United States Department of Agriculture

Natural Resources Conservation Service

In cooperation with University of Nebraska, Conservation and Survey Division; South Platte Natural Resources District; and Deuel County Board of Commissioners

Soil Survey of Deuel County, Nebraska

How To Use This Soil Survey

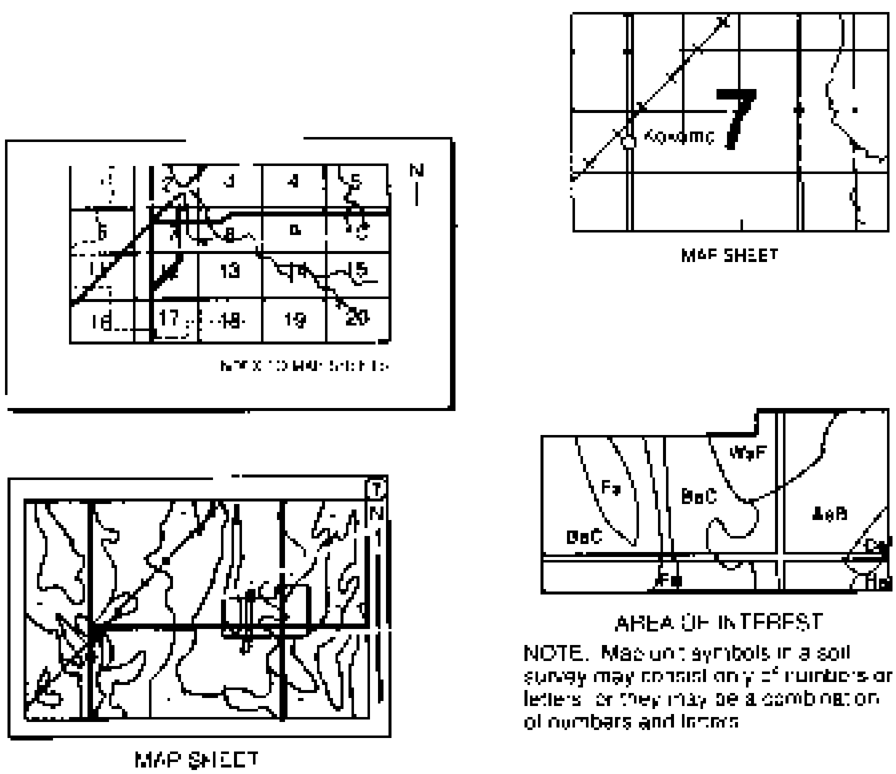
Detailed Soil Maps

The detailed soil maps can be useful in planning the use and management of small areas.

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.

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.

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 Stations, 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.

Major fieldwork for this soil survey was completed in 1998. Soil names and descriptions were approved in 2000. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1998. This survey was made cooperatively by the Natural Resources Conservation Service and the University of Nebraska, Conservation and Survey Division. It is part of the technical assistance furnished to the South Platte Natural Resources District and Deuel County. The Conservation and Survey Division provided a soil scientist to assist with the field mapping.

Cover: Harvesting winter wheat on the tableland in Deuel County.

Additional information about the Nation's natural resources is available on the Natural Resources Conservation Service homepage on the World Wide Web. The address is http://www.nrcs.usda.gov.

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Issued 2002

Foreword

This soil survey contains information that affects land use planning in this survey area. It contains predictions of soil behavior for selected land uses. The survey also highlights soil limitations, 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.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help the land user identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

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. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described, and information on specific uses is given. 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.

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State Conservationist
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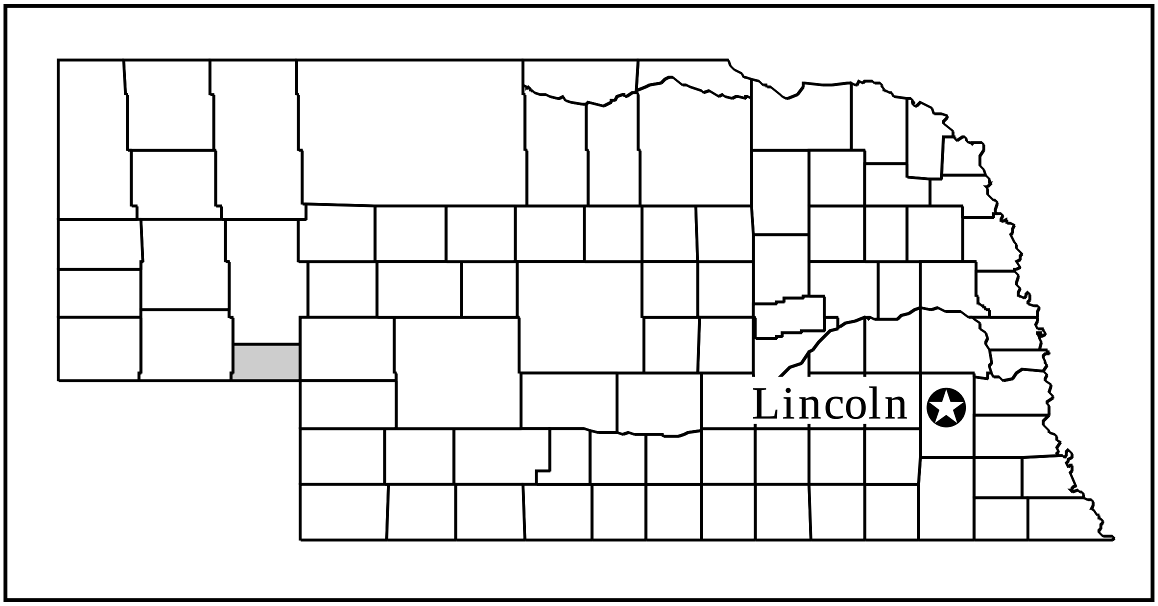

Location of Deuel County in Nebraska.

Soil Survey of
Deuel County, Nebraska

Fieldwork by Jay Wilson and Alan Stuebe, Natural Resources Conservation Service, and Phil Young, University of Nebraska

United States Department of Agriculture, Natural Resources Conservation Service,
in cooperation with
the Conservation and Survey Division, University of Nebraska; the South Platte Natural Resources District; and the Deuel County Board of Commissioners

DEUEL COUNTY is in the southeast corner of the panhandle of Nebraska. It has a total area of 282,093 acres. It is bordered on the north by Garden County, on the east by Keith County, on the west by Cheyenne County, and on the south by Sedgwick County in Colorado.

General Nature of the County

The following paragraphs provide general information about Deuel County. They describe history and development; physiography, drainage, and relief; and climate.

History and Development

The area that is now Deuel County was part of the hunting grounds of the Ogallala and Brule Indians, the two most powerful bands of the Teton Sioux. In 1834, the land in the region was set aside by the U.S. Government for the Indians. The first white settlers arrived in the area in 1850. Until 1861, when the telegraph was built through the region, communication with the outside was limited to the Pony Express.

The Union Pacific Railroad reached Deuel County in 1868. It followed the trail blazed by the trappers and gold seekers who passed through on the Oregon Trail. The railroad stimulated settlement in the area, especially in the southern part of the county along Lodgepole Creek and the South Platte River. The army posts that were established to protect the railroad crews from the Indians were partly responsible for the push of settlers into the county.

After crops were grown successfully in the area, homesteaders settled on the tablelands in the north-central part of the county. Some of the first settlers were a group of Swedish immigrants who settled at Froid in 1884. They built a church of sod in 1886, and the church served as a school house for 3 months of the year. But the town of Froid did not last, and the area later became part of Garden County.

In 1888, Deuel County was organized from part of Cheyenne County. Deuel County lost three-fourths of its original territory in the 1909 election, when Garden County was formed from the northern part.

As late as 1884, Chappell was only a railroad siding with a station house. During that year the town was surveyed and laid out, but few people settled permanently. Chappell was not incorporated until 1907, and even then it was difficult to find the 200 people required for incorporation. The town has always been considered the county seat, but a series of elections and lawsuits were needed before it was designated in 1894.

Big Springs, the only other town in the county, got its name from a nearby spring that furnished water for settlers. Although it was settled before Chappell, the town was not surveyed by the Union Pacific Railroad until 3 months after Chappell was laid out. Big Springs did not become a town until 1917.

The population of Deuel County and of Chappell has been slowly on the decline since 1920. In 1920, the population of the county was 3,282; in 1990, it was 2,237. The population of Chappell was 1,131 in 1920 and 979 in 1990. Big Springs, however, had 408 people in 1920 and 495 in 1990.

Farming and ranching are the main agricultural enterprises in the county. Farming consists mainly of the production of dryland winter wheat (about 87,000 acres) in a wheat-fallow rotation.

Other dryland crops, such as millet, sunflowers, and corn, are produced on about 25,000 acres in the county. Most irrigated acres are used for production of corn.

Deuel County consists of nearly level loess-covered tablelands dissected by Lodgepole Creek and the South Platte River and their tributaries. The soils on the tablelands are generally silty to loamy, and those on valley sides are loamy to sandy and gravelly. The soils on valley floors are silty to sandy. The depth to ground water and the affects of salinity and alkalinity vary in these soils.

The Union Pacific Railroad enters the county from the east, follows the South Platte River into Colorado, and reenters the county in Lodgepole Creek Valley. It passes through Chappell and exits on the western side of the county.

U.S. Highway 30 extends from east to west across the county and passes through Chappell. State Highway 138 follows the South Platte River in the southeast corner of the county. Interstate 80 enters near the southeast corner and exits west of Chappell. U.S. Highway 385 extends from Chappell and enters Colorado in the south-central part of the county. County roads are on most section lines and are maintained with gravel surfaces.

This soil survey updates the survey of Deuel County published in 1965 (USDA, 1965). It provides data that are consistent with modern soil surveys in Nebraska and adjoining states.

Physiography, Drainage, and Relief

Deuel County is in the Central High Tablelands Major Land Resource Area of the Central Great Plains Region. The dominant physiographic feature is a level to gently sloping tableland. The tableland is dissected with drainageways and the valleys of the South Platte River and Lodgepole Creek.

On the tablelands where drainage patterns are not well defined, rainwater drains into depressions that occasionally become ponded.

The South Platte River flows northeast across the southeast corner of the county. The South Platte River valley consists of flood plains and stream terraces. The flood plains have low relief and are adjacent to the river stream channels. The soils on flood plains commonly have a seasonal high water table and are subject to flooding. The stream terraces are commonly above the flood plains and at the base of the uplands. The soils on stream terraces have low relief and generally are well drained. The main tributaries of the South Platte River and Lodgepole Creek are Sand Draw, O'Neil Draw, Walrath Draw, and Dry Creek.

Lodgepole Creek, a perennial stream, enters the county at about the midpoint of the western side, flows southeast, and leaves the county at about the midpoint of the southwest side. Lodgepole Creek joins the South Platte River south of the Deuel County line in Sedgwick County, Colorado. Adjacent to the valley of Lodgepole Creek in the south-central part of the county is an area of sandhills 1 to 2 miles wide extending about 7 miles northwest from the Colorado line.

The general slope of the land is toward the southeast, and all of the drainageways flow in this general direction. The elevation in the county ranges from about 3,370 feet at Big Springs to 3,970 feet in the northwestern part of the county. The tablelands are 200 to 300 feet higher than the valley floors. Perennial streams fall at a rate of about 7 to 10 feet per mile.

Climate

Table 1 gives data on temperature and precipitation for the survey area as recorded at Big Springs in the period 1961 to 1990. Table 2 provides data on length of the growing season. Table 3 shows probable dates of the first freeze in fall and the last freeze in spring.

In winter, the average temperature is 27 degrees F and the average daily minimum temperature is 13 degrees. In summer, the average temperature is 72 degrees and the average daily maximum temperature is 86 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that 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 total annual precipitation is about 17 inches. Of this, 13 inches, or 77 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 13.74 inches. The average seasonal snowfall is about 14 inches. On the average, 32 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

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 their location and a discussion of their suitability, limitations, and management 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 into 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 other biological activity.

