Features--Continued

Map symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated steel	Concrete
		In	*In*				
44B:							
Shambo	---	---	---	---	Moderate	Moderate	Low
47:							
Stady	Strongly contrasting textural stratification	20-40	---	---	Moderate	Moderate	Low
48B:							
Manning	Strongly contrasting textural stratification	24-40	---	---	Low	Moderate	Low
49B:							
Lihen	---	---	---	---	Low	High	Low
Parshall	---	---	---	---	Moderate	Moderate	Low
51B:							
Janesburg	Natric Bedrock (paralithic)	2-13 20-40	---	Noncemented	Moderate	High	Moderate
Dogtooth	Natric Bedrock (paralithic)	2-4 20-40	---	Noncemented	Low	High	Moderate
52:							
Heil	Natric	1-4	---	Noncemented	Moderate	High	Moderate
53B:							
Savage	---	---	---	---	Low	High	Low
Daglum	Natric	4-20	---	Noncemented	Moderate	High	Moderate
54:							
Channel	---	---	---	---	---	---	---
Straw	---	---	---	---	Moderate	High	Low
55:							
Pits, gravel and sand	---	---	---	---	None	Low	Low

Soil Features--Continued

Map symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated steel	Concrete
		In	*In*				
57:							
Straw	---	---	---	---	Moderate	High	Low
Rhoades	Natric	1-5	---	Noncemented	Low	High	Moderate
Daglum	Natric	4-20	---	Noncemented	Moderate	High	Moderate
58:							
Straw	---	---	---	---	Moderate	High	Low
60:							
Korell	---	---	---	---	Moderate	High	Low
62F:							
Dogtooth	Natric Bedrock (paralithic)	2-4 20-40	---	Noncemented	Low	High	Moderate
Janesburg	Natric Bedrock (paralithic)	2-13 20-40	---	Noncemented	Moderate	High	Moderate
Brandenburg	Strongly contrasting textural stratification	10-20	---	---	Low	High	Moderate
63F:							
Dogtooth	Natric Bedrock (paralithic)	2-4 20-40	---	Noncemented	Low	High	Moderate
Janesburg	Natric Bedrock (paralithic)	2-13 20-40	---	Noncemented	Moderate	High	Moderate
Cabba	Bedrock (paralithic)	10-20	---	---	Moderate	High	Low
65:							
Channel	---	---	---	---	---	---	---
Banks	---	---	---	---	Low	Moderate	Low
Trembles	---	---	---	---	Moderate	High	Low

Soil Features--Continued

Map symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated steel	Concrete
		In	*In*				
66B:							
Stady	Strongly contrasting textural stratification	20-40	---	---	Moderate	Moderate	Low
67B:							
Evridge	Natric Bedrock (paralithic)	13-33 20-40	---	Noncemented	Low	High	Moderate
Desart	Natric	15-30	---	Noncemented	Moderate	High	Moderate
Telfer	---	---	---	---	Low	Moderate	Low
68F:							
Cabbart	Bedrock (paralithic)	10-20	---	---	Moderate	High	Low
Badland, outcrop	Bedrock (paralithic)	0-5	---	---	Low	High	High
69F:							
Patent	---	---	---	---	Moderate	High	Low
Badland, outcrop	Bedrock (paralithic)	0-5	---	---	Low	High	High
Cabbart	Bedrock (paralithic)	10-20	---	---	Moderate	High	Low
70B:							
Maltese	Natric	2-15	---	Noncemented	Moderate	High	Moderate
Gerda	Natric	0-3	---	Noncemented	Low	High	High
71B:							
Chinook	---	---	---	---	Low	High	Low
Rhame	Bedrock (paralithic)	20-40	---	---	Moderate	Moderate	Low
71D:							
Rhame	Bedrock (paralithic)	20-40	---	---	Moderate	Moderate	Low

Soil Features--Continued

Map symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated steel	Concrete
		In	*In*				
71D:(cont.)							
Chinook	---	---	---	---	Low	High	Low
72F:							
Rhame	Bedrock (paralithic)	20-40	---	---	Moderate	Moderate	Low
Fleak	Bedrock (paralithic)	7-20	---	---	Low	Moderate	Moderate
73D:							
Gerda	Natric	0-3	---	Noncemented	Low	High	High
Kirby	Strongly contrasting textural stratification	17-20	---	---	Low	High	Low
74:							
Channel	---	---	---	---	---	---	---
Glendive	---	---	---	---	Moderate	High	Low
Havre	---	---	---	---	Moderate	High	Low
75:							
Havre	---	---	---	---	Moderate	High	Low
76B:							
Lonna	---	---	---	---	Moderate	High	Low
76C:							
Lonna	---	---	---	---	Moderate	High	Low
77:							
Glendive	---	---	---	---	Moderate	High	Low
78B:							
Hanly	---	---	---	---	Low	Moderate	Low
79C:							
Zeona	---	---	---	---	Low	Low	Low
80:							
Ethridge	---	---	---	---	Low	High	Low

Soil Features--Continued

Map symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated steel	Concrete
		In	*In*				
81B:							
Vebar	Bedrock (paralithic)	20-40	---	---	Moderate	Moderate	Low
Parshall	---	---	---	---	Moderate	Moderate	Low
81C:							
Vebar	Bedrock (paralithic)	20-40	---	---	Moderate	Moderate	Low
Tally	---	---	---	---	Moderate	High	Low
81D:							
Vebar	Bedrock (paralithic)	20-40	---	---	Moderate	Moderate	Low
Flasher	Bedrock (paralithic)	7-20	---	---	Low	Moderate	Low
Tally	---	---	---	---	Moderate	High	Low
82E:							
Badland, outcrop	Bedrock (paralithic)	0-5	---	---	Low	High	High
Patent	---	---	---	---	Moderate	High	Low
83:							
Badland	Bedrock (paralithic)	0-5	---	---	Low	High	High
85F:							
Lonna	---	---	---	---	Moderate	High	Low
Cabbart	Bedrock (paralithic)	10-20	---	---	Moderate	High	Low
86F:							
Kirby	Strongly contrasting textural stratification	17-20	---	---	Low	High	Low
Badland, outcrop	Bedrock (paralithic)	0-5	---	---	Low	High	High

Soil Features--Continued

Map symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated steel	Concrete
		In	*In*				
86F:(cont.)							
Patent	---	---	---	---	Moderate	High	Low
88:							
Littlemo	---	---	---	---	Moderate	High	Low
Chanta	Strongly contrasting textural stratification	20-40	---	---	Moderate	High	Moderate
89B:							
Patent	---	---	---	---	Moderate	High	Low
91F:							
Lonna	---	---	---	---	Moderate	High	Low
Kirby	Strongly contrasting textural stratification	17-20	---	---	Low	High	Low
Cabbart	Bedrock (paralithic)	10-20	---	---	Moderate	High	Low
92B:							
Kremlin	---	---	---	---	Moderate	High	Low
Ethridge	---	---	---	---	Low	High	Low
Gerda	Natric	0-3	---	Noncemented	Low	High	High
94F:							
Kirby	Strongly contrasting textural stratification	17-20	---	---	Low	High	Low
Arikara	---	---	---	---	Moderate	High	Moderate
Badland, outcrop	Bedrock (paralithic)	0-5	---	---	Low	High	High

Soil Features--Continued

Map symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated steel	Concrete
		In	*In*				
95F:							
Tinsley	Strongly contrasting textural stratification	2-7	---	---	Low	High	Low
Chanta	Strongly contrasting textural stratification	20-40	---	---	Moderate	High	Moderate
97:							
Kremlin	---	---	---	---	Moderate	High	Low
98:							
Wolf Point	---	---	---	---	Low	High	Low
99F:							
Badland, outcrop	Bedrock (paralithic)	0-5	---	---	Low	High	High
Cabbart	Bedrock (paralithic)	10-20	---	---	Moderate	High	Low
100C:							
Patent	---	---	---	---	Moderate	High	Low
Gullied land	Bedrock (paralithic)	0-40	---	---	Moderate	High	Low
Glendive	---	---	---	---	Moderate	High	Low
101F:							
Boxwell	Bedrock (paralithic)	20-40	---	---	Moderate	High	Low
Cabbart	Bedrock (paralithic)	10-20	---	---	Moderate	High	Low
Arikara	---	---	---	---	Moderate	High	Low
102B:							
Boxwell	Bedrock (paralithic)	20-40	---	---	Moderate	High	Low
Kremlin	---	---	---	---	Moderate	High	Low

Soil Features--Continued

Map symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated steel	Concrete
		In	*In*				
102D:							
Boxwell	Bedrock (paralithic)	20-40	---	---	Moderate	High	Low
Kremlin	---	---	---	---	Moderate	High	Low
103F:							
Badland, outcrop	Bedrock (paralithic)	0-5	---	---	Low	High	High
Arikara	---	---	---	---	Moderate	High	Moderate
Cabbart	Bedrock (paralithic)	10-20	---	---	Moderate	High	Low
105:							
Harriet	Natric	0-5	---	Noncemented	High	High	Moderate
106:							
Riverwash	---	---	---	---	Low	Moderate	Low
107D:							
Rhame	Bedrock (paralithic)	20-40	---	---	Moderate	Moderate	Low
Kremlin	---	---	---	---	Moderate	High	Low
Maltese	Natric	2-15	---	Noncemented	Moderate	High	Moderate
108D:							
Boxwell	Bedrock (paralithic)	20-40	---	---	Moderate	High	Low
Scairt	Natric Bedrock (paralithic)	1-4 20-40	---	Noncemented	Low	High	Moderate
Maltese	Natric	2-15	---	Noncemented	Moderate	High	Moderate
109F:							
Rhame	Bedrock (paralithic)	20-40	---	---	Moderate	Moderate	Low
Arikara	---	---	---	---	Moderate	High	Moderate

Soil Features--Continued

Map symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated steel	Concrete
		In	*In*				
109F:(cont.)							
Fleak	Bedrock (paralithic)	7-20	---	---	Low	Moderate	Moderate
110C:							
Patent	---	---	---	---	Moderate	High	Low
Gerda	Natric	0-3	---	Noncemented	Low	High	High
Slickspots	---	0-0	---	---	Moderate	High	Low
111F:							
Lonna	---	---	---	---	Moderate	High	Low
Arikara	---	---	---	---	Moderate	High	Moderate
Cabbart	Bedrock (paralithic)	10-20	---	---	Moderate	High	Low
112:							
Wolf Point, wooded	---	---	---	---	Low	High	Low
113:							
Havre, wooded	---	---	---	---	Moderate	High	Low
114B:							
Haplustolls	---	---	---	---	Moderate	High	Low
Ustorthents	---	---	---	---	Moderate	High	Low
115B:							
Cozberg	Strongly contrasting textural stratification	20-40	---	---	Moderate	High	Low
Chanta	Strongly contrasting textural stratification	20-40	---	---	Moderate	High	Moderate
116F:							
Kremlin	---	---	---	---	Moderate	High	Low
Shibah	---	---	---	---	Low	High	Low

Soil Features--Continued

Map symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated steel	Concrete
		In	*In*				
117B:							
Kremlin	---	---	---	---	Moderate	High	Low
Chanta	Strongly contrasting textural stratification	20-40	---	---	Moderate	High	Moderate
118F:							
Shibah	---	---	---	---	Low	High	Low
Rubbleland	---	---	---	---	---	---	---
Arikara	---	---	---	---	Moderate	High	Moderate
119:							
Glendive, wooded	---	---	---	---	Moderate	High	Low
120B:							
Hanly, wooded	---	---	---	---	Low	Moderate	Low
121F:							
Maltese	Natric	2-15	---	Noncemented	Moderate	High	Moderate
Lonna	---	---	---	---	Moderate	High	Low
Arikara	---	---	---	---	Moderate	High	Moderate
122C:							
Bulltop	---	---	---	---	Low	High	Low
Shibah	---	---	---	---	Low	High	Low
123E:							
Scairt	Natric Bedrock (paralithic)	1-4 20-40	---	Noncemented	Low	High	Moderate
Maltese	Natric	2-15	---	Noncemented	Moderate	High	Moderate
Boxwell	Bedrock (paralithic)	20-40	---	---	Moderate	High	Low
152:							
Heil	Natric	1-4	---	Noncemented	Moderate	High	Moderate

Soil Features--Continued

Map symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated steel	Concrete
		In	*In*				
155:							
Dumps and pits, mine	---	---	---	---	Moderate	High	Low
159:							
Channel	---	---	---	---	---	---	---
Straw	---	---	---	---	Moderate	High	Low
Daglum	Natric	4-20	---	Noncemented	Moderate	High	Moderate
175:							
Havre, rarely flooded	---	---	---	---	Moderate	High	Low
177:							
Glendive, rarely flooded	---	---	---	---	Moderate	High	Low
183:							
Badland, high precipitation	Bedrock (paralithic)	0-5	---	---	Low	High	High
205:							
Harriet, low precipitation	Natric	0-5	---	Noncemented	High	High	Moderate
210C:							
Lambert	---	---	---	---	Moderate	High	Low
Slickspots	---	---	---	---	Moderate	High	Low
Rhoades	Natric	1-5	---	Noncemented	Low	High	Moderate
255:							
Pits, gravel and sand, low precipitation	---	---	---	---	None	Low	Low
M-W:							
Miscellaneous water	---	---	---	---	---	---	---
W:							
Water	---	---	---	---	---	---	---

Hydric Soils List

See end of table for criteria codes and definitions.