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

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Table 1.--Temperature and Precipitation

(Recorded in the period 1961-90 at Big Springs, Nebraska.)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	38.1	11.0	24.5	65	-20	7	0.38	0.19	0.65	1	2.1
February---	44.0	15.9	29.9	72	-14	24	.38	.13	.64	1	2.3
March------	51.8	24.0	37.9	81	-2	96	1.23	.38	1.92	2	3.7
April------	63.4	33.9	48.6	88	12	279	1.88	.94	2.81	4	1.6
May--------	71.9	44.5	58.2	92	26	547	3.36	1.67	4.83	6	.1
June-------	81.9	53.9	67.9	101	37	801	2.95	1.37	4.31	5	.0
July-------	88.9	60.2	74.6	103	47	1,044	2.14	1.26	2.92	5	.0
August-----	86.5	57.5	72.0	100	42	929	1.61	.67	2.41	3	.0
September--	77.2	47.0	62.1	96	28	627	1.12	.28	1.85	2	.0
October----	66.1	34.7	50.4	89	18	325	.77	.34	1.36	1	.1
November---	51.3	22.7	37.0	76	1	72	.57	.15	.98	1	2.3
December---	40.2	12.9	26.6	68	-18	12	.50	.14	.85	1	2.0
Yearly:											
Average---	63.4	34.9	49.1	---	---	---	---	---	---	---	---
Extreme---	106	-37	---	103	-24	---	---	---	---	---	---
Total-----	---	---	---	---	---	4,764	16.88	13.74	19.49	32	14.3

* 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 (40 degrees F).

Table 2.--Growing Season

(The dates in this table refer to the probable beginning and ending of the growing season. The number of days refers to the probable length of the growing season.)

Probability	Temperature		
	24 °F or higher	28 °F or higher	32 °F or higher
50 percent	4/13 to 10/15 185 days	4/24 to 10/9 168 days	5/8 to 9/30 145 days
70 percent	4/9 to 10/19 193 days	4/20 to 10/13 176 days	5/3 to 10/4 154 days

Table 3.--Freeze Dates in Spring and Fall

(Recorded in the period 1961-90 at Big Springs, Nebraska.)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 29	May 9	May 24
2 years in 10 later than--	Apr. 24	May 4	May 18
5 years in 10 later than--	Apr. 14	Apr. 24	May 8
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 3	Sept. 25	Sept. 15
2 years in 10 earlier than--	Oct. 8	Sept. 30	Sept. 20
5 years in 10 earlier than--	Oct. 17	Oct. 10	Sept. 29

Detailed Soil Map Units

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

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The contrasting minor components are mentioned in the map unit descriptions. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit.

Soils that have profiles that are almost alike make up a ***soil series***. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into ***soil phases***. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Las Animas loam, 0 to 1 percent slopes, occasionally flooded, is a phase of the Las Animas series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes 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. Alliance-Rosebud loams, 1 to 3 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. Gothenburg soils, 0 to 1 percent slopes, occasionally flooded, 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, sand and gravel, is an example.

In the descriptions, “LEP” means linear extensibility percent.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see Contents) 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.

1130—Alliance loam, 0 to 1 percent slopes

Map Unit Composition

Alliance and similar soils: 90 percent
Minor components: 10 percent

Component Descriptions

Alliance

MLRA: 72—Central High Tableland
Landform: Plain on tableland
Parent material: Loess over sandstone
Slope: 0 to 1 percent
Depth to restrictive feature: 40 to 60 inches to bedrock (paralithic)
Drainage class: Well drained
Slowest permeability: Moderately slow (about 0.20 in/hr)
Available water capacity: Moderate (about 8.6 inches)
Shrink-swell potential: Moderate (about 4.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Negligible
Ecological site: Silty; Veg. Zone 2
Land capability (irrigated): 1-4
Land capability (nonirrigated): 2c

Typical profile:
Ap—0 to 6 inches; loam
Bt1—6 to 17 inches; clay loam
Bt2—17 to 24 inches; loam
BCk—24 to 34 inches; loam
C1—34 to 47 inches; very fine sandy loam
2C2—47 to 54 inches; loamy fine sand
2Cr—54 to 80 inches; weathered bedrock

Minor components

Rosebud and similar soils
Slope: 0 to 1 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (paralithic)
Drainage class: Well drained
Ecological site: Silty; Veg. Zone 2

Major Uses

Most areas of this map unit are used for dryland production of winter wheat. In some areas a rotation of millet, sunflowers, or corn is used.

1146—Alliance-Rosebud loams, 1 to 3 percent slopes

Map Unit Composition

Alliance and similar soils: 65 percent
Rosebud and similar soils: 25 percent
Minor components: 10 percent

Component Descriptions

Alliance

MLRA: 72—Central High Tableland
Landform: Plain on tableland
Parent material: Loess over sandstone
Slope: 1 to 3 percent
Depth to restrictive feature: 40 to 60 inches to bedrock (paralithic)
Drainage class: Well drained
Slowest permeability: Moderately slow (about 0.20 in/hr)
Available water capacity: Moderate (about 7.8 inches)
Shrink-swell potential: Moderate (about 4.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Low
Ecological site: Silty; Veg. Zone 2
Land capability (irrigated): 2e-4
Land capability (nonirrigated): 2e

Typical profile:
Ap—0 to 6 inches; loam
Bt1—6 to 14 inches; clay loam
Bt2—14 to 19 inches; clay loam
Bk—19 to 25 inches; loam
C—25 to 45 inches; very fine sandy loam
Cr—45 to 60 inches; weathered bedrock

Rosebud

MLRA: 72—Central High Tableland
Landform: Plain on tableland

Parent material: Loess over sandstone
Slope: 1 to 3 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (paralithic)
Drainage class: Well drained
Slowest permeability: Moderately slow (about 0.20 in/hr)
Available water capacity: Low (about 5.3 inches)
Shrink-swell potential: Moderate (about 4.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Low
Ecological site: Silty; Veg. Zone 2
Land capability (irrigated): 3e-7
Land capability (nonirrigated): 3e

Typical profile:
Ap—0 to 6 inches; loam
Bt1—6 to 11 inches; clay loam
Bt2—11 to 17 inches; clay loam
BCk—17 to 23 inches; loam
C—23 to 30 inches; very fine sandy loam
Cr—30 to 80 inches; weathered bedrock

Minor components

Canyon and similar soils
Slope: 1 to 3 percent
Depth to restrictive feature: 6 to 20 inches to bedrock (paralithic)
Drainage class: Well drained
Ecological site: Shallow Limy; Veg. Zone 2

Major Uses

Most areas of this map unit are used for dryland production of winter wheat. In some areas a rotation of millet, sunflowers, or corn is used.

1198—Altvan-Eckley-Satanta complex, 3 to 9 percent slopes

Map Unit Composition

Altvan and similar soils: 45 percent
Eckley and similar soils: 30 percent
Satanta and similar soils: 20 percent
Minor components: 5 percent

Component Descriptions

Altvan

MLRA: 72—Central High Tableland
Landform: Hillside on upland
Hillslope position: Backslope, shoulder
Parent material: Loess over alluvium
Slope: 3 to 9 percent
Drainage class: Well drained
Slowest permeability: Moderately slow (about 0.20 in/hr)
Available water capacity: Low (about 5.8 inches)
Shrink-swell potential: Moderate (about 4.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Medium
Ecological site: Silty; Veg. Zone 2
Land capability (irrigated): 4e-7
Land capability (nonirrigated): 4e

Typical profile:
Ap—0 to 7 inches; fine sandy loam
Bt1—7 to 12 inches; loam
Bt2—12 to 17 inches; clay loam
BCk—17 to 25 inches; very fine sandy loam
C1—25 to 31 inches; loamy fine sand
2C2—31 to 80 inches; gravelly coarse sand

Eckley

MLRA: 72—Central High Tableland
Landform: Hillside on upland
Hillslope position: Shoulder, backslope
Parent material: Alluvium
Slope: 3 to 9 percent
Drainage class: Well drained
Slowest permeability: Moderately slow (about 0.20 in/hr)
Available water capacity: Low (about 3.0 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Low
Ecological site: Shallow to Gravel; Veg. Zone 2
Land capability (nonirrigated): 6e

Typical profile:
Ap—0 to 5 inches; sandy loam
Bt—5 to 8 inches; sandy clay loam
BC—8 to 11 inches; gravelly sandy loam
2C1—11 to 15 inches; gravelly coarse sand
2C2—15 to 80 inches; gravelly coarse sand

Satanta

MLRA: 72—Central High Tableland
Landform: Hillside on upland
Hillslope position: Backslope, shoulder
Parent material: Loess
Slope: 3 to 9 percent
Drainage class: Well drained

Slowest permeability: Moderately slow (about 0.20 in/hr)
Available water capacity: Moderate (about 8.5 inches)
Shrink-swell potential: Moderate (about 4.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Medium
Ecological site: Silty; Veg. Zone 2
Land capability (irrigated): 4e-4
Land capability (nonirrigated): 4e

Typical profile:
Ap—0 to 10 inches; loam
Bt1—10 to 21 inches; loam
Bt2—21 to 30 inches; clay loam
BCk—30 to 37 inches; very fine sandy loam
C—37 to 42 inches; very fine sandy loam
2C1—42 to 50 inches; loamy fine sand
2C2—50 to 80 inches; fine sand

Minor components

Broadwater
Extent within map unit: About 3 percent
Slope: 1 to 3 percent
Drainage class: Somewhat excessively drained
Ecological site: Shallow to Gravel; Veg. Zone 2

Sarben and similar soils
Extent within map unit: About 2 percent
Geomorphic position: Hillside on upland
Slope: 3 to 9 percent
Drainage class: Well drained
Ecological site: Sandy; Veg. Zone 2

Major Uses

Most areas of this map unit are used for dryland production of winter wheat. In some areas a rotation of millet, sunflowers, or corn is used.

1295—Ashollow-Tassel complex, 9 to 30 percent slopes

Map Unit Composition

Ashollow and similar soils: 65 percent
Tassel and similar soils: 30 percent
Minor components: 5 percent

Component Descriptions

Ashollow

MLRA: 72—Central High Tableland
Landform: Hillside on upland
Hillslope position: Footslope
Parent material: Sandstone residuum
Slope: 9 to 17 percent
Drainage class: Well drained
Slowest permeability: Moderate (about 0.60 in/hr)
Available water capacity: High (about 10.1 inches)
Shrink-swell potential: Low (about 0.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: High
Ecological site: Sandy; Veg. Zone 2
Land capability (nonirrigated): 6e

Typical profile:
A—0 to 3 inches; very fine sandy loam
AC—3 to 10 inches; very fine sandy loam
C1—10 to 32 inches; very fine sandy loam
C2—32 to 60 inches; very fine sandy loam

Tassel

MLRA: 72—Central High Tableland
Landform: Hillside on upland
Hillslope position: Backslope, shoulder
Parent material: Sandstone residuum
Slope: 9 to 30 percent
Depth to restrictive feature: 6 to 20 inches to bedrock (paralithic)
Drainage class: Somewhat excessively drained
Slowest permeability: Moderately rapid (about 2.00 in/hr)
Available water capacity: Very low (about 1.9 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Medium
Ecological site: Shallow Limy; Veg. Zone 2
Land capability (nonirrigated): 6s

Typical profile:
A—0 to 4 inches; fine sandy loam
C1—4 to 7 inches; fine sandy loam
C2—7 to 18 inches; gravelly fine sandy loam
Cr—18 to 60 inches; weathered bedrock

Minor components

Rock outcrop
Geomorphic position: Hillside on upland
Slope: 30 to 60 percent
Drainage class: Excessively drained
Ecological site: None; Veg. Zone 2

Major Uses

Most areas of this map unit are used as rangeland.

1588—Blueridge-Altvan complex, 6 to 30 percent slopes

Map Unit Composition

Blueridge and similar soils: 50 percent
Altvan and similar soils: 35 percent
Minor components: 15 percent

Component Descriptions

Blueridge

MLRA: 72—Central High Tableland
Landform: Hillside on upland
Hillslope position: Backslope, shoulder
Parent material: Very old alluvium that is now part of the dissected upland
Slope: 6 to 30 percent
Drainage class: Excessively drained
Slowest permeability: Very rapid (about 20.00 in/hr)
Available water capacity: Very low (about 1.9 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Low
Ecological site: Shallow to Gravel; Veg. Zone 2
Land capability (nonirrigated): 6s

Typical profile:
A—0 to 4 inches; coarse sand
C1—4 to 40 inches; gravelly coarse sand
C2—40 to 80 inches; gravelly coarse sand

Altvan

MLRA: 72—Central High Tableland
Landform: Hillside on upland
Hillslope position: Shoulder, footslope
Parent material: Loess and the underlying old alluvium
Slope: 6 to 9 percent
Drainage class: Well drained
Slowest permeability: Moderately slow (about 0.20 in/hr)
Available water capacity: Moderate (about 6.5 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: High
Ecological site: Silty; Veg. Zone 2
Land capability (nonirrigated): 6e

Typical profile:
Ap—0 to 7 inches; loam
Bt1—7 to 10 inches; sandy clay loam
Bt2—10 to 20 inches; sandy clay loam
BCk—20 to 24 inches; very fine sandy loam
C1—24 to 30 inches; loamy fine sand
2C2—30 to 80 inches; gravelly sand

Minor components

Sarben and similar soils
Extent within map unit: About 10 percent
Geomorphic position: Hillside on upland
Slope: 6 to 9 percent
Drainage class: Well drained
Ecological site: Sandy; Veg. Zone 2

Broadwater
Extent within map unit: About 5 percent
Slope: 1 to 3 percent
Drainage class: Somewhat excessively drained
Ecological site: Shallow to Gravel; Veg. Zone 2

Major Uses

Most areas of this map unit are used as rangeland (fig. 1).