There may be small areas of included soils or miscellaneous areas that are significant to use and management of the soil; yet are too small to delineate on the soil map at the map's original scale. These may be designated as spot symbols and are described on the conventional and special symbols legend.

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
3:							
Peta loam, 0 to 2 percent slopes	Peta	No	alluvial flat	---	---	---	---
	Parshall, moderately well drained	No	alluvial flat	---	---	---	---
	Peta, fine sandy loam	No	alluvial flat	---	---	---	---
	Daglum	No	alluvial flat	---	---	---	---
	Heil	Yes	depression	2B3,3	Yes	No	Yes
5:							
Savage silty clay loam, 0 to 2 percent slopes	Savage	No	alluvial flat	---	---	---	---
	Grail	No	swale	---	---	---	---
	Belfield	No	alluvial flat	---	---	---	---
	Farnuf	No	alluvial flat	---	---	---	---
	Regent	No	pediment	---	---	---	---
	Daglum	No	alluvial flat	---	---	---	---
	Lawther	No	alluvial flat	---	---	---	---
	Parshall	No	swale	---	---	---	---
5B:							
Savage silty clay loam, 2 to 6 percent slopes	Savage	No	alluvial fan	---	---	---	---
	Grail	No	drainageway, swale	---	---	---	---
	Farland	No	alluvial fan	---	---	---	---
	Regent	No	pediment	---	---	---	---
	Shambo	No	alluvial fan	---	---	---	---
	Daglum	No	alluvial fan	---	---	---	---
	Amor	No	pediment	---	---	---	---
	Stady	No	stream terrace	---	---	---	---
6:							
Regan silt loam, 0 to 2 percent slopes	Regan	Yes	drainageway	2B3	Yes	No	No
	Arveson	Yes	drainageway	2B3	Yes	No	No
	Harriet	Yes	drainageway	2B3	Yes	No	No
	Marysland, saline	Yes	drainageway	2B3	Yes	No	No
	Straw	No	stream terrace	---	---	---	---
	Peta	No	alluvial flat	---	---	---	---

Hydric Soils List--Continued

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria: Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
7:							
Arnegard loam, 0 to 2 percent slopes	Arnegard	No	alluvial flat, swale	---	---	---	---
	Farnuf	No	alluvial flat, rise	---	---	---	---
	Parshall	No	alluvial flat, swale	---	---	---	---
	Belfield	No	alluvial flat, rise	---	---	---	---
	Grail	No	alluvial flat, swale	---	---	---	---
	Stady	No	stream terrace	---	---	---	---
	Amor	No	pediment	---	---	---	---
	Savage	No	alluvial flat, rise	---	---	---	---
9F:							
Cabba-Sen-Chama silt loams, 15 to 70 percent slopes	Cabba	No	ridge	---	---	---	---
	Sen	No	ridge	---	---	---	---
	Chama	No	ridge	---	---	---	---
	Shambo	No	ridge	---	---	---	---
	Regent	No	ridge	---	---	---	---
	Vebar	No	ridge	---	---	---	---
	Janesburg	No	ridge	---	---	---	---
	Regan	Yes	drainageway	2B3	Yes	No	No
	Rock outcrop	No	---	---	---	---	---
	Straw	No	flood plain	---	---	---	---
12B:							
Rhoades-Daglum complex, 0 to 6 percent slopes	Rhoades	No	alluvial fan, alluvial flat	---	---	---	---
	Daglum	No	alluvial fan, alluvial flat	---	---	---	---
	Belfield	No	alluvial fan, alluvial flat, rise, rise	---	---	---	---
	Savage	No	alluvial fan, rise	---	---	---	---
	Moreau	No	pediment	---	---	---	---
	Slickspots	No	alluvial flat	---	---	---	---
13B:							
Dogtooth-Janesburg silt loams, 0 to 6 percent slopes	Dogtooth	No	pediment	---	---	---	---
	Janesburg	No	pediment	---	---	---	---
	Daglum	No	alluvial fan, alluvial flat	---	---	---	---
	Regent	No	pediment	---	---	---	---
	Savage	No	alluvial flat	---	---	---	---
	Slickspots	No	alluvial flat	---	---	---	---
	Wayden	No	pediment, rise	---	---	---	---
	Chama	No	pediment	---	---	---	---
13D:							
Dogtooth-Janesburg complex, 6 to 15 percent slopes	Dogtooth	No	ridge	---	---	---	---
	Janesburg	No	ridge	---	---	---	---
	Rhoades	No	ridge	---	---	---	---
	Belfield	No	ridge	---	---	---	---
	Cabba	No	ridge	---	---	---	---
	Chama	No	ridge	---	---	---	---
	Reeder	No	ridge	---	---	---	---
	Stady	No	stream terrace	---	---	---	---

Hydric Soils List--Continued

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria: Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
14E:							
Amor-Brandenburg complex, 3 to 25 percent slopes	Amor	No	hill, ridge	---	---	---	---
	Brandenburg	No	hill, ridge	---	---	---	---
	Shambo	No	alluvial fan, hill, ridge	---	---	---	---
	Searing	No	hill, ridge	---	---	---	---
	Cabba	No	hill, ridge	---	---	---	---
	Daglum	No	alluvial fan	---	---	---	---
	Savage	No	alluvial fan	---	---	---	---
	Arnegard	No	swale	---	---	---	---
	Scoria outcrop	No	hill, ridge	---	---	---	---
15B:							
Daglum-Rhoades complex, 0 to 6 percent slopes	Daglum	No	alluvial fan, alluvial flat	---	---	---	---
	Rhoades	No	alluvial fan, alluvial flat	---	---	---	---
	Belfield	No	alluvial fan, alluvial flat, rise, rise	---	---	---	---
	Savage	No	alluvial fan	---	---	---	---
	Farland	No	alluvial fan	---	---	---	---
	Grail	No	swale	---	---	---	---
	Heil	Yes	depression	2B3,3	Yes	No	Yes
17:							
Amor-Arnegard loams, 0 to 3 percent slopes	Amor	No	pediment	---	---	---	---
	Reeder	No	pediment	---	---	---	---
	Arnegard	No	swale	---	---	---	---
	Farnuf	No	alluvial flat	---	---	---	---
	Daglum	No	alluvial flat	---	---	---	---
	Stady	No	stream terrace	---	---	---	---
	Vebar	No	pediment	---	---	---	---
	Parshall	No	swale	---	---	---	---
	Cabba	No	pediment, rise	---	---	---	---
17B:							
Amor-Shambo loams, 3 to 6 percent slopes	Amor	No	pediment	---	---	---	---
	Shambo	No	alluvial fan	---	---	---	---
	Morton	No	pediment	---	---	---	---
	Chama	No	pediment	---	---	---	---
	Cabba	No	pediment, rise	---	---	---	---
	Arnegard	No	swale	---	---	---	---
	Vebar	No	pediment	---	---	---	---
17C:							
Amor-Cabba loams, 6 to 9 percent slopes	Amor	No	knoll, ridge	---	---	---	---
	Cabba	No	knoll, ridge	---	---	---	---
	Amor, gently sloping	No	knoll, ridge	---	---	---	---
	Shambo	No	knoll, ridge	---	---	---	---
	Chama	No	knoll, ridge	---	---	---	---
	Cohagen	No	knoll, ridge	---	---	---	---
	Regent	No	knoll, ridge	---	---	---	---
	Savage	No	knoll, ridge	---	---	---	---

Hydric Soils List--Continued

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
17D:							
Amor-Cabba loams, 9 to 15 percent slopes	Amor	No	hill, ridge	---	---	---	---
	Cabba	No	hill, ridge	---	---	---	---
	Amor, moderately sloping	No	hill, ridge	---	---	---	---
	Shambo	No	hill, ridge	---	---	---	---
	Chama	No	hill, ridge	---	---	---	---
	Cohagen	No	hill, ridge	---	---	---	---
	Vebar	No	hill, ridge	---	---	---	---
	Arnegard	No	hill, ridge	---	---	---	---
	Dogtooth	No	hill, ridge	---	---	---	---
	Regent	No	hill, ridge	---	---	---	---
	Savage	No	hill, ridge	---	---	---	---
18E:							
Manning-Schaller-Wabek complex, 6 to 25 percent slopes	Manning	No	escarpment, stream terrace	---	---	---	---
	Schaller	No	escarpment, escarpment, stream terrace	---	---	---	---
	Wabek	No	escarpment, escarpment, stream terrace	---	---	---	---
	Stady	No	escarpment, stream terrace	---	---	---	---
	Tally	No	escarpment, stream terrace	---	---	---	---
	Cabba	No	escarpment, stream terrace	---	---	---	---
	Janesburg	No	escarpment, stream terrace	---	---	---	---
19:							
Sen-Golva silt loams, 0 to 3 percent slopes	Sen	No	pediment	---	---	---	---
	Amor	No	pediment	---	---	---	---
	Chama	No	pediment	---	---	---	---
	Golva	No	alluvial flat	---	---	---	---
	Cabba	No	pediment, rise	---	---	---	---
	Shambo	No	alluvial flat	---	---	---	---
	Vebar	No	pediment	---	---	---	---
19B:							
Chama-Sen-Cabba silt loams, 3 to 6 percent slopes	Chama	No	pediment	---	---	---	---
	Sen	No	pediment	---	---	---	---
	Cabba	No	pediment, rise	---	---	---	---
	Golva	No	alluvial fan	---	---	---	---
	Chama, moderately sloping	No	pediment	---	---	---	---
	Janesburg	No	pediment	---	---	---	---
	Maschetah	No	alluvial fan	---	---	---	---