1782—Broadwater loamy sand, 0 to 1 percent slopes, frequently flooded

Map Unit Composition

Broadwater: 90 percent
Minor components: 10 percent

Component Descriptions

Broadwater

MLRA: 72—Central High Tableland
Landform: Flood plain on valley
Parent material: Alluvium
Slope: 0 to 1 percent
Drainage class: Somewhat excessively drained
Slowest permeability: Rapid (about 6.00 in/hr)
Available water capacity: Very low (about 2.4 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: Frequent
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Negligible
Ecological site: Shallow to Gravel; Veg. Zone 2
Land capability (nonirrigated): 6w

Figure 1.—Native pasture on Blueridge-Altvan complex, 6 to 30 percent slopes. The South Platte River valley is in the background.

Typical profile:
A—0 to 3 inches; loamy sand
C1—3 to 9 inches; loamy sand
2C2—9 to 32 inches; gravelly coarse sand
2C3—32 to 60 inches; gravelly coarse sand

Minor components

Chappell and similar soils
Extent within map unit: About 5 percent
Slope: 0 to 1 percent
Drainage class: Well drained
Ecological site: Sandy; Veg. Zone 2

Glenberg and similar soils
Extent within map unit: About 5 percent
Slope: 0 to 2 percent
Drainage class: Well drained
Ecological site: Sandy Lowland; Veg. Zone 1

Major Uses

Most areas of this map unit are used as rangeland.

1944—Calamus sand, 0 to 1 percent slopes, very rarely flooded

Map Unit Composition

Calamus and similar soils: 95 percent
Minor components: 5 percent

Component Descriptions

Calamus

MLRA: 72—Central High Tableland
Landform: Flood plain on river valley
Parent material: Alluvium
Slope: 0 to 1 percent
Drainage class: Moderately well drained
Slowest permeability: Rapid (about 6.00 in/hr)
Available water capacity: Low (about 3.3 inches)
Shrink-swell potential: Low (about 0.5 LEP)
Flooding hazard: Very rare
Depth to seasonal zone of saturation: About 36 to 72 inches

Runoff class: Negligible
Ecological site: Sandy; Veg. Zone 2
Land capability (irrigated): 4s-14
Land capability (nonirrigated): 6s

Typical profile:
Ap—0 to 7 inches; loamy sand
AC—7 to 14 inches; sand
C1—14 to 22 inches; sand
C2—22 to 38 inches; sand
C3—38 to 58 inches; stratified gravelly coarse sand to coarse sand
C4—58 to 60 inches; stratified gravelly coarse sand to coarse sand

Minor components

Platte and similar soils
Slope: 0 to 1 percent
Drainage class: Somewhat poorly drained
Ecological site: Subirrigated; Veg. Zone 2

Special Features

This map unit consists of old alluvial sandbars that have been reworked by wind. The river within this map unit has become entrenched. Dams that have been built upstream reduce the hazard of flooding.

Major Uses

Most areas of this map unit are used as rangeland.

2072—Chappell-Alice-Broadwater complex, 0 to 3 percent slopes

Map Unit Composition

Chappell and similar soils: 38 percent
Alice and similar soils: 33 percent
Broadwater soil: 24 percent
Minor components: 5 percent

Component Descriptions

Chappell

MLRA: 72—Central High Tableland
Landform: Stream terrace on river valley
Parent material: Alluvium
Slope: 0 to 3 percent
Drainage class: Well drained
Slowest permeability: Moderately rapid (about 2.00 in/hr)
Available water capacity: Low (about 5.3 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Very low
Ecological site: Sandy; Veg. Zone 2
Land capability (irrigated): 2e-9
Land capability (nonirrigated): 3e

Typical profile:
Ap—0 to 7 inches; fine sandy loam
A—7 to 17 inches; fine sandy loam
Bw—17 to 25 inches; fine sandy loam
C1—25 to 30 inches; fine sandy loam
2C2—30 to 60 inches; gravelly coarse sand

Alice

MLRA: 72—Central High Tableland
Landform: Stream terrace on river valley
Parent material: Alluvium
Slope: 0 to 3 percent
Drainage class: Well drained
Slowest permeability: Moderately rapid (about 2.00 in/hr)
Available water capacity: Moderate (about 7.4 inches)
Shrink-swell potential: Low (about 0.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Very low
Ecological site: Sandy; Veg. Zone 2
Land capability (irrigated): 2e-8
Land capability (nonirrigated): 3e

Typical profile:
Ap—0 to 8 inches; sandy loam
A—8 to 14 inches; sandy loam
Bw—14 to 19 inches; sandy loam
C1—19 to 33 inches; sandy loam
C2—33 to 80 inches; sandy loam

Broadwater

MLRA: 72—Central High Tableland
Landform: Flood plain on river valley
Parent material: Alluvium
Slope: 0 to 3 percent
Drainage class: Somewhat excessively drained
Slowest permeability: Rapid (about 6.00 in/hr)
Available water capacity: Very low (about 2.4 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: Occasional
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Negligible
Ecological site: Shallow to Gravel; Veg. Zone 2
Land capability (nonirrigated): 6w

Typical profile:
A—0 to 3 inches; loamy sand
C1—3 to 9 inches; loamy sand

2C2—9 to 32 inches; gravelly coarse sand
2C3—32 to 60 inches; gravelly coarse sand

Minor components

Duroc and similar soils
Slope: 0 to 3 percent
Drainage class: Well drained
Ecological site: Silty; Veg. Zone 2

Major Uses

Most areas of this map unit are used for dryland production of winter wheat. In some areas a rotation of millet, sunflowers, or corn is used.

2630—Duroc loam, 0 to 1 percent slopes

Map Unit Composition

Duroc and similar soils: 90 percent
Minor components: 10 percent

Component Descriptions

Duroc

MLRA: 72—Central High Tableland
Landform: Swale on tableland
Parent material: Alluvium
Slope: 0 to 1 percent
Drainage class: Well drained
Slowest permeability: Moderate (about 0.60 in/hr)
Available water capacity: High (about 11.1 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Negligible
Ecological site: Silty; Veg. Zone 2
Land capability (irrigated): 1-6
Land capability (nonirrigated): 2c

Typical profile:
Ap—0 to 6 inches; loam
A—6 to 14 inches; loam
Bw1—14 to 27 inches; loam
Bw2—27 to 32 inches; loam
Bk—32 to 42 inches; loam
C—42 to 60 inches; loam

Minor components

Kuma and similar soils
Extent within map unit: About 8 percent
Slope: 0 to 1 percent
Drainage class: Well drained
Ecological site: Silty; Veg. Zone 2

Lodgepole and similar soils
Extent within map unit: About 2 percent
Slope: 0 to 1 percent
Drainage class: Somewhat poorly drained
Ecological site: Clayey Overflow; Veg. Zone 2

Major Uses

Most areas of this map unit are used for dryland production of winter wheat. In some areas a rotation of millet, sunflowers, or corn is used.

2638—Duroc loam, terrace, 0 to 1 percent slopes

Map Unit Composition

Duroc and similar soils: 90 percent
Minor components: 10 percent

Component Descriptions

Duroc

MLRA: 72—Central High Tableland
Landform: Stream terrace on river valley
Parent material: Alluvium
Slope: 0 to 1 percent
Drainage class: Well drained
Slowest permeability: Moderate (about 0.60 in/hr)
Available water capacity: High (about 11.4 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Negligible
Ecological site: Silty; Veg. Zone 2
Land capability (irrigated): 1-6
Land capability (nonirrigated): 2c

Typical profile:
Ap—0 to 12 inches; loam
A—12 to 24 inches; loam
Bw—24 to 31 inches; loam
BC—31 to 37 inches; loam
C1—37 to 46 inches; loam
C2—46 to 60 inches; loam

Minor components

Alice and similar soils
Extent within map unit: About 5 percent
Slope: 0 to 1 percent
Drainage class: Well drained
Ecological site: Sandy; Veg. Zone 2

Chappell and similar soils
Extent within map unit: About 5 percent

Slope: 0 to 1 percent
Drainage class: Well drained
Ecological site: Sandy; Veg. Zone 2

Major Uses

Most areas of this map unit are used for irrigated production of corn and alfalfa.

2639—Duroc loam, terrace, 1 to 3 percent slopes

Map Unit Composition

Duroc and similar soils: 90 percent
Minor components: 10 percent

Component Descriptions

Duroc

MLRA: 72—Central High Tableland
Landform: Stream terrace on river valley
Parent material: Alluvium
Slope: 1 to 3 percent
Drainage class: Well drained
Slowest permeability: Moderate (about 0.60 in/hr)
Available water capacity: High (about 11.4 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Low
Ecological site: Silty; Veg. Zone 2
Land capability (irrigated): 2e-6
Land capability (nonirrigated): 2e

Typical profile:
Ap—0 to 12 inches; loam
A—12 to 24 inches; loam
Bw—24 to 31 inches; loam
BC—31 to 37 inches; loam
C1—37 to 46 inches; loam
C2—46 to 60 inches; loam

Minor components

Alice and similar soils
Extent within map unit: About 5 percent
Slope: 1 to 3 percent
Drainage class: Well drained
Ecological site: Sandy; Veg. Zone 2

Chappell and similar soils
Extent within map unit: About 5 percent
Slope: 1 to 3 percent
Drainage class: Well drained
Ecological site: Sandy; Veg. Zone 2

Major Uses

Most areas of this map unit are used for irrigated production of corn and alfalfa.

3050—Glenberg fine sandy loam, 0 to 1 percent slopes, rarely flooded

Map Unit Composition

Glenberg and similar soils: 90 percent
Minor components: 10 percent

Component Descriptions

Glenberg

MLRA: 72—Central High Tableland
Landform: Flood plain on river valley
Parent material: Alluvium
Slope: 0 to 1 percent
Drainage class: Well drained
Slowest permeability: Moderately rapid (about 2.00 in/hr)
Available water capacity: Moderate (about 7.5 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: Rare
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Very low
Ecological site: Sandy Lowland; Veg. Zone 1
Land capability (irrigated): 2e-8
Land capability (nonirrigated): 3e

Typical profile:
A—0 to 8 inches; fine sandy loam
C—8 to 60 inches; stratified loamy fine sand to fine sandy loam to very fine sandy loam

Minor components

Chappell and similar soils
Extent within map unit: About 5 percent
Slope: 0 to 1 percent
Drainage class: Well drained
Ecological site: Sandy; Veg. Zone 2

Broadwater
Extent within map unit: About 5 percent
Slope: 0 to 1 percent
Drainage class: Somewhat excessively drained
Ecological site: Shallow to Gravel; Veg. Zone 2

Major Uses

Most areas of this map unit are used as rangeland.

3140—Gothenburg soils, 0 to 1 percent slopes, occasionally flooded

Map Unit Composition

Gothenburg and similar soils: 85 percent
Minor components: 15 percent

Component Descriptions

Gothenburg soils

MLRA: 72—Central High Tableland
Landform: Flood plain on river valley
Parent material: Alluvium
Slope: 0 to 1 percent
Drainage class: Poorly drained
Slowest permeability: Rapid (about 6.00 in/hr)
Available water capacity: Very low (about 2.5 inches)
Shrink-swell potential: Low (about 0.5 LEP)
Flooding hazard: Occasional
Depth to seasonal zone of saturation: About 0 to 18 inches
Runoff class: Very low
Land capability (nonirrigated): 7s

Typical profile:
A—0 to 5 inches; loamy sand
C—5 to 14 inches; sand
Cg—14 to 60 inches; coarse sand

Minor components

Platte and similar soils
Slope: 0 to 1 percent
Drainage class: Somewhat poorly drained
Ecological site: Subirrigated; Veg. Zone 2

Major Uses

Most areas of this map unit are used as rangeland.

3952—Jankosh loam, 0 to 1 percent slopes, rarely flooded

Map Unit Composition

Jankosh and similar soils: 85 percent
Minor components: 15 percent

Component Descriptions

Jankosh

MLRA: 72—Central High Tableland
Landform: Flood plain on river valley
Parent material: Alluvium
Slope: 0 to 1 percent
Drainage class: Somewhat poorly drained
Slowest permeability: Moderately slow (about 0.20 in/hr)
Available water capacity: Moderate (about 6.7 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: Rare
Depth to seasonal zone of saturation: About 18 to 36 inches
Runoff class: Low
Ecological site: Saline Subirrigated; Veg. Zone 2
Land capability (irrigated): 4s-6
Land capability (nonirrigated): 6s

Typical profile:
A—0 to 2 inches; loam
E—2 to 4 inches; loam
Btn—4 to 14 inches; sandy clay loam
Bkn1—14 to 18 inches; loam
Bkn2—18 to 33 inches; very fine sandy loam
2C—33 to 60 inches; gravelly coarse sand

Minor components

Platte and similar soils
Extent within map unit: About 10 percent
Slope: 0 to 1 percent
Drainage class: Somewhat poorly drained
Ecological site: Subirrigated; Veg. Zone 2

Lexsworth and similar soils
Extent within map unit: About 5 percent
Slope: 0 to 1 percent
Drainage class: Moderately well drained
Ecological site: Silty Lowland; Veg. Zone 2

Special Features

This map unit is on a high flood plain. The river channel has become entrenched. Dams that have been built upstream reduce the hazard of flooding.

Major Uses

Most areas of this map unit are used for dryland production of winter wheat. In some areas a rotation of millet, sunflowers, or corn is used.

4028—Jayem fine sandy loam, 0 to 2 percent slopes

Map Unit Composition

Jayem and similar soils: 90 percent
Minor components: 10 percent

Component Descriptions

Jayem

MLRA: 72—Central High Tableland

Landform: Plain on tableland
Parent material: Sandy and silty eolian deposits
Slope: 0 to 2 percent
Drainage class: Well drained
Slowest permeability: Moderately rapid (about 2.00 in/hr)
Available water capacity: Moderate (about 8.8 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Very low
Ecological site: Sandy; Veg. Zone 2
Land capability (irrigated): 2e-8
Land capability (nonirrigated): 3e

Typical profile:
Ap—0 to 6 inches; fine sandy loam
A—6 to 9 inches; fine sandy loam
Bw—9 to 22 inches; fine sandy loam
C1—22 to 50 inches; fine sandy loam
C2—50 to 60 inches; fine sandy loam

Minor components

Sarben and similar soils
Extent within map unit: About 5 percent
Slope: 0 to 2 percent
Drainage class: Well drained
Ecological site: Sandy; Veg. Zone 2

Satanta and similar soils
Extent within map unit: About 5 percent
Slope: 0 to 2 percent
Drainage class: Well drained
Ecological site: Silty; Veg. Zone 2

Major Uses

Most areas of this map unit are used for dryland production of winter wheat. In some areas a rotation of millet, sunflowers, or corn is used.

4070—Johnstown-Satanta-Richfield loams, 0 to 1 percent slopes

Map Unit Composition

Johnstown and similar soils: 35 percent
Satanta and similar soils: 31 percent
Richfield and similar soils: 29 percent
Minor components: 5 percent

Component Descriptions

Johnstown

MLRA: 72—Central High Tableland
Landform: Plain on tableland
Parent material: Loess
Slope: 0 to 1 percent
Drainage class: Well drained
Slowest permeability: Moderately slow (about 0.20 in/hr)
Available water capacity: High (about 9.0 inches)
Shrink-swell potential: Moderate (about 4.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Negligible
Ecological site: Silty; Veg. Zone 2
Land capability (irrigated): 1-4
Land capability (nonirrigated): 2c

Typical profile:
Ap—0 to 9 inches; loam
Bt1—9 to 25 inches; silty clay loam
Bt2—25 to 29 inches; silty clay loam
BCk—29 to 35 inches; loam
C1—35 to 46 inches; very fine sandy loam
2C2—46 to 60 inches; coarse sand

Satanta

MLRA: 72—Central High Tableland
Landform: Plain on tableland
Parent material: Loess
Slope: 0 to 1 percent
Drainage class: Well drained
Slowest permeability: Moderately slow (about 0.20 in/hr)
Available water capacity: High (about 9.8 inches)
Shrink-swell potential: Moderate (about 4.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Negligible
Ecological site: Silty; Veg. Zone 2
Land capability (irrigated): 1-4
Land capability (nonirrigated): 2c

Typical profile:
Ap—0 to 8 inches; loam
Bt—8 to 25 inches; clay loam
BCk—25 to 32 inches; loam
C1—32 to 52 inches; very fine sandy loam
2C2—52 to 60 inches; sand

Richfield

MLRA: 72—Central High Tableland
Landform: Plain on tableland
Parent material: Loess
Slope: 0 to 1 percent
Drainage class: Well drained
Slowest permeability: Very slow (about 0.01 in/hr)

Available water capacity: High (about 10.1 inches)
Shrink-swell potential: High (about 7.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Negligible
Ecological site: Silty; Veg. Zone 2
Land capability (irrigated): 1-4
Land capability (nonirrigated): 2c

Typical profile:
Ap—0 to 7 inches; loam
Bt1—7 to 12 inches; silty clay
Bt2—12 to 17 inches; silty clay loam
BC—17 to 21 inches; silt loam
BCk—21 to 32 inches; silt loam
C1—32 to 42 inches; silt loam
2C2—42 to 48 inches; fine sandy loam
2C3—48 to 78 inches; sandy loam
2C4—78 to 80 inches; gravelly coarse sand

Minor components

Altvan and similar soils
Slope: 0 to 1 percent
Drainage class: Well drained
Ecological site: Silty; Veg. Zone 2

Major Uses

Most areas of this map unit are used for dryland production of winter wheat. In some areas a rotation of millet, sunflowers, or corn is used.

4151—Keith loam, 1 to 3 percent slopes

Map Unit Composition

Keith and similar soils: 90 percent
Minor components: 10 percent

Component Descriptions

Keith

MLRA: 72—Central High Tableland
Landform: Plain on tableland
Parent material: Loess
Slope: 1 to 3 percent
Drainage class: Well drained
Slowest permeability: Moderately slow (about 0.20 in/hr)
Available water capacity: High (about 11.3 inches)
Shrink-swell potential: Moderate (about 4.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Low
Ecological site: Silty; Veg. Zone 2
Land capability (irrigated): 2e-4
Land capability (nonirrigated): 2e

Typical profile:
Ap—0 to 6 inches; loam
A—6 to 13 inches; loam
Bt1—13 to 22 inches; silty clay loam
Bt2—22 to 31 inches; silt loam
BCk—31 to 48 inches; silt loam
C—48 to 60 inches; very fine sandy loam

Minor components

Alliance and similar soils
Extent within map unit: About 5 percent
Slope: 1 to 3 percent
Depth to restrictive feature: 40 to 60 inches to bedrock (paralithic)
Drainage class: Well drained
Ecological site: Silty; Veg. Zone 2

Duroc and similar soils
Extent within map unit: About 3 percent
Slope: 1 to 3 percent
Drainage class: Well drained
Ecological site: Silty Lowland; Veg. Zone 2

Lodgepole and similar soils
Extent within map unit: About 2 percent
Slope: 0 to 1 percent
Drainage class: Somewhat poorly drained
Ecological site: Clayey Overflow; Veg. Zone 2

Major Uses

Most areas of this map unit are used for dryland production of winter wheat. In some areas a rotation of millet, sunflowers, or corn is used.

4152—Keith loam, 3 to 6 percent slopes

Map Unit Composition

Keith and similar soils: 90 percent
Minor components: 10 percent

Component Descriptions

Keith

MLRA: 72—Central High Tableland
Landform: Plain on tableland
Parent material: Loess
Slope: 3 to 6 percent
Drainage class: Well drained
Slowest permeability: Moderately slow (about 0.20 in/hr)
Available water capacity: High (about 10.6 inches)

Shrink-swell potential: Moderate (about 4.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Low
Ecological site: Silty; Veg. Zone 2
Land capability (irrigated): 3e-4
Land capability (nonirrigated): 3e

Typical profile:
Ap—0 to 7 inches; loam
Bt1—7 to 14 inches; silty clay loam
Bt2—14 to 19 inches; silt loam
BCk—19 to 25 inches; loam
C—25 to 60 inches; loam

Minor components

Alliance and similar soils
Extent within map unit: About 5 percent
Slope: 3 to 6 percent
Depth to restrictive feature: 40 to 60 inches to bedrock (paralithic)
Drainage class: Well drained
Ecological site: Silty; Veg. Zone 2

Sidney and similar soils
Extent within map unit: About 5 percent
Slope: 3 to 6 percent
Depth to restrictive feature: 40 to 60 inches to bedrock (paralithic)
Drainage class: Well drained
Ecological site: Silty; Veg. Zone 2

Major Uses

Most areas of this map unit are used for dryland production of winter wheat. In some areas a rotation of millet, sunflowers, or corn is used.

4310—Kuma loam, 0 to 1 percent slopes

Map Unit Composition

Kuma and similar soils: 95 percent
Minor components: 5 percent

Component Descriptions

Kuma

MLRA: 72—Central High Tableland
Landform: Plain on tableland
Parent material: Loess
Slope: 0 to 1 percent
Drainage class: Well drained
Slowest permeability: Moderate (about 0.60 in/hr)
Available water capacity: High (about 10.8 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Negligible
Ecological site: Silty; Veg. Zone 2
Land capability (irrigated): 1-4
Land capability (nonirrigated): 2c

Typical profile:
A—0 to 7 inches; loam
BA—7 to 17 inches; loam
Bt—17 to 24 inches; loam
Btb—24 to 37 inches; loam
Btkb—37 to 44 inches; loam
Bk—44 to 60 inches; loam

Minor components

Lodgepole and similar soils
Slope: 0 to 1 percent
Drainage class: Somewhat poorly drained
Ecological site: Clayey Overflow; Veg. Zone 2

Major Uses

Most areas of this map unit are used for dryland production of winter wheat. In some areas a rotation of millet, sunflowers, or corn is used.

4311—Kuma loam, 1 to 3 percent slopes

Map Unit Composition

Kuma and similar soils: 90 percent
Minor components: 10 percent

Component Descriptions

Kuma

MLRA: 72—Central High Tableland
Landform: Plain on tableland
Parent material: Loess
Slope: 1 to 3 percent
Drainage class: Well drained
Slowest permeability: Moderately slow (about 0.20 in/hr)
Available water capacity: High (about 11.2 inches)
Shrink-swell potential: Moderate (about 4.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Low
Ecological site: Silty; Veg. Zone 2
Land capability (irrigated): 2e-4
Land capability (nonirrigated): 2e

Typical profile:
Ap—0 to 6 inches; loam
Bt1—6 to 10 inches; silty clay loam
Bt2—10 to 23 inches; silty clay loam
Btb1—23 to 33 inches; silty clay loam
Btb2—33 to 41 inches; silt loam
C—41 to 60 inches; loam

Minor components

Satanta and similar soils
Extent within map unit: About 8 percent
Slope: 1 to 3 percent
Drainage class: Well drained
Ecological site: Silty; Veg. Zone 2

Lodgepole and similar soils
Extent within map unit: About 2 percent
Slope: 0 to 1 percent
Drainage class: Somewhat poorly drained
Ecological site: Clayey Overflow; Veg. Zone 2

Major Uses

Most areas of this map unit are used for dryland production of winter wheat. In some areas a rotation of millet, sunflowers, or corn is used.

4472—Las Animas loam, 0 to 1 percent slopes, channeled, frequently flooded

Map Unit Composition

Las Animas and similar soils: 95 percent
Minor components: 5 percent

Component Descriptions

Las Animas

MLRA: 72—Central High Tableland
Landform: Flood plain on river valley
Parent material: Alluvium
Slope: 0 to 1 percent
Drainage class: Poorly drained
Slowest permeability: Moderate (about 0.60 in/hr)
Available water capacity: Moderate (about 7.8 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: Frequent
Depth to seasonal zone of saturation: About 0 to 18 inches
Runoff class: Negligible
Ecological site: Silty Overflow; Veg. Zone 2
Land capability (nonirrigated): 5w

Typical profile:
A—0 to 5 inches; loam
ACg—5 to 11 inches; fine sandy loam
Cg1—11 to 33 inches; stratified sandy loam to fine sandy loam
Cg2—33 to 60 inches; stratified loamy fine sand to very fine sandy loam

Minor components

Ralton and similar soils
Slope: 0 to 1 percent
Drainage class: Moderately well drained
Ecological site: Silty Lowland; Veg. Zone 2

Special Features

This map unit is on a first-level flood plain. The river channel has become entrenched and dissected with meandering channels. Some small areas have short, steep slopes.