Hydric Soils List--Continued

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria: Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
19C:							
Chama-Cabba-Sen silt loams, 6 to 9 percent slopes	Chama	No	knoll, ridge	---	---	---	---
	Cabba	No	knoll, ridge	---	---	---	---
	Sen	No	knoll, ridge	---	---	---	---
	Cohagen	No	knoll, ridge	---	---	---	---
	Chama, gently sloping	No	knoll, ridge	---	---	---	---
	Golva	No	knoll, ridge	---	---	---	---
	Grail	No	knoll, ridge	---	---	---	---
	Janesburg	No	knoll, ridge	---	---	---	---
	Vebar	No	knoll, ridge	---	---	---	---
19D:							
Cabba-Chama-Sen silt loams, 9 to 15 percent slopes	Cabba	No	hill, ridge	---	---	---	---
	Chama	No	hill, ridge	---	---	---	---
	Sen	No	hill, ridge	---	---	---	---
	Vebar	No	hill, ridge	---	---	---	---
	Arnegard	No	hill, ridge	---	---	---	---
	Cabba, gently sloping	No	hill, ridge	---	---	---	---
	Janesburg	No	hill, ridge	---	---	---	---
	Golva	No	hill, ridge	---	---	---	---
	Maschetah	No	hill, ridge	---	---	---	---
21B:							
Parshall fine sandy loam, 0 to 6 percent slopes	Parshall	No	alluvial fan, alluvial flat, stream terrace	---	---	---	---
	Tally	No	alluvial fan, alluvial flat, stream terrace	---	---	---	---
	Arnegard	No	alluvial fan, alluvial flat, stream terrace	---	---	---	---
	Lihen	No	alluvial fan, alluvial flat, stream terrace	---	---	---	---
	Vebar	No	pediment	---	---	---	---
	Daglum	No	alluvial flat, stream terrace	---	---	---	---
	Manning	No	stream terrace	---	---	---	---
	Regan	Yes	drainageway	2B3	Yes	No	No
22B:							
Regent-Savage silty clay loams, 3 to 6 percent slopes	Regent	No	pediment	---	---	---	---
	Savage	No	alluvial fan	---	---	---	---
	Moreau	No	pediment	---	---	---	---
	Cabba	No	pediment, rise	---	---	---	---
	Chama	No	pediment	---	---	---	---
	Daglum	No	alluvial fan	---	---	---	---
	Wayden	No	pediment, rise	---	---	---	---

Hydric Soils List--Continued

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
24B:							
Janesburg fine sandy loam, 0 to 6 percent slopes	Janesburg	No	pediment	---	---	---	---
	Tally	No	alluvial fan, alluvial flat	---	---	---	---
	Evridge	No	pediment	---	---	---	---
	Vebar	No	pediment	---	---	---	---
	Daglum	No	alluvial flat	---	---	---	---
	Desart	No	alluvial flat	---	---	---	---
	Dogtooth	No	pediment	---	---	---	---
	Lihen	No	alluvial flat	---	---	---	---
	Regent	No	pediment	---	---	---	---
	Shambo	No	alluvial flat	---	---	---	---
25B:							
Lefor fine sandy loam, 0 to 6 percent slopes	Lefor	No	pediment	---	---	---	---
	Parshall	No	swale	---	---	---	---
	Vebar	No	pediment	---	---	---	---
	Belfield	No	alluvial fan	---	---	---	---
	Cohagen	No	pediment, rise	---	---	---	---
	Dogtooth	No	pediment	---	---	---	---
	Lihen	No	alluvial fan	---	---	---	---
	Heil	Yes	depression	3,2B3	Yes	No	Yes
27F:							
Badland, outcrop-Lambert-Cabba complex, 6 to 50 percent slopes	Badland, outcrop	No	ridge	---	---	---	---
	Lambert	No	alluvial fan	---	---	---	---
	Cabba	No	ridge	---	---	---	---
	Daglum	No	ridge	---	---	---	---
	Rhoades	No	ridge	---	---	---	---
	Arikara	No	ridge	---	---	---	---
	Vebar	No	ridge	---	---	---	---
	Havrelon	No	flood plain	---	---	---	---
28F:							
Flasher-Rock outcrop-Vebar complex, 9 to 70 percent slopes	Flasher	No	hill, ridge	---	---	---	---
	Rock outcrop	No	hill, ridge	---	---	---	---
	Vebar	No	hill, ridge	---	---	---	---
	Beisigl	No	hill, ridge	---	---	---	---
	Tally	No	hill, ridge	---	---	---	---
	Cohagen	No	hill, ridge	---	---	---	---
	Telfer	No	hill, ridge	---	---	---	---
	Amor	No	hill, ridge	---	---	---	---
	Cabba	No	hill, ridge	---	---	---	---
29F:							
Arikara-Shambo-Cabba loams, 9 to 70 percent slopes	Arikara	No	ridge	---	---	---	---
	Shambo	No	ridge	---	---	---	---
	Cabba	No	ridge	---	---	---	---
	Lambert	No	alluvial fan	---	---	---	---
	Chama	No	ridge	---	---	---	---
	Tally	No	ridge	---	---	---	---
	Badland, outcrop	No	ridge	---	---	---	---
	Daglum	No	ridge	---	---	---	---
	Regent	No	ridge	---	---	---	---

Hydric Soils List--Continued

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria: Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
30F:							
Vebar-Amor complex, 6 to 35 percent slopes, extremely stony	Vebar, extremely stony	No	ridge	---	---	---	---
	Amor, extremely stony	No	ridge	---	---	---	---
	Parshall, very stony	No	ridge, swale	---	---	---	---
	Cabba, extremely stony	No	ridge	---	---	---	---
	Flasher, extremely stony	No	ridge	---	---	---	---
	Arnegard	No	ridge, swale	---	---	---	---
	Amor, extremely stony, moderately steep	No	ridge	---	---	---	---
	Regent, very stony	No	ridge	---	---	---	---
	Janesburg	No	ridge	---	---	---	---
31B:							
Sen-Janesburg silt loams, 0 to 6 percent slopes	Sen	No	pediment	---	---	---	---
	Janesburg	No	pediment	---	---	---	---
	Regent	No	pediment	---	---	---	---
	Farland	No	alluvial fan	---	---	---	---
	Dogtooth	No	pediment	---	---	---	---
	Chama	No	pediment	---	---	---	---
	Reeder	No	pediment	---	---	---	---
	Belfield	No	alluvial fan, alluvial flat	---	---	---	---
	Cabba	No	pediment, rise	---	---	---	---
31C:							
Sen-Janesburg silt loams, 6 to 9 percent slopes	Sen	No	ridge	---	---	---	---
	Janesburg	No	ridge	---	---	---	---
	Shambo	No	ridge	---	---	---	---
	Cabba	No	ridge	---	---	---	---
	Dogtooth	No	ridge	---	---	---	---
	Daglum	No	ridge	---	---	---	---
	Regent	No	ridge	---	---	---	---
	Savage	No	ridge	---	---	---	---
	Belfield	No	ridge	---	---	---	---
	Tally	No	ridge	---	---	---	---
35F:							
Flasher-Vebar-Parshall complex, 9 to 35 percent slopes	Flasher	No	hill, ridge	---	---	---	---
	Vebar	No	hill, ridge	---	---	---	---
	Parshall	No	hill, ridge	---	---	---	---
	Beisigl	No	hill, ridge	---	---	---	---
	Telfer	No	hill, ridge	---	---	---	---
	Cohagen	No	hill, ridge	---	---	---	---
	Amor	No	hill, ridge	---	---	---	---
	Rock outcrop	No	hill, ridge	---	---	---	---

Hydric Soils List--Continued

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
36B:							
Ekalaka-Parshall-Desart fine sandy loams, 0 to 6 percent slopes	Ekalaka	No	alluvial fan, alluvial flat	---	---	---	---
	Parshall	No	alluvial fan, alluvial flat	---	---	---	---
	Desart	No	alluvial fan, alluvial flat	---	---	---	---
	Daglum, fine sandy loam	No	alluvial flat	---	---	---	---
	Farnuf	No	alluvial flat	---	---	---	---
	Telfer	No	alluvial flat	---	---	---	---
	Daglum, silt loam	No	alluvial flat	---	---	---	---
	Janesburg, fine sandy loam	No	pediment	---	---	---	---
	Rhoades	No	alluvial flat	---	---	---	---
37B:							
Farfeld-Cedarpan loams, 0 to 6 percent slopes	Farfeld	No	divide	---	---	---	---
	Cedarpan	No	divide	---	---	---	---
	Amor	No	divide, pediment	---	---	---	---
	Janesburg	No	divide, pediment	---	---	---	---
	Dogtooth	No	divide, pediment	---	---	---	---
	Savage	No	divide	---	---	---	---
	Farnuf	No	divide	---	---	---	---
37F:							
Cedarpan-Slickspots, stony-Farfeld complex, 3 to 35 percent slopes	Cedarpan	No	divide	---	---	---	---
	Slickspots, stony	No	divide	---	---	---	---
	Cabba	No	divide	---	---	---	---
	Farfeld	No	divide	---	---	---	---
	Janesburg	No	divide	---	---	---	---
	Dogtooth	No	divide	---	---	---	---
	Felor	No	divide	---	---	---	---
	Vebar	No	divide	---	---	---	---
	Wayden	No	divide	---	---	---	---
	Savage	No	divide	---	---	---	---
41C:							
Wayden-Moreau silty clays, 3 to 9 percent slopes	Wayden	No	ridge	---	---	---	---
	Moreau	No	ridge	---	---	---	---
	Cabba	No	ridge	---	---	---	---
	Dogtooth	No	ridge	---	---	---	---
	Sen	No	ridge	---	---	---	---
	Regent	No	ridge	---	---	---	---
	Lawther	No	ridge	---	---	---	---
	Daglum	No	ridge	---	---	---	---

Hydric Soils List--Continued

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
42B:							
Searing-Ringling loams, 0 to 6 percent slopes	Searing	No	pediment	---	---	---	---
	Ringling	No	pediment, rise	---	---	---	---
	Farnuf	No	alluvial fan, alluvial flat	---	---	---	---
	Belfield	No	alluvial fan	---	---	---	---
	Amor	No	pediment	---	---	---	---
	Brandenburg	No	pediment, rise	---	---	---	---
	Cabba	No	pediment, rise	---	---	---	---
	Chama	No	pediment	---	---	---	---
43:							
Belfield-Grail silty clay loams, 0 to 2 percent slopes	Belfield	No	alluvial flat	---	---	---	---
	Grail	No	swale	---	---	---	---
	Savage	No	alluvial flat	---	---	---	---
	Daglum	No	alluvial flat	---	---	---	---
	Farnuf	No	alluvial flat	---	---	---	---
	Arnegard	No	swale	---	---	---	---
	Lawther	No	alluvial flat	---	---	---	---
	Regent	No	pediment	---	---	---	---
	Straw	No	flood plain	---	---	---	---
44:							
Shambo loam, 0 to 2 percent slopes	Shambo	No	alluvial flat, stream terrace	---	---	---	---
	Shambo, gravelly substratum	No	alluvial flat, stream terrace	---	---	---	---
	Arnegard	No	swale	---	---	---	---
	Farnuf	No	alluvial flat, stream terrace	---	---	---	---
	Stady	No	stream terrace	---	---	---	---
	Amor	No	pediment	---	---	---	---
	Parshall	No	stream terrace, swale	---	---	---	---
	Tally	No	alluvial flat, stream terrace	---	---	---	---
44B:							
Shambo loam, 2 to 6 percent slopes	Shambo	No	alluvial fan, stream terrace	---	---	---	---
	Arnegard	No	swale	---	---	---	---
	Farnuf	No	alluvial fan, stream terrace	---	---	---	---
	Shambo, gravelly substratum	No	alluvial fan, stream terrace	---	---	---	---
	Stady	No	stream terrace	---	---	---	---
	Amor	No	pediment	---	---	---	---
	Arnegard, level	No	swale	---	---	---	---
	Parshall	No	swale	---	---	---	---