Major Uses

Most areas of this map unit are used as rangeland.

4475—Las Animas loam, 0 to 1 percent slopes, occasionally flooded

Map Unit Composition

Las Animas and similar soils: 92 percent
Minor components: 8 percent

Component Descriptions

Las Animas

MLRA: 72—Central High Tableland
Landform: Flood plain on river valley
Parent material: Alluvium
Slope: 0 to 2 percent
Drainage class: Somewhat poorly drained
Slowest permeability: Moderate (about 0.60 in/hr)
Available water capacity: Moderate (about 7.8 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: Occasional
Depth to seasonal zone of saturation: About 18 to 36 inches
Runoff class: Negligible
Ecological site: Subirrigated; Veg. Zone 2
Land capability (irrigated): 2w-8
Land capability (nonirrigated): 2w

Typical profile:
A—0 to 5 inches; loam
ACg—5 to 11 inches; fine sandy loam
Cg1—11 to 33 inches; stratified sandy loam to fine sandy loam

Cg2—33 to 60 inches; stratified loamy fine sand to very fine sandy loam

Minor components

Ralton and similar soils
Extent within map unit: About 6 percent
Slope: 0 to 2 percent
Drainage class: Moderately well drained
Ecological site: Silty Lowland; Veg. Zone 2

Glenberg and similar soils
Extent within map unit: About 2 percent
Slope: 0 to 2 percent
Drainage class: Well drained
Ecological site: Sandy Lowland; Veg. Zone 1

Major Uses

Most areas of this map unit are used for irrigated production of corn and alfalfa.

4592—Lexsworth loam, 0 to 1 percent slopes, very rarely flooded

Map Unit Composition

Lexsworth and similar soils: 85 percent
Minor components: 15 percent

Component Descriptions

Lexsworth

MLRA: 72—Central High Tableland
Landform: Flood plain on river valley
Parent material: Alluvium
Slope: 0 to 1 percent
Drainage class: Moderately well drained
Slowest permeability: Moderately slow (about 0.20 in/hr)
Available water capacity: Low (about 5.5 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: Very rare
Depth to seasonal zone of saturation: About 60 to 96 inches
Runoff class: Negligible
Ecological site: Silty Lowland; Veg. Zone 2
Land capability (irrigated): 3w-7
Land capability (nonirrigated): 3w

Typical profile:
Ap—0 to 12 inches; loam
C1—12 to 19 inches; sandy clay loam
C2—19 to 26 inches; coarse sandy loam
C3—26 to 33 inches; coarse sand
C4—33 to 52 inches; coarse sand
C5—52 to 60 inches; fine sand
C6—60 to 80 inches; coarse sand

Minor components

Merrick and similar soils
Extent within map unit: About 10 percent
Slope: 0 to 1 percent
Drainage class: Moderately well drained
Ecological site: Silty Lowland; Veg. Zone 2

Platte and similar soils
Extent within map unit: About 5 percent
Slope: 0 to 1 percent
Drainage class: Somewhat poorly drained
Ecological site: Subirrigated; Veg. Zone 2

Special Features

This map unit is on a high flood plain. The river channel has become entrenched. Dams that have been built upstream reduce the hazard of flooding.

Major Uses

Most areas of this map unit are used for irrigated production of corn and alfalfa.

4655—Lodgepole silt loam, ponded

Map Unit Composition

Lodgepole and similar soils: 95 percent
Minor components: 5 percent

Component Descriptions

Lodgepole

MLRA: 72—Central High Tableland
Landform: Playa on tableland
Parent material: Loess
Slope: 0 to 1 percent
Drainage class: Somewhat poorly drained
Slowest permeability: Very slow (about 0.01 in/hr)
Available water capacity: High (about 10.1 inches)
Shrink-swell potential: High (about 7.5 LEP)
Flooding hazard: None
Ponding hazard: Occasional
Seasonal zone of saturation: At the surface
Runoff class: Very low
Ecological site: Clayey Overflow; Veg. Zone 2
Land capability (irrigated): 4w-2
Land capability (nonirrigated): 3w

Typical profile:
Ap—0 to 5 inches; silt loam
Bt1—5 to 14 inches; silty clay
Bt2—14 to 26 inches; silty clay
BC—26 to 32 inches; silty clay loam
C1—32 to 48 inches; loam
C2—48 to 60 inches; loam

Minor components

Duroc and similar soils
Slope: 0 to 1 percent
Drainage class: Well drained
Ecological site: Silty Lowland; Veg. Zone 2

Major Uses

Most areas of this map unit are used for dryland production of winter wheat. In some areas a rotation of millet, sunflowers, or corn is used.

5212—Merrick sandy clay loam, 0 to 1 percent slopes, very rarely flooded

Map Unit Composition

Merrick and similar soils: 90 percent
Minor components: 10 percent

Component Descriptions

Merrick

MLRA: 72—Central High Tableland
Landform: Flood plain on river valley
Parent material: Alluvium
Slope: 0 to 1 percent
Drainage class: Moderately well drained
Slowest permeability: Moderately slow (about 0.20 in/hr)
Available water capacity: High (about 11.1 inches)
Shrink-swell potential: Moderate (about 4.5 LEP)
Flooding hazard: Very rare
Depth to seasonal zone of saturation: About 48 to 72 inches
Runoff class: Negligible
Ecological site: Silty Lowland; Veg. Zone 2
Land capability (irrigated): 1-6
Land capability (nonirrigated): 2c

Typical profile:
Ap—0 to 12 inches; sandy clay loam
A—12 to 27 inches; clay loam
AC—27 to 38 inches; clay loam
C1—38 to 42 inches; loam
C2—42 to 53 inches; loam
C3—53 to 64 inches; very fine sandy loam
C4—64 to 80 inches; very fine sandy loam

Minor components

Duroc and similar soils
Extent within map unit: About 5 percent
Slope: 0 to 1 percent
Drainage class: Well drained
Ecological site: Silty Lowland; Veg. Zone 2

Lexsworth and similar soils
Extent within map unit: About 5 percent
Slope: 0 to 1 percent
Drainage class: Moderately well drained
Ecological site: Silty Lowland; Veg. Zone 2

Special Features

This map unit is on a high flood plain. The river channel has become entrenched. Dams that have been built upstream reduce the hazard of flooding.

Major Uses

Most areas of this map unit are used for irrigated production of corn and alfalfa.

6132—Platte loam, 0 to 1 percent slopes, occasionally flooded

Map Unit Composition

Platte and similar soils: 90 percent
Minor components: 10 percent

Component Descriptions

Platte

MLRA: 72—Central High Tableland
Landform: Flood plain on river valley
Parent material: Alluvium
Slope: 0 to 1 percent
Drainage class: Somewhat poorly drained
Slowest permeability: Moderate (about 0.60 in/hr)
Available water capacity: Low (about 4.2 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: Occasional
Depth to seasonal zone of saturation: About 12 to 36 inches
Runoff class: Negligible
Ecological site: Subirrigated; Veg. Zone 2
Land capability (irrigated): 4w-13
Land capability (nonirrigated): 6w

Typical profile:
A—0 to 5 inches; loam
AC—5 to 11 inches; fine sandy loam
C1—11 to 18 inches; fine sandy loam
2C2—18 to 60 inches; gravelly coarse sand

Minor components

Gothenburg and similar soils
Slope: 0 to 1 percent
Drainage class: Poorly drained

Major Uses

Most areas of this map unit are used as rangeland.

6248—Ralton loam, 0 to 1 percent slopes, very rarely flooded

Map Unit Composition

Ralton and similar soils: 90 percent
Minor components: 10 percent

Component Descriptions

Ralton

MLRA: 72—Central High Tableland
Landform: Stream terrace on river valley
Parent material: Alluvium
Slope: 0 to 1 percent
Drainage class: Moderately well drained
Slowest permeability: Moderate (about 0.60 in/hr)
Available water capacity: High (about 10.8 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: Very rare
Depth to seasonal zone of saturation: About 36 to 72 inches
Runoff class: Negligible
Ecological site: Silty Lowland; Veg. Zone 2
Land capability (irrigated): 1-6
Land capability (nonirrigated): 2c

Typical profile:
Ap1—0 to 6 inches; loam
Ap2—6 to 14 inches; loam
C1—14 to 24 inches; stratified very fine sandy loam to loam
C2—24 to 34 inches; very fine sandy loam
C3—34 to 51 inches; loam
C4—51 to 71 inches; very fine sandy loam
2C5—71 to 80 inches; gravelly loamy coarse sand

Minor components

Alice and similar soils
Extent within map unit: About 5 percent
Slope: 0 to 1 percent
Drainage class: Well drained
Ecological site: Sandy; Veg. Zone 2

Chappell and similar soils
Extent within map unit: About 5 percent
Slope: 0 to 1 percent
Drainage class: Well drained
Ecological site: Sandy; Veg. Zone 2

Major Uses

Most areas of this map unit are used for irrigated production of corn and alfalfa.

6625—Sarben loamy fine sand, 0 to 3 percent slopes

Map Unit Composition

Sarben and similar soils: 90 percent
Minor components: 10 percent

Component Descriptions

Sarben

MLRA: 72—Central High Tableland
Landform: Plain on tableland
Parent material: Sandy and silty eolian deposits
Slope: 0 to 3 percent
Drainage class: Well drained
Slowest permeability: Moderately rapid (about 2.00 in/hr)
Available water capacity: Low (about 5.6 inches)
Shrink-swell potential: Low (about 0.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Negligible
Ecological site: Sandy; Veg. Zone 2
Land capability (irrigated): 3e-10
Land capability (nonirrigated): 4e

Typical profile:
Ap—0 to 7 inches; loamy fine sand
AC—7 to 15 inches; fine sandy loam
C1—15 to 32 inches; fine sandy loam
C2—32 to 60 inches; fine sandy loam

Minor components

Jayem and similar soils
Extent within map unit: About 5 percent
Slope: 0 to 3 percent
Drainage class: Well drained
Ecological site: Sandy; Veg. Zone 2

Valent and similar soils
Extent within map unit: About 5 percent
Slope: 0 to 3 percent
Drainage class: Excessively drained
Ecological site: Sands; Veg. Zone 2

Major Uses

Most areas of this map unit are used for dryland production of winter wheat. In some areas a rotation of millet, sunflowers, or corn is used.

6626—Sarben loamy fine sand, 3 to 6 percent slopes

Map Unit Composition

Sarben and similar soils: 90 percent
Minor components: 10 percent

Component Descriptions

Sarben

MLRA: 72—Central High Tableland
Landform: Hillside on upland
Parent material: Sandy and silty eolian deposits
Slope: 3 to 6 percent
Drainage class: Well drained
Slowest permeability: Moderately rapid (about 2.00 in/hr)
Available water capacity: Low (about 5.6 inches)
Shrink-swell potential: Low (about 0.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: More than 6 feet
Runoff class: Very low
Ecological site: Sandy; Veg. Zone 2
Land capability (irrigated): 4e-10
Land capability (nonirrigated): 4e

Typical profile:
A—0 to 7 inches; loamy fine sand
AC—7 to 15 inches; fine sandy loam
C1—15 to 32 inches; fine sandy loam
C2—32 to 60 inches; fine sandy loam

Minor components

Jayem and similar soils
Extent within map unit: About 5 percent
Slope: 3 to 6 percent
Drainage class: Well drained
Ecological site: Sandy; Veg. Zone 2

Valent and similar soils
Extent within map unit: About 5 percent
Slope: 3 to 6 percent
Drainage class: Excessively drained
Ecological site: Sands; Veg. Zone 2

Major Uses

Most areas of this map unit are used for dryland production of winter wheat. In some areas a rotation of millet, sunflowers, or corn is used.