Hydric Soils List--Continued

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
47:							
Stady loam, 0 to 3 percent slopes	Stady	No	river valley, stream terrace	---	---	---	---
	Bowdle	No	river valley, stream terrace	---	---	---	---
	Arnegard	No	river valley, stream terrace, swale	---	---	---	---
	Lehr	No	river valley, stream terrace	---	---	---	---
	Belfield	No	river valley, stream terrace	---	---	---	---
	Manning	No	river valley, stream terrace	---	---	---	---
	Marysland	Yes	drainageway, river valley, stream terrace	2B3	Yes	No	No
	Amor	No	pediment, river valley, stream terrace	---	---	---	---
48B:							
Manning fine sandy loam, 0 to 6 percent slopes	Manning	No	river valley, stream terrace	---	---	---	---
	Parshall	No	river valley, stream terrace, swale	---	---	---	---
	Stady	No	river valley, stream terrace	---	---	---	---
	Shambo, gravelly substratum	No	river valley, stream terrace	---	---	---	---
	Wabek	No	river valley, stream terrace	---	---	---	---
	Vebar	No	pediment, river valley, stream terrace	---	---	---	---
49B:							
Lihen-Parshall complex, 0 to 6 percent slopes	Lihen	No	alluvial fan, alluvial flat	---	---	---	---
	Parshall	No	swale	---	---	---	---
	Telfer	No	alluvial fan, alluvial flat	---	---	---	---
	Tally	No	alluvial fan, alluvial flat	---	---	---	---
	Stady	No	stream terrace	---	---	---	---
	Lihen, fine sandy loam	No	alluvial fan, alluvial flat	---	---	---	---
	Seroco	No	alluvial fan	---	---	---	---
	Shambo	No	alluvial fan, alluvial flat	---	---	---	---
	Beisigl	No	pediment	---	---	---	---
	Manning	No	stream terrace	---	---	---	---

Hydric Soils List--Continued

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
51B:							
Janesburg-Dogtooth silt loams, 0 to 6 percent slopes	Janesburg	No	pediment	---	---	---	---
	Dogtooth	No	pediment	---	---	---	---
	Belfield	No	alluvial fan, alluvial flat	---	---	---	---
	Regent	No	pediment	---	---	---	---
	Janesburg, fine sandy loam	No	pediment	---	---	---	---
	Moreau	No	pediment	---	---	---	---
	Farland	No	alluvial fan, alluvial flat	---	---	---	---
	Slickspots	No	alluvial flat	---	---	---	---
52:							
Heil silt loam, 0 to 1 percent slopes	Heil	Yes	depression	2B3,3	Yes	No	Yes
	Heil, silty clay	Yes	depression	3,2B3	Yes	No	Yes
	Belfield	No	alluvial flat	---	---	---	---
	Dimmick	Yes	depression	2B3,3	Yes	No	Yes
	Rhoades	No	alluvial flat	---	---	---	---
	Regan	Yes	depression, rim	2B3	Yes	No	No
53B:							
Savage-Daglum silt loams, 0 to 6 percent slopes	Savage	No	alluvial fan, alluvial flat	---	---	---	---
	Daglum	No	alluvial fan, alluvial flat	---	---	---	---
	Golva	No	alluvial fan, alluvial flat	---	---	---	---
	Grail	No	alluvial fan, alluvial flat, swale, swale	---	---	---	---
	Rhoades	No	alluvial flat	---	---	---	---
	Maschetah	No	alluvial flat	---	---	---	---
	Belfield	No	alluvial flat	---	---	---	---
	Regent	No	pediment	---	---	---	---
	Regan	Yes	drainageway	2B3	Yes	No	No
54:							
Straw loam, channeled, 0 to 2 percent slopes	Channel	No	channel, flood plain	---	---	---	---
	Straw	No	flood plain	---	---	---	---
	Korell	No	flood plain	---	---	---	---
	Belfield	No	stream terrace	---	---	---	---
	Rhoades	No	stream terrace	---	---	---	---
	Velva	No	flood plain	---	---	---	---
	Dimmick	Yes	depression	2B3,3	Yes	No	Yes
55:							
Pits, gravel and sand	Pits, gravel and sand	No	stream terrace	---	---	---	---
	Wabek	No	stream terrace	---	---	---	---
	Lehr	No	stream terrace	---	---	---	---

Hydric Soils List--Continued

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
57:							
Straw-Rhoades-Daglum silt loams, 0 to 2 percent slopes	Straw	No	flood plain	---	---	---	---
	Rhoades	No	stream terrace	---	---	---	---
	Daglum	No	stream terrace	---	---	---	---
	Korell	No	flood plain	---	---	---	---
	Harriet	Yes	drainageway	2B3	Yes	No	No
	Magnus	No	flood plain	---	---	---	---
	Channel	No	channel, flood plain	---	---	---	---
	Regan	Yes	drainageway	2B3	Yes	No	No
	Trembles	No	flood plain	---	---	---	---
58:							
Straw loam, 0 to 2 percent slopes	Straw	No	flood plain	---	---	---	---
	Korell	No	flood plain	---	---	---	---
	Velva	No	flood plain	---	---	---	---
	Channel	No	channel, flood plain	---	---	---	---
	Arnegard	No	stream terrace, swale	---	---	---	---
	Havrelon, fine sandy loam	No	flood plain	---	---	---	---
	Belfield	No	stream terrace	---	---	---	---
60:							
Korell silt loam, 0 to 2 percent slopes	Korell	No	flood plain	---	---	---	---
	Straw	No	flood plain	---	---	---	---
	Channel	No	channel, flood plain	---	---	---	---
	Velva, very fine sandy loam	No	flood plain	---	---	---	---
	Velva, loam	No	flood plain	---	---	---	---
	Daglum	No	stream terrace	---	---	---	---
	Havrelon	No	flood plain	---	---	---	---
	Magnus	No	flood plain	---	---	---	---
62F:							
Dogtooth-Janesburg-Brandenburg complex, 9 to 35 percent slopes	Dogtooth	No	hill, ridge	---	---	---	---
	Janesburg	No	hill, ridge	---	---	---	---
	Brandenburg	No	hill, ridge	---	---	---	---
	Cabba	No	hill, ridge	---	---	---	---
	Amor	No	hill, ridge	---	---	---	---
	Harriet	Yes	drainageway, drainageway, hill, ridge	2B3	Yes	No	No
	Searing	No	hill, ridge	---	---	---	---
	Wayden	No	hill, ridge	---	---	---	---
	Regent	No	hill, ridge	---	---	---	---

Hydric Soils List--Continued

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria: Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
63F:							
Dogtooth-Janesburg-Cabba complex, 6 to 30 percent slopes	Dogtooth	No	hill, ridge	---	---	---	---
	Janesburg	No	hill, ridge	---	---	---	---
	Cabba	No	hill, hill, ridge, ridge	---	---	---	---
	Moreau	No	hill, ridge	---	---	---	---
	Wayden	No	hill, hill, ridge, ridge	---	---	---	---
	Amor	No	hill, ridge	---	---	---	---
	Chama	No	hill, ridge	---	---	---	---
	Ekalaka	No	hill, ridge	---	---	---	---
	Regan	Yes	drainageway, drainageway, hill, ridge	2B3	Yes	No	No
	Slickspots	No	hill, ridge	---	---	---	---
65:							
Banks-Trembles fine sandy loams, channeled, 0 to 2 percent slopes	Channel	No	channel, flood plain	---	---	---	---
	Banks	No	flood plain	---	---	---	---
	Trembles	No	flood plain	---	---	---	---
	Straw	No	flood plain	---	---	---	---
	Dogiecreek	Yes	flood plain	2B3	Yes	No	No
	Havrelon	No	flood plain	---	---	---	---
	Shambo	No	stream terrace	---	---	---	---
66B:							
Stady loam, 3 to 6 percent slopes	Stady	No	river valley, stream terrace	---	---	---	---
	Bowdle	No	river valley, stream terrace	---	---	---	---
	Lehr	No	river valley, stream terrace	---	---	---	---
	Manning	No	river valley, stream terrace	---	---	---	---
	Shambo, gravelly substratum	No	river valley, stream terrace	---	---	---	---
	Parshall	No	stream terrace, swale	---	---	---	---
	Amor	No	pediment, river valley, stream terrace	---	---	---	---
	Daglum	No	river valley, stream terrace	---	---	---	---

Hydric Soils List--Continued

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
67B:							
Evridge-Desart-Telfer fine sandy loams, 0 6 percent slopes	Evridge	No	pediment	---	---	---	---
	Desart	No	alluvial fan, alluvial flat	---	---	---	---
	Telfer	No	alluvial fan, alluvial flat	---	---	---	---
	Janesburg	No	pediment	---	---	---	---
	Tally	No	alluvial fan, alluvial flat	---	---	---	---
	Ekalaka	No	alluvial fan, alluvial flat	---	---	---	---
	Beisigl	No	pediment	---	---	---	---
	Slickspots	No	alluvial fan, alluvial flat	---	---	---	---
	Reeder	No	pediment	---	---	---	---
	Heil	Yes	depression	2B3,3	Yes	No	Yes
68F:							
Cabbart-Badland, outcrop complex, 6 to 70 percent slopes	Cabbart	No	ridge	---	---	---	---
	Badland, outcrop	No	ridge	---	---	---	---
	Boxwell	No	ridge	---	---	---	---
	Patent	No	alluvial fan	---	---	---	---
	Blacksheep	No	ridge	---	---	---	---
	Fleak	No	ridge	---	---	---	---
	Kirby	No	ridge	---	---	---	---
	Kremlin	No	ridge	---	---	---	---
	Gerda	No	ridge	---	---	---	---
69F:							
Patent-Badland, outcrop-Cabbart complex, 6 to 50 percent slopes	Patent	No	alluvial fan	---	---	---	---
	Badland, outcrop	No	ridge	---	---	---	---
	Cabbart	No	ridge	---	---	---	---
	Lonna	No	alluvial fan	---	---	---	---
	Gerda	No	ridge	---	---	---	---
	Kremlin	No	alluvial fan	---	---	---	---
	Arikara	No	ridge	---	---	---	---
	Kirby	No	ridge	---	---	---	---
	Maltese	No	ridge	---	---	---	---
70B:							
Maltese-Gerda complex, 0 to 6 percent slopes	Maltese	No	alluvial fan, alluvial flat	---	---	---	---
	Gerda	No	alluvial fan, alluvial flat	---	---	---	---
	Tanna	No	pediment	---	---	---	---
	Kremlin	No	alluvial fan, alluvial flat	---	---	---	---
	Scairt	No	pediment	---	---	---	---
	Lonna	No	alluvial fan	---	---	---	---
	Rhame	No	pediment	---	---	---	---
	Slickspots	No	alluvial fan, alluvial flat	---	---	---	---

Hydric Soils List--Continued

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria: Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
71B:							
Chinook-Rhame fine sandy loams, 1 to 6 percent slopes	Chinook	No	alluvial fan	---	---	---	---
	Rhame	No	pediment	---	---	---	---
	Kremlin	No	alluvial fan	---	---	---	---
	Boxwell	No	pediment	---	---	---	---
	Chinook, moderately sloping	No	alluvial fan	---	---	---	---
	Blacksheep	No	pediment, rise	---	---	---	---
	Ethridge	No	alluvial fan	---	---	---	---
	Maltese	No	alluvial fan, alluvial flat	---	---	---	---
71D:							
Rhame-Chinook fine sandy loams, 6 to 15 percent slopes	Rhame	No	hill, ridge	---	---	---	---
	Chinook	No	hill, ridge	---	---	---	---
	Kremlin	No	hill, ridge	---	---	---	---
	Tusler	No	ridge	---	---	---	---
	Blacksheep	No	hill, ridge	---	---	---	---
	Fleak	No	hill, ridge	---	---	---	---
	Maltese	No	hill, ridge	---	---	---	---
	Burgraff	No	hill, ridge	---	---	---	---
72F:							
Rhame-Fleak complex, 9 to 50 percent slopes	Rhame	No	ridge	---	---	---	---
	Fleak	No	ridge	---	---	---	---
	Chinook	No	ridge	---	---	---	---
	Blacksheep	No	ridge	---	---	---	---
	Cabbart	No	ridge	---	---	---	---
	Rhame, strongly sloping	No	ridge	---	---	---	---
	Tusler	No	ridge	---	---	---	---
	Kremlin	No	ridge	---	---	---	---
	Rock outcrop	No	ridge	---	---	---	---
	Gerda	No	ridge	---	---	---	---
73D:							
Gerda-Kirby complex, 1 to 15 percent slopes	Gerda	No	hill, ridge	---	---	---	---
	Kirby	No	hill, ridge	---	---	---	---
	Scairt	No	hill, ridge	---	---	---	---
	Kremlin	No	hill, ridge	---	---	---	---
	Absher	No	hill, ridge	---	---	---	---
	Maltese	No	hill, ridge	---	---	---	---
	Searing, aridic-ustic	No	hill, ridge	---	---	---	---
	Cabbart	No	hill, ridge	---	---	---	---
	Ethridge	No	hill, ridge	---	---	---	---
	Harriet	Yes	hill, ridge	2B3	Yes	No	No
74:							
Glendive and Havre soils, channeled, 0 to 3 percent slopes	Channel	No	channel, flood plain	---	---	---	---
	Glendive	No	flood plain	---	---	---	---
	Havre	No	flood plain	---	---	---	---
	Hanly	No	flood plain	---	---	---	---
	Lonna	No	stream terrace	---	---	---	---
	Regan	Yes	drainageway, flood plain	2B3	Yes	No	No

Hydric Soils List--Continued

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria: Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
75:							
Havre silt loam, 0 to 3 percent slopes	Havre	No	flood plain	---	---	---	---
	Havre, loam	No	flood plain	---	---	---	---
	Glendive	No	flood plain	---	---	---	---
	Channel	No	channel, flood plain	---	---	---	---
	Kremlin	No	stream terrace	---	---	---	---
	Wolf Point	No	flood plain	---	---	---	---
76B:							
Lonna silt loam, 1 to 6 percent slopes	Lonna	No	alluvial fan	---	---	---	---
	Ethridge	No	alluvial fan	---	---	---	---
	Patent	No	alluvial fan	---	---	---	---
	Lonna, moderately sloping	No	alluvial fan	---	---	---	---
	Maltese	No	alluvial fan	---	---	---	---
76C:							
Lonna silt loam, 6 to 9 percent slopes	Lonna	No	alluvial fan	---	---	---	---
	Lonna, gently sloping	No	alluvial fan	---	---	---	---
	Patent	No	alluvial fan	---	---	---	---
	Kremlin	No	alluvial fan	---	---	---	---
	Sham	No	alluvial fan	---	---	---	---
	Cabbart	No	pediment, rise	---	---	---	---
77:							
Glendive fine sandy loam, 0 to 3 percent slopes	Glendive	No	flood plain	---	---	---	---
	Hanly	No	flood plain	---	---	---	---
	Glendive, loam	No	flood plain	---	---	---	---
	Channel	No	channel, flood plain	---	---	---	---
	Havre	No	flood plain	---	---	---	---
78B:							
Hanly fine sandy loam, 0 to 6 percent slopes	Hanly	No	flood plain	---	---	---	---
	Glendive	No	flood plain	---	---	---	---
	Minnewaukan	Yes	flood plain	2B3	Yes	No	No
	Riverwash	Yes	flood plain	2B2,4	Yes	Yes	No
79C:							
Zeona loamy fine sand, 1 to 9 percent slopes	Zeona	No	dune, flood plain	---	---	---	---
	Glendive	No	flood plain	---	---	---	---
	Hanly	No	flood plain	---	---	---	---
	Havre	No	flood plain	---	---	---	---
80:							
Ethridge silt loam, 1 to 3 percent slopes	Ethridge	No	alluvial flat	---	---	---	---
	Ethridge, silty clay loam	No	alluvial flat	---	---	---	---
	Kremlin	No	alluvial flat	---	---	---	---
	Tanna	No	pediment	---	---	---	---
	Maltese	No	alluvial flat	---	---	---	---
	Gerda	No	alluvial flat	---	---	---	---
	Lonna	No	alluvial flat	---	---	---	---

Hydric Soils List--Continued

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
81B:							
Vebar-Parshall fine sandy loams, 0 to 6 percent slopes	Vebar	No	pediment	---	---	---	---
	Parshall	No	swale	---	---	---	---
	Tally	No	alluvial fan, alluvial flat	---	---	---	---
	Beisigl	No	pediment	---	---	---	---
	Arnegard	No	swale	---	---	---	---
	Flasher	No	pediment, rise	---	---	---	---
	Amor	No	pediment	---	---	---	---
	Cohagen	No	pediment, rise	---	---	---	---
81C:							
Vebar-Tally fine sandy loams, 6 to 9 percent slopes	Vebar	No	hill, ridge	---	---	---	---
	Tally	No	hill, ridge	---	---	---	---
	Parshall	No	hill, ridge	---	---	---	---
	Cohagen	No	hill, ridge	---	---	---	---
	Vebar, nearly level	No	hill, ridge	---	---	---	---
	Amor	No	hill, ridge	---	---	---	---
	Farnuf	No	hill, ridge	---	---	---	---
	Ekalaka	No	hill, ridge	---	---	---	---
81D:							
Vebar-Flasher-Tally complex, 9 to 15 percent slopes	Vebar	No	hill, ridge	---	---	---	---
	Flasher	No	hill, ridge	---	---	---	---
	Tally	No	hill, ridge	---	---	---	---
	Cohagen	No	hill, ridge	---	---	---	---
	Vebar, moderately sloping	No	hill, ridge	---	---	---	---
	Beisigl	No	hill, ridge	---	---	---	---
	Parshall	No	hill, ridge	---	---	---	---
	Amor	No	hill, ridge	---	---	---	---
	Telfer	No	hill, ridge	---	---	---	---
82E:							
Badland, outcrop-Patent complex, 6 to 25 percent slopes	Badland, outcrop	No	ridge	---	---	---	---
	Patent	No	alluvial fan	---	---	---	---
	Patent, moderately steep	No	alluvial fan	---	---	---	---
	Cabbart	No	ridge	---	---	---	---
	Lonna	No	alluvial fan	---	---	---	---
	Scoria outcrop	No	ridge	---	---	---	---
	Havre	No	flood plain	---	---	---	---
83:							
Badland	Badland	No	ridge	---	---	---	---
	Cabbart	No	ridge	---	---	---	---
	Patent	No	alluvial fan	---	---	---	---
	Scoria outcrop	No	ridge	---	---	---	---

Hydric Soils List--Continued

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
85F:							
Lonna-Cabbart silt loams, 6 to 35 percent slopes	Lonna	No	alluvial fan	---	---	---	---
	Cabbart	No	ridge	---	---	---	---
	Lonna, moderately steep	No	ridge	---	---	---	---
	Kremlin	No	alluvial fan	---	---	---	---
	Gerda	No	alluvial fan	---	---	---	---
	Blacksheep	No	ridge	---	---	---	---
	Ethridge	No	alluvial fan	---	---	---	---
	Arikara	No	ridge	---	---	---	---
86F:							
Kirby-Badland, outcrop-Patent complex, 9 to 70 percent slopes	Kirby	No	ridge	---	---	---	---
	Badland, outcrop	No	ridge	---	---	---	---
	Cabbart	No	ridge	---	---	---	---
	Patent	No	alluvial fan	---	---	---	---
	Patent, strongly sloping	No	alluvial fan	---	---	---	---
	Maltese	No	alluvial fan	---	---	---	---
	Kremlin	No	alluvial fan	---	---	---	---
88:							
Littlemo-Chanta complex, 0 to 3 percent slopes	Littlemo	No	paleoterrace	---	---	---	---
	Chanta	No	paleoterrace	---	---	---	---
	Kremlin	No	paleoterrace	---	---	---	---
	Boxwell	No	pediment	---	---	---	---
89B:							
Patent loam, 1 to 6 percent slopes	Patent	No	alluvial fan	---	---	---	---
	Sham	No	alluvial fan	---	---	---	---
	Lonna	No	alluvial fan	---	---	---	---
	Benz	No	alluvial fan	---	---	---	---
	Kremlin	No	alluvial fan	---	---	---	---
91F:							
Lonna-Kirby-Cabbart complex, 3 to 50 percent slopes	Lonna	No	alluvial fan, hill, ridge	---	---	---	---
	Kirby	No	hill, ridge	---	---	---	---
	Cabbart	No	hill, ridge	---	---	---	---
	Boxwell	No	hill, ridge	---	---	---	---
	Maltese	No	hill, ridge	---	---	---	---
	Scairt	No	hill, ridge	---	---	---	---
	Scoria outcrop	No	hill, ridge	---	---	---	---
92B:							
Kremlin-Ethridge-Gerda complex, 1 to 6 percent slopes	Kremlin	No	alluvial fan	---	---	---	---
	Ethridge	No	alluvial fan	---	---	---	---
	Gerda	No	alluvial fan	---	---	---	---
	Maltese	No	alluvial fan	---	---	---	---
	Boxwell	No	pediment	---	---	---	---
	Patent	No	alluvial fan	---	---	---	---

Hydric Soils List--Continued

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
94F:							
Kirby-Arikara-Badland, outcrop complex, 15 to 70 percent slopes	Kirby	No	ridge	---	---	---	---
	Arikara	No	ridge	---	---	---	---
	Badland, outcrop	No	ridge	---	---	---	---
	Patent	No	alluvial fan	---	---	---	---
	Cabbart	No	ridge	---	---	---	---
	Lonna	No	ridge	---	---	---	---
	Scairt	No	ridge	---	---	---	---
95F:							
Tinsley-Chanta complex, 6 to 35 percent slopes	Tinsley	No	escarpment, paleoterrace	---	---	---	---
	Chanta	No	escarpment, paleoterrace	---	---	---	---
	Chinook	No	escarpment, paleoterrace	---	---	---	---
	Cozberg	No	escarpment, paleoterrace	---	---	---	---
	Cabbart	No	escarpment, paleoterrace	---	---	---	---
	Rhame	No	escarpment, paleoterrace	---	---	---	---
	Kremlin	No	escarpment, paleoterrace	---	---	---	---
97:							
Kremlin loam, 0 to 3 percent slopes	Kremlin	No	paleoterrace	---	---	---	---
	Littlemo	No	paleoterrace, river valley	---	---	---	---
	Chanta	No	paleoterrace	---	---	---	---
	Chinook	No	paleoterrace	---	---	---	---
	Haydraw	No	paleoterrace	---	---	---	---
98:							
Wolf Point silty clay loam, 0 to 1 percent slopes	Wolf Point	No	flood plain	---	---	---	---
	Havre	No	flood plain	---	---	---	---
	Channel	No	channel, flood plain	---	---	---	---
	Ethridge	No	terrace	---	---	---	---
	Glendive	No	flood plain	---	---	---	---
99F:							
Badland, outcrop-Cabbart complex, 6 to 70 percent slopes	Badland, outcrop	No	ridge	---	---	---	---
	Cabbart	No	ridge	---	---	---	---
	Arikara	No	ridge	---	---	---	---
	Boxwell	No	ridge	---	---	---	---
	Patent	No	alluvial fan	---	---	---	---
	Rock outcrop	No	ridge	---	---	---	---