6722—Satanta-Altvan complex, 3 to 6 percent slopes

Map Unit Composition

Satanta and similar soils: 65 percent
Altvan and similar soils: 25 percent
Minor components: 10 percent

Component Descriptions

Satanta

MLRA: 72—Central High Tableland
Landform: Hillside on upland
Hillslope position: Backslope
Parent material: Loess
Slope: 3 to 6 percent
Drainage class: Well drained
Slowest permeability: Moderately slow (about 0.20 in/hr)
Available water capacity: High (about 9.6 inches)
Shrink-swell potential: Moderate (about 4.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Low
Ecological site: Silty; Veg. Zone 2
Land capability (irrigated): 3e-4
Land capability (nonirrigated): 3e

Typical profile:
Ap—0 to 6 inches; very fine sandy loam
Bt1—6 to 13 inches; clay loam
Bt2—13 to 19 inches; clay loam
BCk—19 to 26 inches; very fine sandy loam
C1—26 to 52 inches; very fine sandy loam
2C2—52 to 76 inches; loamy fine sand

Altvan

MLRA: 72—Central High Tableland
Landform: Hillside on upland
Hillslope position: Shoulder, backslope
Parent material: Loess over alluvium
Slope: 3 to 6 percent
Drainage class: Well drained
Slowest permeability: Moderately slow (about 0.20 in/hr)
Available water capacity: Moderate (about 7.3 inches)
Shrink-swell potential: Moderate (about 4.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Low
Ecological site: Silty; Veg. Zone 2
Land capability (irrigated): 4e-7
Land capability (nonirrigated): 4e

Typical profile:
Ap—0 to 5 inches; fine sandy loam
Bt1—5 to 10 inches; clay loam
Bt2—10 to 14 inches; clay loam
BCk—14 to 24 inches; loam

C1—24 to 38 inches; very fine sandy loam
2C2—38 to 80 inches; coarse sand

Minor components

Johnstown and similar soils
Extent within map unit: About 5 percent
Slope: 3 to 6 percent
Drainage class: Well drained
Ecological site: Silty; Veg. Zone 2

Jayem and similar soils
Extent within map unit: About 5 percent
Slope: 3 to 6 percent
Drainage class: Well drained
Ecological site: Sandy; Veg. Zone 2

Major Uses

Most areas of this map unit are used for dryland production of winter wheat. In some areas a rotation of millet, sunflowers, or corn is used.

6725—Satanta-Ascalon complex, 0 to 2 percent slopes

Map Unit Composition

Satanta and similar soils: 45 percent
Ascalon and similar soils: 45 percent
Minor components: 10 percent

Component Descriptions

Satanta

MLRA: 72—Central High Tableland
Landform: Plain on tableland
Parent material: Loess
Slope: 0 to 2 percent
Drainage class: Well drained
Slowest permeability: Moderately slow (about 0.20 in/hr)
Available water capacity: High (about 10.3 inches)
Shrink-swell potential: Moderate (about 4.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: More than 6 feet
Runoff class: Low
Ecological site: Silty; Veg. Zone 2
Land capability (irrigated): 2e-5
Land capability (nonirrigated): 3e

Typical profile:
Ap—0 to 9 inches; loam
A—9 to 14 inches; loam
Bt—14 to 26 inches; clay loam
BCk—26 to 31 inches; loam
C1—31 to 55 inches; very fine sandy loam
2C2—55 to 80 inches; sand

Ascalon

MLRA: 72—Central High Tableland
Landform: Plain on tableland
Parent material: Loess
Slope: 0 to 2 percent
Drainage class: Well drained
Slowest permeability: Moderately slow (about 0.20 in/hr)
Available water capacity: Moderate (about 7.8 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Low
Ecological site: Sandy; Veg. Zone 2
Land capability (irrigated): 2e-5
Land capability (nonirrigated): 3e

Typical profile:
Ap—0 to 6 inches; fine sandy loam
Bt—6 to 19 inches; sandy clay loam
BC—19 to 35 inches; fine sandy loam
C1—35 to 40 inches; fine sandy loam
C2—40 to 46 inches; loamy fine sand
C3—46 to 80 inches; stratified coarse sand to sand to loamy fine sand

Minor components

Jayem and similar soils
Slope: 0 to 2 percent
Drainage class: Well drained
Ecological site: Sandy; Veg. Zone 2

Major Uses

Most areas of this map unit are used for dryland production of winter wheat. In some areas a rotation of millet, sunflowers, or corn is used.

6727—Satanta-Johnstown-Altvan loams, 1 to 3 percent slopes

Map Unit Composition

Satanta and similar soils: 60 percent
Johnstown and similar soils: 18 percent
Altvan and similar soils: 15 percent
Minor components: 7 percent

Component Descriptions

Satanta

MLRA: 72—Central High Tableland
Landform: Plain on tableland
Parent material: Loess
Slope: 1 to 3 percent

Drainage class: Well drained
Slowest permeability: Moderately slow (about 0.20 in/hr)
Available water capacity: High (about 10.3 inches)
Shrink-swell potential: Moderate (about 4.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Low
Ecological site: Silty; Veg. Zone 2
Land capability (irrigated): 2e-4
Land capability (nonirrigated): 2e

Typical profile:
Ap—0 to 9 inches; loam
A—9 to 14 inches; loam
Bt—14 to 26 inches; clay loam
BCk—26 to 31 inches; loam
C1—31 to 55 inches; very fine sandy loam
2C2—55 to 80 inches; sand

Johnstown

MLRA: 72—Central High Tableland
Landform: Plain on tableland
Parent material: Loess
Slope: 1 to 3 percent
Drainage class: Well drained
Slowest permeability: Moderately slow (about 0.20 in/hr)
Available water capacity: High (about 10.5 inches)
Shrink-swell potential: Moderate (about 4.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Low
Ecological site: Silty; Veg. Zone 2
Land capability (irrigated): 2e-4
Land capability (nonirrigated): 2e

Typical profile:
Ap—0 to 6 inches; loam
Bt—6 to 23 inches; clay loam
Btb—23 to 36 inches; clay loam
BCkb—36 to 42 inches; very fine sandy loam
Cb—42 to 58 inches; very fine sandy loam
2C—58 to 80 inches; sand

Altvan

MLRA: 72—Central High Tableland
Landform: Plain on tableland
Parent material: Loess over alluvium
Slope: 1 to 3 percent
Drainage class: Well drained
Slowest permeability: Moderately slow (about 0.20 in/hr)
Available water capacity: Moderate (about 6.4 inches)
Shrink-swell potential: Moderate (about 4.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Low
Ecological site: Silty; Veg. Zone 2
Land capability (irrigated): 2s-7
Land capability (nonirrigated): 3e

Typical profile:
Ap—0 to 5 inches; loam
Bt1—5 to 10 inches; clay loam
Bt2—10 to 17 inches; clay loam
BCk—17 to 24 inches; loam
C1—24 to 30 inches; loam
2C2—30 to 80 inches; coarse sand

Minor components

Kuma and similar soils
Extent within map unit: About 5 percent
Slope: 1 to 3 percent
Drainage class: Well drained
Ecological site: Silty; Veg. Zone 2

Lodgepole and similar soils
Extent within map unit: About 2 percent
Slope: 0 to 1 percent
Drainage class: Somewhat poorly drained
Ecological site: Clayey Overflow; Veg. Zone 2

Major Uses

Most areas of this map unit are used for dryland production of winter wheat. In some areas a rotation of millet, sunflowers, or corn is used.

6817—Scoville loamy fine sand, 0 to 3 percent slopes

Map Unit Composition

Scoville and similar soils: 95 percent
Minor components: 5 percent

Component Descriptions

Scoville

MLRA: 72—Central High Tableland
Landform: Stream terrace on river valley
Parent material: Alluvium
Slope: 0 to 3 percent

Drainage class: Somewhat excessively drained
Slowest permeability: Moderate (about 0.60 in/hr)
Available water capacity: Low (about 4.9 inches)
Shrink-swell potential: Low (about 0.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Negligible
Ecological site: Sandy; Veg. Zone 2
Land capability (irrigated): 4e-11
Land capability (nonirrigated): 4e

Typical profile:
Ap—0 to 6 inches; loamy fine sand
AC—6 to 10 inches; loamy fine sand
C1—10 to 42 inches; fine sand
2C2—42 to 46 inches; very fine sandy loam
2C3—46 to 60 inches; loamy fine sand

Minor components

Chappell and similar soils
Slope: 0 to 3 percent
Drainage class: Well drained
Ecological site: Sandy; Veg. Zone 2

Major Uses

Most areas of this map unit are used for irrigated production of corn and alfalfa.

6930—Sidney loam, 3 to 6 percent slopes

Map Unit Composition

Sidney and similar soils: 85 percent
Minor components: 15 percent

Component Descriptions

Sidney

MLRA: 72—Central High Tableland
Landform: Hillside on upland
Hillslope position: Shoulder, footslope
Parent material: Sandstone residuum
Slope: 3 to 6 percent
Depth to restrictive feature: 40 to 60 inches to bedrock (paralithic)
Drainage class: Well drained
Slowest permeability: Moderate (about 0.60 in/hr)
Available water capacity: Moderate (about 8.7 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Low
Ecological site: Silty; Veg. Zone 2
Land capability (irrigated): 3e-6
Land capability (nonirrigated): 3e

Typical profile:
A—0 to 11 inches; loam
Bw—11 to 17 inches; loam
Bk—17 to 29 inches; very fine sandy loam
C—29 to 48 inches; very fine sandy loam
Cr—48 to 60 inches; weathered bedrock

Minor components

Canyon and similar soils
Extent within map unit: About 10 percent
Slope: 3 to 6 percent
Depth to restrictive feature: 6 to 20 inches to bedrock (paralithic)
Drainage class: Well drained
Ecological site: Shallow Limy; Veg. Zone 2

Alliance and similar soils
Extent within map unit: About 5 percent
Slope: 3 to 6 percent
Depth to restrictive feature: 40 to 60 inches to bedrock (paralithic)
Drainage class: Well drained
Ecological site: Silty; Veg. Zone 2

Major Uses

Most areas of this map unit are used for dryland production of winter wheat. In some areas a rotation of millet, sunflowers, or corn is used.

6937—Sidney-Canyon loams, 3 to 9 percent slopes

Map Unit Composition

Sidney and similar soils: 65 percent
Canyon and similar soils: 25 percent
Minor components: 10 percent

Component Descriptions

Sidney

MLRA: 72—Central High Tableland
Landform: Hillside on upland
Hillslope position: Footslope, shoulder
Parent material: Sandstone residuum
Slope: 6 to 9 percent
Depth to restrictive feature: 40 to 60 inches to bedrock (paralithic)
Drainage class: Well drained
Slowest permeability: Moderate (about 0.60 in/hr)
Available water capacity: Moderate (about 8.7 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: None

Depth to seasonal zone of saturation: More than 6 feet
Runoff class: Medium
Ecological site: Silty; Veg. Zone 2
Land capability (irrigated): 4e-6
Land capability (nonirrigated): 4e

Typical profile:
A—0 to 11 inches; loam
Bw—11 to 17 inches; loam
Bk—17 to 29 inches; very fine sandy loam
C—29 to 48 inches; very fine sandy loam
Cr—48 to 60 inches; weathered bedrock

Canyon

MLRA: 72—Central High Tableland
Landform: Hillside on upland
Hillslope position: Backslope, shoulder
Parent material: Sandstone residuum
Slope: 6 to 9 percent
Depth to restrictive feature: 6 to 20 inches to bedrock (paralithic)
Drainage class: Well drained
Slowest permeability: Moderate (about 0.60 in/hr)
Available water capacity: Very low (about 1.9 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: More than 6 feet
Runoff class: Medium
Ecological site: Shallow Limy; Veg. Zone 2
Land capability (nonirrigated): 6s

Typical profile:
A—0 to 5 inches; loam
C—5 to 10 inches; very fine sandy loam
Cr—10 to 60 inches; weathered bedrock

Minor components

Rosebud and similar soils
Slope: 6 to 9 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (paralithic)
Drainage class: Well drained
Ecological site: Silty; Veg. Zone 2

Major Uses

Most areas of this map unit are used for dryland production of winter wheat. In some areas a rotation of millet, sunflowers, or corn is used.