Hydric Soils List--Continued

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
100C:							
Patent-Gullied land-Glendive complex, 1 to 9 percent slopes	Patent	No	alluvial fan	---	---	---	---
	Gullied land	No	alluvial fan	---	---	---	---
	Glendive	No	flood plain	---	---	---	---
	Lonna	No	alluvial fan	---	---	---	---
	Hanly	No	flood plain	---	---	---	---
	Kremlin	No	alluvial fan	---	---	---	---
	Havre	No	flood plain	---	---	---	---
	Gerda	No	alluvial fan	---	---	---	---
	Ethridge	No	alluvial fan	---	---	---	---
	Sham	No	alluvial fan	---	---	---	---
101F:							
Boxwell-Cabbart-Arikara complex, 9 to 50 percent slopes	Boxwell	No	ridge	---	---	---	---
	Cabbart	No	ridge	---	---	---	---
	Arikara	No	ridge	---	---	---	---
	Rhame	No	ridge	---	---	---	---
	Ethridge	No	ridge	---	---	---	---
	Maltese	No	ridge	---	---	---	---
	Scairt	No	ridge	---	---	---	---
	Fleak	No	ridge	---	---	---	---
	Badland, outcrop	No	ridge	---	---	---	---
102B:							
Boxwell-Kremlin loams, 1 to 6 percent slopes	Boxwell	No	pediment	---	---	---	---
	Kremlin	No	alluvial fan, alluvial flat	---	---	---	---
	Rhame	No	pediment	---	---	---	---
	Burgraff	No	pediment	---	---	---	---
	Chanta	No	paleoterrace	---	---	---	---
	Gerda	No	alluvial flat	---	---	---	---
	Cabbart	No	pediment, rise	---	---	---	---
102D:							
Boxwell-Kremlin loams, 6 to 15 percent slopes	Boxwell	No	ridge	---	---	---	---
	Kremlin	No	ridge	---	---	---	---
	Cabbart	No	ridge	---	---	---	---
	Kremlin, gently sloping	No	ridge	---	---	---	---
	Boxwell, gently sloping	No	ridge	---	---	---	---
	Burgraff	No	ridge	---	---	---	---
	Haydraw	No	ridge	---	---	---	---
	Blacksheep	No	ridge	---	---	---	---
	Maltese	No	ridge	---	---	---	---
103F:							
Badland, outcrop-Arikara-Cabbart complex, 15 to 70 percent slopes	Badland, outcrop	No	ridge	---	---	---	---
	Arikara	No	ridge	---	---	---	---
	Cabbart	No	ridge	---	---	---	---
	Boxwell	No	ridge	---	---	---	---
	Lonna	No	alluvial fan, ridge	---	---	---	---
	Kirby	No	ridge	---	---	---	---
	Rhame	No	ridge	---	---	---	---
	Scairt	No	ridge	---	---	---	---

Hydric Soils List--Continued

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
105:							
Harriet silt loam, 0 to 2 percent slopes	Harriet	Yes	alluvial flat, drainageway	2B3	Yes	No	No
	Regan	Yes	drainageway	2B3	Yes	No	No
	Slickspots	No	alluvial flat	---	---	---	---
	Rhoades	No	stream terrace	---	---	---	---
	Heil	Yes	depression	2B3,3	Yes	No	Yes
	Daglum	No	stream terrace	---	---	---	---
106:							
Riverwash	Riverwash	Yes	flood plain	2B2,4	Yes	Yes	No
	Hanly	No	flood plain	---	---	---	---
	Minnewaukan	Yes	flood plain	2B3	Yes	No	No
107D:							
Rhame-Kremlin-Maltese complex, 1 to 15 percent slopes	Rhame	No	ridge	---	---	---	---
	Chinook	No	ridge	---	---	---	---
	Kremlin	No	ridge	---	---	---	---
	Maltese	No	ridge	---	---	---	---
	Blacksheep	No	ridge	---	---	---	---
	Boxwell	No	ridge	---	---	---	---
	Ethridge	No	ridge	---	---	---	---
	Tusler	No	ridge	---	---	---	---
	Scairt	No	ridge	---	---	---	---
	Heil	Yes	depression	2B3,3	Yes	No	Yes
108D:							
Boxwell-Scairt-Maltese complex, 6 to 15 percent slopes	Boxwell	No	ridge	---	---	---	---
	Scairt	No	ridge	---	---	---	---
	Maltese	No	ridge	---	---	---	---
	Kremlin	No	ridge	---	---	---	---
	Burgraff	No	ridge	---	---	---	---
	Ethridge	No	ridge	---	---	---	---
	Lonna	No	alluvial fan	---	---	---	---
	Cabbart	No	ridge	---	---	---	---
	Yawdim	No	ridge	---	---	---	---
109F:							
Rhame-Arikara-Fleak complex, 9 to 50 percent slopes	Rhame	No	ridge	---	---	---	---
	Arikara	No	ridge	---	---	---	---
	Fleak	No	ridge	---	---	---	---
	Tusler	No	ridge	---	---	---	---
	Chinook	No	ridge	---	---	---	---
	Kremlin	No	ridge	---	---	---	---
	Rhame, strongly sloping	No	ridge	---	---	---	---
	Blacksheep	No	ridge	---	---	---	---
	Maltese	No	ridge	---	---	---	---

Hydric Soils List--Continued

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
110C:							
Patent-Gerda-Slickspots complex, 1 to 9 percent slopes	Patent	No	alluvial fan	---	---	---	---
	Gerda	No	alluvial fan, alluvial flat	---	---	---	---
	Slickspots	No	alluvial fan, alluvial flat	---	---	---	---
	Benz	No	alluvial fan	---	---	---	---
	Haydraw	No	alluvial fan	---	---	---	---
	Ethridge	No	alluvial fan	---	---	---	---
	Chinook	No	alluvial fan	---	---	---	---
	Sham	No	alluvial fan	---	---	---	---
	Yawdim	No	pediment	---	---	---	---
111F:							
Lonna-Arikara-Cabbart complex, 9 to 70 percent slopes	Lonna	No	ridge	---	---	---	---
	Arikara	No	ridge	---	---	---	---
	Cabbart	No	ridge	---	---	---	---
	Badland, outcrop	No	ridge	---	---	---	---
	Burgraff	No	ridge	---	---	---	---
	Fleak	No	ridge	---	---	---	---
	Rhame	No	ridge	---	---	---	---
	Havre	No	flood plain	---	---	---	---
112:							
Wolf Point silty clay loam, wooded, 0 to 1 percent slopes	Wolf Point, wooded	No	flood plain	---	---	---	---
	Havre	No	flood plain	---	---	---	---
	Channel	No	channel, flood plain	---	---	---	---
	Glendive	No	flood plain	---	---	---	---
	Ethridge	No	stream terrace	---	---	---	---
113:							
Havre silt loam, wooded, 0 to 1 percent slopes	Havre, wooded	No	flood plain	---	---	---	---
	Glendive, wooded	No	flood plain	---	---	---	---
	Channel	No	channel, flood plain	---	---	---	---
	Wolf Point	No	flood plain	---	---	---	---
	Kremlin	No	stream terrace	---	---	---	---
	Harriet	Yes	drainageway, flood plain	2B3	Yes	No	No
114B:							
Haplustolls-Ustorthents complex, 0 to 6 percent slopes	Haplustolls	No	stream terrace	---	---	---	---
	Ustorthents	No	stream terrace	---	---	---	---
	Spoil pile	No	stream terrace	---	---	---	---
115B:							
Cozberg-Chanta loams, 1 to 6 percent slopes	Cozberg	No	paleoterrace	---	---	---	---
	Chanta	No	paleoterrace	---	---	---	---
	Chinook	No	paleoterrace	---	---	---	---
	Kremlin	No	paleoterrace	---	---	---	---
	Tinsley	No	paleoterrace	---	---	---	---

Hydric Soils List--Continued

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria: Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
116F:							
Kremlin-Shibah loams, 9 to 50 percent slopes, very bouldery	Kremlin	No	ridge	---	---	---	---
	Kremlin, strongly sloping	No	ridge	---	---	---	---
	Shibah	No	ridge	---	---	---	---
	Boxwell	No	ridge	---	---	---	---
	Tanna	No	ridge	---	---	---	---
	Blacksheep	No	ridge	---	---	---	---
	Arikara	No	ridge	---	---	---	---
	Maltese	No	ridge	---	---	---	---
	Lonna	No	ridge	---	---	---	---
	Scairt	No	ridge	---	---	---	---
117B:							
Kremlin-Chanta loams, 1 to 6 percent slopes	Kremlin	No	paleoterrace	---	---	---	---
	Chanta	No	paleoterrace	---	---	---	---
	Littlemo	No	paleoterrace	---	---	---	---
	Chinook	No	paleoterrace	---	---	---	---
	Tinsley	No	paleoterrace	---	---	---	---
118F:							
Shibah-Rubbleland-Arikara complex, 15 to 70 percent slopes	Shibah	No	ridge	---	---	---	---
	Rubbleland	No	ridge	---	---	---	---
	Arikara	No	ridge	---	---	---	---
	Kremlin	No	ridge	---	---	---	---
	Rock outcrop	No	ridge	---	---	---	---
119:							
Glendive fine sandy loam, wooded, 0 to 3 percent slopes	Glendive, wooded	No	flood plain	---	---	---	---
	Glendive	No	flood plain	---	---	---	---
	Hanly	No	flood plain	---	---	---	---
	Channel	No	channel, flood plain	---	---	---	---
	Havre	No	flood plain	---	---	---	---
120B:							
Hanly fine sandy loam, wooded, 0 to 6 percent slopes	Hanly, wooded	No	flood plain	---	---	---	---
	Hanly	No	flood plain	---	---	---	---
	Glendive	No	flood plain	---	---	---	---
	Minnewaukan	Yes	flood plain	2B3	Yes	No	No
	Riverwash	Yes	flood plain	2B2,4	Yes	Yes	No
121F:							
Maltese-Lonna-Arikara complex, 3 to 50 percent slopes	Maltese	No	ridge	---	---	---	---
	Lonna	No	ridge	---	---	---	---
	Arikara	No	ridge	---	---	---	---
	Scairt	No	ridge	---	---	---	---
	Tanna	No	ridge	---	---	---	---
	Cabbart	No	ridge	---	---	---	---
	Lallie	Yes	ridge	2B3	Yes	No	No
	Yawdim	No	ridge	---	---	---	---

Hydric Soils List--Continued

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria: Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
122C:							
Bulltop-Shibah loams, 1 to 9 percent slopes	Bulltop	No	alluvial fan	---	---	---	---
	Shibah	No	alluvial fan, rise	---	---	---	---
	Kremlin	No	alluvial fan	---	---	---	---
	Cabbart	No	pediment, rise	---	---	---	---
	Burgraff	No	pediment	---	---	---	---
123E:							
Scairt-Maltese-Boxwell complex, 3 to 25 percent slopes	Scairt	No	ridge	---	---	---	---
	Maltese	No	ridge	---	---	---	---
	Gerda	No	ridge	---	---	---	---
	Boxwell	No	ridge	---	---	---	---
	Cabbart	No	ridge	---	---	---	---
	Kremlin	No	ridge	---	---	---	---
	Burgraff	No	ridge	---	---	---	---
	Rhame	No	ridge	---	---	---	---
	Yawdim	No	ridge	---	---	---	---
152:							
Heil silt loam, low precipitation, 0 to 1 percent slopes	Heil	Yes	depression	2B3,3	Yes	No	Yes
	Ethridge	No	alluvial flat	---	---	---	---
	Gerda	No	alluvial flat	---	---	---	---
	Harriet	Yes	alluvial flat	2B3,3	Yes	No	Yes
155:							
Dumps and pits, mine	Dumps and pits, mine	No	hill, hill, ridge, ridge	---	---	---	---
	Cabba	No	hill, ridge	---	---	---	---
	Flasher	No	hill, ridge	---	---	---	---
159:							
Straw-Daglum complex, channeled, 0 to 2 percent slopes	Channel	No	channel, flood plain	---	---	---	---
	Straw	No	flood plain	---	---	---	---
	Daglum	No	stream terrace	---	---	---	---
	Rhoades	No	stream terrace	---	---	---	---
	Belfield	No	stream terrace	---	---	---	---
	Grail	No	stream terrace, swale	---	---	---	---
	Harriet	Yes	drainageway, stream terrace	2B3	Yes	No	No
	Savage	No	stream terrace	---	---	---	---
175:							
Havre silt loam, 0 to 3 percent slopes, rarely flooded	Havre, rarely flooded	No	flood plain	---	---	---	---
	Channel	No	channel, flood plain	---	---	---	---
	Glendive	No	flood plain	---	---	---	---
	Patent	No	alluvial fan	---	---	---	---
177:							
Glendive fine sandy loam, 0 to 3 percent slopes, rarely flooded	Glendive, rarely flooded	No	flood plain	---	---	---	---
	Channel	No	channel, flood plain	---	---	---	---
	Hanly	No	flood plain	---	---	---	---
	Havre	No	flood plain	---	---	---	---
	Patent	No	alluvial fan	---	---	---	---