7120—Sulco-McConaughy loams, 3 to 6 percent slopes, moderately eroded

Map Unit Composition

Sulco and similar soils: 55 percent
McConaughy and similar soils: 30 percent
Minor components: 15 percent

Component Descriptions

Sulco

MLRA: 72—Central High Tableland
Landform: Hillside on upland
Hillslope position: Shoulder, backslope
Parent material: Loess
Slope: 3 to 6 percent
Drainage class: Well drained
Slowest permeability: Moderate (about 0.60 in/hr)
Available water capacity: High (about 10.8 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Low
Ecological site: Limy Upland; Veg. Zone 2
Land capability (irrigated): 3e-6
Land capability (nonirrigated): 4e

Typical profile:
Ap—0 to 5 inches; loam
AC—5 to 16 inches; loam
C1—16 to 26 inches; loam
C2—26 to 60 inches; loam

McConaughy

MLRA: 72—Central High Tableland
Landform: Hillside on upland
Hillslope position: Shoulder, footslope
Parent material: Loess
Slope: 3 to 6 percent
Drainage class: Well drained
Slowest permeability: Moderate (about 0.60 in/hr)
Available water capacity: High (about 10.8 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Low
Ecological site: Silty; Veg. Zone 2
Land capability (irrigated): 3e-6
Land capability (nonirrigated): 4e

Typical profile:
A—0 to 7 inches; loam
Bw—7 to 18 inches; loam
Bk—18 to 28 inches; loam
C—28 to 60 inches; loam

Minor components

Keith and similar soils
Extent within map unit: About 10 percent

Geomorphic position: Hillside on upland
Slope: 3 to 6 percent
Drainage class: Well drained
Ecological site: Silty; Veg. Zone 2

Duroc and similar soils
Extent within map unit: About 5 percent
Slope: 1 to 3 percent
Drainage class: Well drained
Ecological site: Silty Lowland; Veg. Zone 2

Major Uses

Most areas of this map unit are used for dryland production of winter wheat. In some areas a rotation of millet, sunflowers, or corn is used.

7121—Sulco-McConaughy loams, 6 to 9 percent slopes, moderately eroded

Map Unit Composition

Sulco and similar soils: 65 percent
McConaughy and similar soils: 25 percent
Minor components: 10 percent

Component Descriptions

Sulco

MLRA: 72—Central High Tableland
Landform: Hillside on upland
Hillslope position: Backslope, shoulder
Parent material: Loess
Slope: 6 to 9 percent
Drainage class: Well drained
Slowest permeability: Moderate (about 0.60 in/hr)
Available water capacity: High (about 10.8 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Medium
Ecological site: Limy Upland; Veg. Zone 2
Land capability (irrigated): 4e-6
Land capability (nonirrigated): 4e

Typical profile:
Ap—0 to 5 inches; loam
AC—5 to 16 inches; loam
C1—16 to 26 inches; loam
C2—26 to 60 inches; loam

McConaughy

MLRA: 72—Central High Tableland
Landform: Hillside on upland
Hillslope position: Shoulder, footslope
Parent material: Loess
Slope: 6 to 9 percent
Drainage class: Well drained
Slowest permeability: Moderate (about 0.60 in/hr)
Available water capacity: High (about 10.8 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Medium
Ecological site: Silty; Veg. Zone 2
Land capability (irrigated): 4e-6
Land capability (nonirrigated): 4e

Typical profile:
A—0 to 7 inches; loam
Bw—7 to 18 inches; loam
Bk—18 to 28 inches; loam
C—28 to 60 inches; loam

Minor components

Keith and similar soils
Extent within map unit: About 5 percent
Geomorphic position: Hillside on upland; hillside on tableland
Slope: 3 to 6 percent
Drainage class: Well drained
Ecological site: Silty; Veg. Zone 2

Sarben and similar soils
Extent within map unit: About 5 percent
Geomorphic position: Hillside on upland
Slope: 6 to 9 percent
Drainage class: Well drained
Ecological site: Sandy; Veg. Zone 2

Major Uses

Most areas of this map unit are used for dryland production of winter wheat. In some areas a rotation of millet, sunflowers, or corn is used.

7122—Sulco-McConaughy loams, 9 to 20 percent slopes, moderately eroded

Map Unit Composition

Sulco and similar soils: 70 percent
McConaughy and similar soils: 20 percent
Minor components: 10 percent

Component Descriptions

Sulco

MLRA: 72—Central High Tableland
Landform: Hillside on upland

Hillslope position: Backslope, shoulder
Parent material: Loess
Slope: 9 to 20 percent
Drainage class: Well drained
Slowest permeability: Moderate (about 0.60 in/hr)
Available water capacity: High (about 10.8 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Medium
Ecological site: Limy Upland; Veg. Zone 2
Land capability (nonirrigated): 6e

Typical profile:
Ap—0 to 5 inches; loam
AC—5 to 16 inches; loam
C1—16 to 26 inches; loam
C2—26 to 60 inches; loam

McConaughy

MLRA: 72—Central High Tableland
Landform: Hillside on upland
Hillslope position: Shoulder, footslope
Parent material: Loess
Slope: 9 to 15 percent
Drainage class: Well drained
Slowest permeability: Moderate (about 0.60 in/hr)
Available water capacity: High (about 10.8 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Medium
Ecological site: Silty; Veg. Zone 2
Land capability (nonirrigated): 6e

Typical profile:
A—0 to 7 inches; loam
Bw—7 to 18 inches; loam
Bk—18 to 28 inches; loam
C—28 to 60 inches; loam

Minor components

Keith and similar soils
Extent within map unit: About 5 percent
Geomorphic position: Hillside on upland
Slope: 3 to 6 percent
Drainage class: Well drained
Ecological site: Silty; Veg. Zone 2

Sarben and similar soils
Extent within map unit: About 5 percent
Geomorphic position: Hillside on upland
Slope: 9 to 15 percent
Drainage class: Well drained
Ecological site: Sandy; Veg. Zone 2

Major Uses

Most areas of this map unit are used as rangeland.

7582—Valent fine sand, 3 to 9 percent slopes

Map Unit Composition

Valent and similar soils: 90 percent
Minor components: 10 percent

Component Descriptions

Valent

MLRA: 72—Central High Tableland
Landform: Dune on sandhills
Parent material: Eolian sands
Slope: 3 to 9 percent
Drainage class: Excessively drained
Slowest permeability: Rapid (about 6.00 in/hr)
Available water capacity: Low (about 3.6 inches)
Shrink-swell potential: Low (0.0 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: Greater than 6 feet
Runoff class: Very low
Ecological site: Sands; Veg. Zone 2
Land capability (irrigated): 4e-12
Land capability (nonirrigated): 6e

Typical profile:
A—0 to 4 inches; fine sand
C—4 to 60 inches; fine sand

Minor components

Sarben and similar soils
Slope: 3 to 9 percent
Drainage class: Well drained
Ecological site: Sandy; Veg. Zone 2

Major Uses

Most areas of this map unit are used as rangeland.

7586—Valent fine sand, rolling

Map Unit Composition

Valent and similar soils: 95 percent
Minor components: 5 percent

Component Descriptions

Valent

MLRA: 72—Central High Tableland
Landform: Dune on sandhills
Parent material: Eolian sands
Slope: 9 to 24 percent
Drainage class: Excessively drained
Slowest permeability: Rapid (about 6.00 in/hr)
Available water capacity: Low (about 3.6 inches)
Shrink-swell potential: Low (0.0 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: More than 6 feet
Runoff class: Low
Ecological site: Sands; Veg. Zone 2
Land capability (nonirrigated): 6e

Typical profile:
A—0 to 4 inches; fine sand
C—4 to 60 inches; fine sand

Minor components

Sarben and similar soils
Slope: 3 to 9 percent
Drainage class: Well drained
Ecological site: Sandy; Veg. Zone 2

Major Uses

Most areas of this map unit are used as rangeland.

7588—Valent complex, rolling and hilly

Map Unit Composition

Valent, rolling, and similar soils: 50 percent
Valent, hilly, and similar soils: 45 percent
Minor components: 5 percent

Component Descriptions

Valent, rolling

MLRA: 72—Central High Tableland
Landform: Dune on sandhills
Parent material: Eolian sands
Slope: 9 to 24 percent
Drainage class: Excessively drained
Slowest permeability: Rapid (about 6.00 in/hr)
Available water capacity: Low (about 3.6 inches)
Shrink-swell potential: Low (0.0 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: More than 6 feet
Runoff class: Low
Ecological site: Sands; Veg. Zone 2
Land capability (nonirrigated): 6e

Typical profile:
A—0 to 4 inches; fine sand
C—4 to 60 inches; fine sand

Valent, hilly

MLRA: 72—Central High Tableland
Landform: Dune on sandhills
Parent material: Eolian sands
Slope: 24 to 60 percent
Drainage class: Excessively drained
Slowest permeability: Rapid (about 6.00 in/hr)
Available water capacity: Low (about 3.6 inches)
Shrink-swell potential: Low (0.0 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: More than 6 feet
Runoff class: Low
Ecological site: Choppy Sands; Veg. Zone 2
Land capability (nonirrigated): 7e

Typical profile:
A—0 to 4 inches; fine sand
C—4 to 60 inches; fine sand

Minor components

Sarben and similar soils
Slope: 3 to 9 percent
Drainage class: Well drained
Ecological site: Sandy; Veg. Zone 2

Major Uses

Most areas of this map unit are used as rangeland.

9975—Sanitary landfill

Component Description

This map unit consists of accumulated waste products of human habitation that can be above or below the natural ground level. The unit has been used as the county landfill for several years. It is poorly suited to use as cropland or as a site for engineering practices.

9985—Pits, sand and gravel

Component Description

This map unit consists of areas from which sand and gravel have been removed for construction purposes.

9998—Water

Component Description

This map unit consists of streams, lakes, ponds, and estuaries. Some areas are covered with water in most years, at least during the growing season. Many areas are covered throughout the year.

Table 4.--Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
1130	Alliance loam, 0 to 1 percent slopes	8,402	3.0
1146	Alliance-Rosebud loams, 1 to 3 percent slopes	16,496	5.8
1198	Altvan-Eckley-Satanta complex, 3 to 9 percent slopes	19,587	6.9
1295	Ashollow-Tassel complex, 9 to 30 percent slopes	3,202	1.1
1588	Blueridge-Altvan complex, 6 to 30 percent slopes	28,401	10.1
1782	Broadwater loamy sand, 0 to 1 percent slopes, frequently flooded	4,359	1.5
1944	Calamus sand, 0 to 1 percent slopes, very rarely flooded	675	0.2
2072	Chappell-Alice-Broadwater complex, 0 to 3 percent slopes	14,343	5.1
2630	Duroc loam, 0 to 1 percent slopes	10,723	3.8
2638	Duroc loam, terrace, 0 to 1 percent slopes	5,231	1.9
2639	Duroc loam, terrace, 1 to 3 percent slopes	798	0.3
3050	Glenberg fine sandy loam, 0 to 1 percent slopes, rarely flooded	2,621	0.9
3140	Gothenburg soils, 0 to 1 percent slopes, occasionally flooded	1,706	0.6
3952	Jankosh loam, 0 to 1 percent slopes, rarely flooded	1,097	0.4
4028	Jayem fine sandy loam, 0 to 2 percent slopes	1,348	0.5
4070	Johnstown-Satanta-Richfield loams, 0 to 1 percent slopes	23,283	8.3
4151	Keith loam, 1 to 3 percent slopes	10,179	3.6
4152	Keith loam, 3 to 6 percent slopes	133	*
4310	Kuma loam, 0 to 1 percent slopes	2,504	0.9
4311	Kuma loam, 1 to 3 percent slopes	326	0.1
4472	Las Animas loam, 0 to 1 percent slopes, channeled, frequently flooded	1,358	0.5
4475	Las Animas loam, 0 to 1 percent slopes, occasionally flooded	467	0.2
4592	Lexsworth loam, 0 to 1 percent slopes, very rarely flooded	1,695	0.6
4655	Lodgepole silt loam, ponded	1,416	0.5
5212	Merrick sandy clay loam, 0 to 1 percent slopes, very rarely flooded	997	0.4
6132	Platte loam, 0 to 1 percent slopes, occasionally flooded	936	0.3
6248	Ralton loam, 0 to 1 percent slopes, very rarely flooded	3,537	1.3
6625	Sarben loamy fine sand, 0 to 3 percent slopes	675	0.2
6626	Sarben loamy fine sand, 3 to 6 percent slopes	4,483	1.6
6722	Satanta-Altvan complex, 3 to 6 percent slopes	15,271	5.4
6725	Satanta-Ascalon complex, 0 to 2 percent slopes	1,735	0.6
6727	Satanta-Johnstown-Altvan loams, 1 to 3 percent slopes	61,994	22.0
6817	Scoville loamy fine sand, 0 to 3 percent slopes	705	0.2
6930	Sidney loam, 3 to 6 percent slopes	8,733	3.1
6937	Sidney-Canyon loams, 3 to 9 percent slopes	7,147	2.5
7120	Sulco-McConaughy loams, 3 to 6 percent slopes, moderately eroded	8,055	2.9
7121	Sulco-McConaughy loams, 6 to 9 percent slopes, moderately eroded	1,934	0.7
7122	Sulco-McConaughy loams, 9 to 20 percent slopes, moderately eroded	433	0.2
7582	Valent fine sand, 3 to 9 percent slopes	2,020	0.7
7586	Valent fine sand, rolling	1,882	0.7
7588	Valent complex, rolling and hilly	339	0.1
9975	Sanitary landfill	37	*
9985	Pits, sand and gravel	386	0.1
9998	Water	444	0.2
	Total	282,093	100.0

* Less than 0.1 percent.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (USDA, 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. Table 5 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Twelve 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 Ustolls (***Ust***, meaning subhumid, 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; type of saturation; 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 Haplustolls (***Hapl***, meaning minimal horizonation, plus ***ustolls***, 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 subgroup 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 taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. 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, mineralogy class, cation-exchange activity class, soil temperature regime, soil depth, and reaction class. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-silty, mixed, superactive, mesic Pachic Haplustolls.