Hydric Soils List--Continued

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
183:							
Badland, high precipitation	Badland, high precipitation	No	ridge	---	---	---	---
	Cabba	No	ridge	---	---	---	---
	Lambert	No	alluvial fan	---	---	---	---
	Moreau	No	ridge	---	---	---	---
205:							
Harriet silt loam, low precipitation, 0 to 3 percent slopes	Harriet, low precipitation	Yes	alluvial flat, drainageway	2B3	Yes	No	No
	Slickspots	No	alluvial flat	---	---	---	---
	Gerda	No	alluvial flat	---	---	---	---
210C:							
Lambert-Slickspots-Rhoades complex, 1 to 9 percent slopes	Lambert	No	alluvial fan	---	---	---	---
	Slickspots	No	alluvial fan, alluvial flat	---	---	---	---
	Rhoades	No	alluvial fan, alluvial flat	---	---	---	---
	Daglum	No	alluvial fan	---	---	---	---
	Korell	No	flood plain	---	---	---	---
	Rhoades	No	alluvial fan	---	---	---	---
255:							
Pits, gravel and sand, low precipitation	Pits, gravel and sand, low precipitation	No	paleoterrace, paleoterrace	---	---	---	---
	Chanta	No	paleoterrace	---	---	---	---
	Tinsley	No	paleoterrace	---	---	---	---
M-W:							
Miscellaneous water	Miscellaneous water	No	---	---	---	---	---
W:							
Water	Water	No	---	---	---	---	---

HYDRIC SOILS CRITERIA CODES AND DEFINITIONS

1. All Histosols except Folists, or

2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Aquisalids, Pachic subgroups, or Cumulic subgroups that are:

   a. Somewhat poorly drained with a water table equal to 0.0 foot (ft) from the surface during the growing season, or

   b. poorly drained or very poorly drained and have either:

      (1) water table equal to 0.0 ft during the growing season if textures are coarse sand, sand, or fine sand in all layers within 20 inches (in), or for other soils

      (2) water table at less than or equal to 0.5 ft from the surface during the growing season if permeability is equal to or greater than 6.0 in/hour (h) in all layers within 20 in, or

(3) water table at less than or equal to 1.0 ft from the surface during the growing season if permeability is less than 6.0 in/h in any layer within 20 in, or

3. Soils that are frequently ponded for long duration or very long duration during the growing season, or

4. Soils that are frequently flooded for long duration or very long duration during the growing season.

References

American Association of State Highway and Transportation Officials (AASHTO). 2002. Standard specifications for transportation materials and methods of sampling and testing. Ed. 22.

American Society for Testing and Materials (ASTM). 2000. Standard practice for classification of soils for engineering purposes (Unified Soil Classification System). ASTM Stand. D 2487.

Anna, Lawrence O., 1981. Ground-water resources of Billings, Golden Valley, and Slope Counties, North Dakota. North Dakota Geological Survey, Bull. 76 - Part III, and North Dakota state Water Commission County Ground Water Studies 31- Part III.

Billings County Historical Society, 1979. Echoing trails - Billings County history.

Bluemle, J.P. 1991. The face of North Dakota. Revised Ed. North Dakota Geological Survey. Ed. Series 21.

Broderson, W., 1991. From the surface down: An introduction to soil surveys for agronomic use. USDA-Soil Conservation Service, National Soil Survey Center, Lincoln, NE.

Brubaker, S.C. and C. T. Hallmark, 1991. A Comparison of Statistical Methods for Evaluating Map Unit Composition. p. 73-88. In M.J. Mausbach and L.P. Wilding (ed.) Spatial Variabilities of Soils and Landforms. SSSA Special Publication Number 28 Soil Science Society of America, Inc. Madison, WI.

Buol, S.W., F.D. Hole, and R.J. McCracken. 1980. Soil genesis and classification. 3rd edition.

Clayton, L, S. Moran, and J. Bluemle, 1980. Explanatory text to accompany the geologic map of North Dakota. North Dakota Geological Survey Report of Investigation, No. 69

Cowardin, L. M., V. Carter, F.C. Golet, and E. T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. USDI-Fish and Wildlife Service. FWS/OSB-79/31.

Environmental Laboratory. 1987. Corps of Engineers Wetlands delineation manual. Tech. Rpt. Y-87-1. U.S. Army Engineers Waterways Experiment Station, Vicksburg, MS.

Federal Register. July 13, 1994. Changes in hydric soils of the United States. Washington, D.C.

Federal Register. February 24, 1995. Hydric soils of the United States, Washington, D.C.

Franzen, D., C. Fanning, and T. Gregoire. 1994. Managing saline soils in North Dakota. North Dakota Agric. Ext. Ser. Bull. SF-1087.

Hartwig, Doug, and Bill Meyer. 2002. North Dakota Agricultural Statistics - 2001. North Dakota Agric. Stat. Serv., Ag. Statistics No. 71. North Dakota State University and USDA-National Agricultural Statistics Service.

Jakes, P.J. and W.B. Smith. 1982. A second look at North Dakota's timber land. NC For. Exp. Sta., USDA-Forest Service, Res. Bull. ND-58.

Jensen, R. E., 1972. Climate of North Dakota. North Dakota State University, Fargo, ND.

National Research Council. 1995. Wetlands: Characteristics and boundaries. National Academy Press. Washington, D.C.

Omodt, H. W., G. A. Johnsgard, D. D. Patterson, and O. P. Olson. 1968. The major soils of North Dakota. North Dakota. Agric. Exp. Stn., Bull. 472.

Patterson, D. D., G. A. Johnsgard, M. D. Sweeney, and H. W. Omodt. 1968. Soil survey report, county general soil maps, North Dakota. North Dakota Agric. Exp. Stn., Bull. 473.

Seelig, B. D. 1993. Soil survey: The foundation for productive natural resource management. North Dakota Agric. Ext. Ser. Bull. 60.

Seelig, B. D. and J. L. Richardson. 1991. Salinity and sodicity in North Dakota soils. North Dakota Agric. Ext. Ser. Bull. EB57.

Soil Survey Staff. 1999. Soil Taxonomy: A basic system of soil classification for making and interpreting soil surveys. USDA-Soil Conservation Service Agric. Hand. 436, 2nd ed., U.S. Govt. Print. Office, Washington, D.C.

Soil Survey Staff. 1993. Soil Survey Manual. USDA-Soil Conservation Service Agric. Hand. 18. U.S. Govt. Print. Office, Washington, D.C.

Soil Survey Staff. 1998. Keys to Soil Taxonomy. Eighth Edition. USDA-Natural Resources Conservation Service. U.S. Govt. Print. Office, Washington, D.C.

Soil Survey Staff. 1996. National Soil Survey Handbook, Title 430-VI. USDA-Natural Resources Conservation Service. U.S. Govt. Print. Office, Washington, D.C.

Tiner, R.W., Jr. 1985. Wetlands of Delaware. USDI-Fish and Wildlife Service, Newton Corner, MA and Delaware Department of Natural Resources and Environmental Control, Wetlands Section, Dover, DE.

Ulmer, M.G. and D.D. Patterson. 1988a. Crop yield interpretation for North Dakota: I. Sequential sampling. Soil Surv. Horiz. 29:116-122.

Ulmer, M. G. and D. D. Patterson. 1988b. Crop yield interpretation for North Dakota: II. Field questionnaires: A delphi example. Soil Surv. Horiz. 29: 123-132.

Ulmer, M. G., D. D. Patterson, and J.W. Enz. 1988c. Crop yield interpretation for North Dakota: III. Long-term empirical models. Soil Surv. Horiz. 29: 132-141.

United States Department of Agriculture-National Agricultural Statistics Service. Agricultural Statistics 2000. U.S. Govt. Print. Office, Washington, DC

United States Department of Agriculture-Natural Resources Conservation Service. 1994. State Soil Geographic Data Base. Misc. Pub. 1492. USDA-Natural Resources Conservation Service, Ft. Worth, TX.

United States Department of Agriculture-Natural Resources Conservation Service. 1998. Field indicators of hydric soils in the United States. Ver. 4.0. Hurt, G.W., P.M. Whited, R.F. Pringle, (eds.). USDA-Natural Resources Conservation Service, Fort Worth, TX.

United States Department of Agriculture-Soil Conservation Service. 1961. Land capability classification. USDA Handb. 210, U.S. Govt. Print. Office, Washington, D.C.

United States Department of Agriculture-Soil Conservation Service. 1981. Land resource regions and major land resource areas of the United States. Agric. Handb. 296, re. ed., U.S. Govt. Print. Office, Washington, D.C.

United States Department of Agriculture-Soil Conservation Service. 1992. Field Office Technical Guide. USDA-Natural ResourcesConservation Service, Bismarck, ND.

United States Department of Agriculture-Soil Quality Institute. 1998. Soil quality test kit guide.

Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvial fan. The fanlike deposit of a stream where it issues from a gorge upon a plain or of a tributary stream near or at its junction with its main stream.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Animal-unit month (AUM). The amount of forage required by one mature cow weighing approximately 1,000 pounds, with or without a calf, for 1 month.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Aspect. The direction in which a slope faces.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Atterberg Limits. A general term that encompasses liquid limit, plastic limit, and shrinkage limit. It is used as an integral part of several engineering classification systems.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	More than 12

Badland or Badland, outcrop. Moderately steep to very steep, commonly nonstony, barren land dissected by many intermittent drainage channels. Badland is most common in semiarid and arid regions where streams are entrenched in soft

geologic material. Local relief generally ranges from 25 to 500 feet. Runoff potential is very high, and geologic erosion is active.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface. It may be either **lithic** (digging with a hand spade impractical) or **paralithic** (dug with difficulty with a spade).

Blowout. A shallow depression from which all or most of the soil material has been removed by the wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breaks. The steep and very steep broken land at the border of an upland summit that is dissected by ravines.

Brush management. Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Butte. An isolated small mountain or hill with steep or precipitous sides and a top variously flat, rounded, or pointed that may be a residual mass isolated by erosion.

$CaCO_3$ Equivalent. The quantity of carbonate (CO_3) in the soil expressed as $CaCO_3$. This material is important to the fertility, erosion, available water holding capacity, and genesis of a soil.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or “chain,” of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Channery soil material. Soil material that is, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chemical treatment. Control of unwanted vegetation through the use of chemicals.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions. Low-chroma zones having a low content of iron, manganese, and clay because of the chemical reduction of iron and manganese and the removal of iron, manganese, and clay. A type of redoximorphic depletion.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax plant community. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that is 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

Colluvium. Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

Conglomerate. A coarse grained, clastic rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.....noncoherent when dry or moist; does not hold together in a mass.

Friable.....when moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.....when moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.....when wet, readily deformed by moderate pressure but can be pressed into a lump; will form a “wire” when rolled between thumb and forefinger.

Sticky.....when wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.....when dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.....when dry, breaks into powder or individual grains under very slight pressure.

Cemented.....hard, little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Contrasting soils (Dissimilar soils). Soils that do not share limits of diagnostic criteria, behave and perform in a similar manner, or have similar conservation needs or management requirements for the major land uses in the survey area.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Divided-slope farming. A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce the hazard of water erosion. One strip is in a close-growing crop that provides protection from erosion, and the other strip is in a crop that provides less protection from erosion. This practice is used where slopes are not long enough to permit a full stripcropping pattern to be used.

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized:

Excessively drained.....these soils have very high and high hydraulic conductivity and a low water-holding capacity. They are not suited to crop production unless irrigated.

Somewhat excessively drained.....these soils have high hydraulic conductivity and a low water-holding capacity. Without irrigation, only a narrow range of crops can be grown and yields are low.

Well drained.....these soils have an intermediate water-holding capacity. They retain optimum amounts of moisture, but they are not wet close enough to the surface or long enough during the growing season to adversely affect yields.

Moderately well drained.....these soils are wet close enough to the surface or long enough that planting or harvesting operations or yields of some field crops are adversely affected unless a drainage system is installed. Moderately well drained soils commonly have a layer with low hydraulic conductivity, a wet layer relatively high in the profile, additions of water by seepage, or some combination of these.

Somewhat poorly drained.....these soils are wet close enough to the surface or long enough that planting or harvesting operations or crop growth is markedly restricted unless a drainage system is installed. Somewhat poorly drained soils commonly have a layer with low hydraulic conductivity, a wet layer high in the profile, additions of water through seepage, or a combination of these.

Poorly drained .....these soils commonly are so wet at or near the surface during a considerable part of the year that field crops cannot be grown under natural conditions. Poorly drained conditions are caused by a saturated zone, a layer with low hydraulic conductivity, seepage, or a combination of these.

Very poorly drained.....these soils are wet to the surface most of the time. The wetness prevents the growth of important crops (except rice) unless a drainage system is installed.

Drainage, surface. Runoff, or surface flow of water, from an area.

Drainageway. An area of ground at a lower elevation than the surrounding ground and in which water collects and is drained to a closed depression or lake or to a drainageway at a lower elevation. A drainageway may or may not have distinctly incised channels at its upper reaches or throughout its course.

Draw. A small stream valley that generally is more open and has broader bottom land than a ravine or gulch.

Duripan. Subsurface horizon that is characterized by cementation by silica.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Endosaturation. A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Episaturation. A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Excess lime (in tables). Excess carbonates in the soil that restrict the growth of some plants.

Excess salts (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

Excess sodium (in tables). Excess exchangeable sodium in the soil. The resulting poor physical properties restrict the growth of plants.

Excess sulfur (in tables). Excessive amount of sulfur in the soil. The sulfur causes extreme acidity if the soil is drained, and the growth of most plants is restricted.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fan terrace. A relict alluvial fan, no longer a site of active deposition, incised by younger and lower alluvial surfaces.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called normal field capacity, normal moisture capacity, or capillary capacity.

Fill slope. A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine textured soil. Sandy clay, silty clay, or clay.

Flaggy soil material. Material that is, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flooding. The temporary covering of the soil surface by flowing water from any source.

Flooding frequency classes:

None ..... 0 percent chance of flooding in any year.
Rare ..... 0 to 5 percent chance of flooding in any year.
Occasional ..... 5 to 50 percent chance of flooding in any year.
Frequent ..... more than 50 percent chance of flooding in any year.

Flooding duration classes:

Extremely brief ..... 0.1 to 4.0 hours
Very brief ..... 4 to 48 hours
Brief ..... 2 to 7 days
Long ..... 7 to 30 days
Very long ..... more than 30 days

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Footslope. The bottom of a slope or the lower part of any elevated landform.

Forb. Any herbaceous plant not a grass or a sedge.

Forest cover. All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type. A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragile (in tables). A soil that is easily damaged by use or disturbance.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water. Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage. A gullied map unit is one that has numerous gullies.

Hardpan. A hardened or cemented soil horizon or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the “Soil Survey Manual.” The major horizons of mineral soil are as follows:

O horizon.....an organic layer of fresh and decaying plant residue.

A horizon.....the mineral horizon at or near the surface in which an accumulation of humidified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.....the mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.....the mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has

distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.....the mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.....Soft, consolidated bedrock beneath the soil.

Hummock. A slight mound or rise of ground above a level surface; generally of equidimensional shape and not ridge-like.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydric soil. Soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions for the upper part.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, plants invade following disturbance of the surface.

Iron depletions. Low-chroma zones having a low content of iron and manganese oxide because of chemical reduction and removal, but having a clay content similar to that of the adjacent matrix. A type of redoximorphic depletion.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.....Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.....Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Sprinkler.....Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

K Factor. Soil erodibility factor in the Universal Soil Loss Equation.
Knoll. A small, low, rounded hill rising above adjacent landforms.
Ksat. See saturated hydraulic conductivity.
Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.
Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.
Leaching. The removal of soluble material from soil or other material by percolating water.
Lime. A soil material that consists of precipitated calcium or magnesium carbonate.
Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.
Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.
Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.
Low-residue crops. Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.
Low strength. The soil is not strong enough to support loads.
Masses. Concentrations of substances in the soil matrix that do not have a clearly defined boundary with the surrounding soil material and cannot be removed as a discrete unit. Common compounds making up masses are calcium carbonate, gypsum or other soluble salts, iron oxide, and manganese oxide. Masses consisting of iron oxide or manganese oxide generally are considered a type of redoximorphic concentration.
Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.
Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.
Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.
Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.
Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.
Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.
Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.
Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.
Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.
Mottling, soil. Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance - few, common, and many; size - fine, medium, and coarse; and contrast - faint, distinct, and prominent. The size measurements are of the diameter along the greatest dimension. Fine indicates less than 5 millimeters (about 0.2 inch); medium, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and coarse, more than 15 millimeters (about 0.6 inch).
Mudstone. A blocky or massive, fine-grained sedimentary rock that consists of a mixture of clay, silt, and sand particles, the proportion of which vary from place to place.

Munsell notation. A designation of color by degrees of three simple variables - hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Natric horizon. A special kind of argillic horizon that contains enough exchangeable sodium to have an adverse effect on the physical condition of the subsoil.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules. Cemented bodies lacking visible internal structure. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up nodules. If formed in place, nodules of iron oxide or manganese oxide are considered types of redoximorphic concentrations.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low	1.0 to 2.0 percent
Moderate	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high	more than 8.0 percent

Paleoterrace. An erosional remnant of a terrace which retains the surface form and alluvial deposits of its origin but was not emplaced by, and comonly does not grade to a present-day stream or drainage network.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, hardpan, fragipan, claypan, plowpan, and traffic pan.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called “a soil.” A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. See saturated hydraulic conductivity (Ksat).

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plateau. An extensive upland mass with relatively flat summit area that is considerably elevated (more than 100 meters) above adjacent lowlands and separated from them on one or more sides by escarpments.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Very brief	less than 2 days
Brief	2 to 7 days
Long	7 to 30 days
Very long	more than 30 days

Poor filter (in tables). Because of rapid or very rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Porcelanite (scoria). Shale and clay that are fused as a result of their proximity to a burning coal vein.

Potential native plant community. See Climax plant community.

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning. Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Range condition. The present composition of the plant community on a range site in relation to the potential natural plant community for that site. Range condition is expressed as excellent, good, fair, or poor on the basis of how much the present plant community has departed from the potential.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3

Slightly alkaline ..... 7.4 to 7.8
Moderately alkaline ..... 7.9 to 8.4
Strongly alkaline ..... 8.5 to 9.0
Very strongly alkaline ..... 9.1 and higher

Redoximorphic concentrations. Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

Redoximorphic depletions. Low-chroma (2 or less) zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

Redoximorphic features. Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

Reduced matrix. A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Revised Universal Soil Loss Equation (RUSLE). An erosion model designed to predict the long term average soil loss carried by runoff from specific field slopes in specified cropping and management systems.

Rill. A steep-sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rock outcrop. Exposures of bare bedrock other than lava flows and rock-lined pits. Most rock outcrops are hard rock.

Root shearing. The cutting, tearing, and disruption of plant roots by the hooves of animals during grazing when the soil is wet and soft.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline seep. Areas of nonirrigated soils with restricted drainage, where salinity has recently developed.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Saline-sodic soil. A soil containing a combination of soluble salts and exchangeable sodium sufficient to interfere with the growth of plants.

Salty water (in tables). Water that is too salty for consumption by livestock.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Saturated hydraulic conductivity (Ksat). The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. Terms describing saturated hydraulic conductivity, measured in inches per hour, are as follows:

Extremely slow	0.0 to 0.01 inch
Very slow	0.01 to 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shoulder slope. The uppermost inclined surface at the top of a hillside. It is the transition zone from the back slope to the summit of a hill or mountain. The surface is dominantly convex in profile and erosional in origin.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silicrete. A hard siltstone that is cemented with silica.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slickspot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil generally is silty or clayey, is slippery when wet, and is low in productivity.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a

slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey, classes for simple slopes are as follows:

Level	0 to 1 percent
Level and nearly level	0 to 3 percent
Nearly level	1 to 3 percent
Gently sloping or undulating	3 to 6 percent
Moderately sloping or gently rolling	6 to 9 percent
Strongly sloping or rolling	9 to 15 percent
Moderately steep or hilly	15 to 25 percent
Steep	25 to 35 percent
Very steep	More than 35 percent

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Sodic (alkali) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration. The degrees of sodicity and their respective ratios are:

Slight	less than 13:1
Moderate	13-30:1
Strong	more than 30:1

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil depth class. The distance from the top of the soil to the underlying bedrock. The distance, in inches, is expressed as:

Very shallow	less than 10 inches
Shallow	10 to 20 inches
Moderately deep	20 to 40 inches
Deep	40 to 60 inches
Very deep	greater than 60 inches

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are - platy (laminated), prismatic (vertical axis of aggregates longer than horizontal), columnar (prisms with rounded tops), blocky (angular or subangular), and granular. Structureless soils are either single grained (each grain by itself, as in dune sand) or massive (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the “plow layer,” or the “Ap horizon.”

Surface soil. The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are - sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay

loam, silty clay loam, sandy clay, silty clay, and clay. The sand, loamy sand, and sandy loam classes may be further divided by specifying “coarse,” “fine,” or “very fine.”

Thin layer (in tables). Otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope. The lower gentle slope of a hillside. The lowest part of a foot slope.

Too arid (in tables). The soil is dry most of the time and vegetation is difficult to establish.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Toxicity (in tables). Excessive amount of toxic substances, such as sodium or sulfur, that severely hinder establishment of vegetation or severely restrict plant growth.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Universal Soil Loss Equation (USLE). An equation used to design water erosion control systems: **A—RKLSPC** where **A** is average annual soil loss in tons per acre per year; **R** is the rainfall factor; **K** is the soil erodibility factor; **L** is the length of slope; **S** is the percent slope; **P** is the conservation practice factor; and **C** is the cropping and management factor.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland. Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley. An elongated depressional area primarily developed by stream action.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Very deep soil. A soil that is more than 60 inches deep over bedrock or to other material that restricts the penetration of plant rows.

Water table. The upper surface of groundwater or that level below the surface where the soil is saturated with water. For soil survey purposes, the depth the water table is observed is within 60 inches from the surface.

Apparent.....Level at which water stands in a freshly dug, unlined borehole after it has adequate time for adjustments in the surrounding soil.

Perched.....A saturated soil zone above an unsaturated layer in the soil.

Artesian.....A water table under hydrostatic head beneath an impermeable layer.

Seasonal.....A water table within 60 inches of the surface during the growing season.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth’s surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windsculptured. A land surface of which its form has been changed by action of the wind.

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