SERIES. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. 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” (USDA, 1993). Many of the technical terms used in the descriptions are defined in “Soil Taxonomy” (USDA, 1999). Unless otherwise indicated, colors in the descriptions are for dry soil. Following the pedon description is the range of important characteristics of the soils in the series.

Alice Series

The Alice series consists of very deep, well drained, moderately rapidly permeable soils on upland hillslopes and river valley terraces. These soils formed in moderately coarse textured alluvium and windblown material. Slopes range from 0 to 15 percent. Mean annual temperature is about 49 degrees F, and mean annual precipitation is about 16 inches.

Typical Pedon

Alice fine sandy loam, in an area of irrigated cropland:

Ap—0 to 9 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium granular structure; soft, very friable; slightly alkaline; abrupt smooth boundary.

A—9 to 13 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak coarse prismatic structure; soft, very friable; slightly alkaline; clear smooth boundary.

Bw—13 to 26 inches; light brownish gray (10YR 6/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; weak medium prismatic structure; soft, very friable; slightly alkaline; abrupt smooth boundary.

Bk—26 to 43 inches; light gray (10YR 7/2) fine sandy loam, grayish brown (10YR 5/2) moist; weak medium prismatic structure; soft, friable; violent effervescence; moderately alkaline; gradual smooth boundary.

C1—43 to 57 inches; light gray (10YR 7/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; massive; soft, friable; strong effervescence; moderately alkaline; gradual smooth boundary.

C2—57 to 60 inches; light gray (10YR 7/2) very fine sandy loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, friable; strong effervescence; moderately alkaline.

Type Location

Scotts Bluff County, Nebraska; about 1 mile north and 3$^{1}/_{2}$ miles east of Mitchell; 2,260 feet east and 150 feet north of the southwest corner of sec. 17, T. 23 N., R. 55 W.

Range in Characteristics

Soil moisture: The soil moisture control section is Aridic moisture regime bordering on Ustic.
Mean annual soil temperature: 46 to 54 degrees F
Depth to secondary calcium carbonate: 18 to 38 inches
Depth to cambic horizon: 7 to 20 inches

A horizon:
Hue—10YR
Value—4 to 6 (2 or 3 moist)
Chroma—2 or 3
Texture—loamy fine sand, fine sandy loam, or very fine sandy loam
Reaction—neutral or slightly alkaline

Bw horizon:
Hue—10YR
Value—6 to 8 (5 or 6 moist)
Chroma—2 to 4
Texture—fine sandy loam, loamy very fine sand, or very fine sandy loam
Content of clay—7 to 18 percent
Reaction—slightly alkaline or moderately alkaline

Bk horizon:
Hue—10YR
Value—6 to 8 (5 or 6 moist)
Chroma—2 to 4
Texture—fine sandy loam, loamy very fine sand, sandy loam, or very fine sandy loam
Content of clay—5 to 18 percent
Reaction—slightly alkaline or moderately alkaline

C horizon:
Hue—10YR
Value—6 or 7 (4 to 6 moist)
Chroma—2 to 4
Texture—dominantly fine sandy loam, but the range includes loamy fine sand, sandy loam, loamy very fine sand, and very fine sandy loam; coarser textures below a depth of 40 inches in some pedons
Content of clay—5 to 15 percent
Reaction—slightly alkaline or moderately alkaline

Alliance Series

The Alliance series consists of deep, well drained soils that formed in a thin layer of loamy loess and the underlying calcareous, weakly cemented limestone or sandstone. Permeability is moderate or moderately slow. These soils are on uplands. Slopes range from 0 to 12 percent. Mean annual temperature is about 50 degrees F, and mean annual precipitation is about 16 inches.

Typical Pedon

Alliance silt loam (fig. 2), on a convex, southwest-facing slope of 2 percent, in a cultivated field:

Ap—0 to 8 inches; grayish brown (10YR 5/2) silt loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable; slightly alkaline; abrupt smooth boundary.

A—8 to 11 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak coarse subangular blocky structure parting to weak fine granular; slightly hard, very friable; slightly alkaline; clear smooth boundary.

Bt1—11 to 15 inches; light brownish gray (10YR 6/2) silty clay loam, dark grayish brown (10YR 4/2) moist; weak coarse prismatic structure parting to

Figure 2.—A profile of an Alliance soil.

moderate medium and fine subangular blocky; slightly hard, friable; few thin patchy clay films on faces of peds; slightly alkaline; clear smooth boundary.

Bt2—15 to 20 inches; brown (10YR 5/3) silty clay loam, brown (10YR 4/3) moist; weak coarse prismatic structure parting to moderate medium and fine subangular blocky; slightly hard, friable; few thin patchy clay films on faces of peds; slightly alkaline; clear smooth boundary.

BC—20 to 26 inches; pale brown (10YR 6/3) silt loam, brown (10YR 5/3) moist; weak coarse prismatic structure parting to weak medium subangular blocky; slightly hard, very friable; 2 percent sandstone gravel, by volume; slightly alkaline; clear smooth boundary.

C—26 to 51 inches; light gray (10YR 7/2) very fine sandy loam, light brownish gray (10YR 6/2) moist; massive; soft, very friable; 5 percent sandstone gravel, by volume; violent effervescence; moderately alkaline; clear wavy boundary.

Cr—51 to 60 inches; light gray (10YR 7/2), weakly cemented, very fine grained sandstone, light brownish gray (10YR 6/2) moist; violent effervescence; moderately alkaline.

Type Location

Dawes County, Nebraska; 10 miles south and 6 miles east of Crawford; 1,600 feet north and 100 feet west of the southeast corner of sec. 26, T. 30 N., R. 51 W.

Range in Characteristics

Thickness of the solum: 16 to 35 inches
Depth to free carbonates: 16 to 35 inches
Thickness of the mollic epipedon: 8 to 20 inches
Depth to the Cr horizon: 40 to 60 inches
Other features: Glass shards are throughout the profile in some areas; the highest concentrations are in the C and Cr horizons. Some pedons have a Bk horizon.

A horizon:
Hue—10YR
Value—4 or 5 (2 or 3 moist)
Chroma—1 or 2
Texture—silt loam; less commonly loam, very fine sandy loam, or fine sandy loam
Reaction—neutral or slightly alkaline

Bt horizon:
Hue—10YR
Value—5 or 6 (3 to 5 moist)
Chroma—2 or 3
Texture—silty clay loam; less commonly loam, silt loam, or clay loam averaging between 25 and 35 percent clay
Reaction—neutral or slightly alkaline

BC horizon (if it occurs):
Hue—10YR
Value—6 or 7 (4 to 6 moist)
Chroma—2 or 3
Texture—silt loam; less commonly very fine sandy loam or loam
Reaction—neutral to moderately alkaline

C horizon:
Hue—10YR
Value—6 to 8 (4 to 6 moist)
Chroma—2 or 3
Texture—very fine sandy loam; less commonly silt loam, loam, loamy very fine sand, or fine sandy loam
Reaction—slightly alkaline or moderately alkaline

Content of fragments—up to 10 percent, by volume, sandstone gravel

Cr horizon:
Hue—10YR or 7.5YR
Value—7 or 8 (6 or 7 moist)
Chroma—2 to 4

Altvan Series

The Altvan series consists of well drained soils that formed in loamy sediments on upland hillslopes and valley terraces. These soils are moderately deep to sand or gravelly sand. Permeability is moderate in the solum and very rapid in the underlying material. Slopes range from 0 to 15 percent. Mean annual precipitation is about 16 inches, and mean annual temperature is 50 degrees F.

Typical Pedon

Altvan loam (fig. 3) on a slope of less than 1 percent, in a cultivated field. When described, the soil was moist to a depth of 23 inches.

Ap—0 to 6 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable; many fine pebbles; neutral; abrupt smooth boundary.

A—6 to 8 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; slightly hard, very friable; many fine pebbles; neutral; abrupt smooth boundary.

BA—8 to 12 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, friable; neutral; clear smooth boundary.

Bt—12 to 23 inches; brown (10YR 5/3) clay loam, dark brown (10YR 4/3) moist; weak coarse prismatic structure parting to moderate fine and medium subangular blocky; hard, firm; thin patchy films on faces of peds; neutral in the upper part, slightly alkaline in the lower part; clear smooth boundary.

Bk—23 to 26 inches; very pale brown (10YR 7/3) loam, pale brown (10YR 6/3) moist; weak medium and coarse subangular blocky structure; slightly hard, very friable; disseminated carbonates in root channels and on faces of peds; violent effervescence; moderately alkaline; clear smooth boundary.

C1—26 to 35 inches; very pale brown (10YR 7/3) loam, pale brown (10YR 6/3) moist; massive; soft, very friable; strong effervescence; strongly alkaline; gradual wavy boundary.

Figure 3.—A profile of an Altvan soil.

2C2—35 to 60 inches; pale brown (10YR 6/3) gravelly sand, brown (10YR 5/3) moist; single grain; 20 percent gravel, by volume; strong effervescence; strongly alkaline.

Type Location

Kimball County, Nebraska; about 6 miles north and 6 1/2 miles west of Bushnell; 2,160 feet east and 100 feet south of the northwest corner of sec. 31, T. 16 N., R. 58 W.

Range in Characteristics

Mean annual soil temperature: 49 to 59 degrees F
Depth to abrupt textural change: 20 to 40 inches; typically 24 to 36 inches
Depth to secondary calcium carbonate: 16 to 38 inches
Thickness of the solum: 16 to 38 inches

Thickness of the mollic epipedon: 7 to 20 inches; includes the upper part of the argillic horizon in some pedons
Content of clay in the particle-size control section (weighted average): 20 to 35 percent
Content of rock fragments: 0 to 15 percent gravel

A horizon:
Hue—10YR
Value—4 or 5 (2 or 3 moist)
Chroma—2 or 3
Texture—loam; less commonly sandy loam, fine sandy loam, or silt loam
Content of clay—15 to 23 percent
Reaction—slightly acid to slightly alkaline

Bt horizon:
Hue—10YR or 7.5YR
Value—4 to 6 (2 to 4 moist)
Chroma—2 to 4
Texture—clay loam; less commonly sandy clay loam or loam
Content of clay—20 to 35 percent
Reaction—neutral to moderately alkaline

Bk horizon:
Hue—10YR or 7.5YR
Value—5 to 7 (4 to 6 moist)
Chroma—2 or 3
Texture—silt loam; less commonly loam; some pedons have a very gravelly 2Bk horizon that extends to a depth of 60 inches or more
Content of clay—8 to 15 percent
Calcium carbonate equivalent—1 to 10 percent
Reaction—slightly alkaline to strongly alkaline

C horizon:
Hue—10YR or 7.5YR
Value—6 to 8 (5 or 6 moist)
Chroma—2 or 3
Texture—loam; less commonly silt loam; some pedons have a layer of fine sandy loam less than 5 inches thick above the 2C horizon
Content of clay—8 to 15 percent
Content of rock fragments—0 to 15 percent gravel, by volume
Reaction—slightly alkaline to strongly alkaline

2C horizon:
Hue—10YR or 7.5YR
Value—5 to 7 (4 to 6 moist)
Chroma—3 or 4
Texture—gravelly sand; less commonly gravelly coarse sand, sand, or coarse sand
Calcium carbonate equivalent—0 to 10 percent
Content of rock fragments—5 to 35 percent gravel, by volume
Reaction—slightly alkaline to strongly alkaline

Ascalon Series

The Ascalon series consists of very deep, well drained soils that formed in moderately coarse textured calcareous material. These soils are on upland hillslopes and tableland plains. Slopes range from 0 to 25 percent. The mean annual precipitation is about 16 inches, and the mean annual air temperature is about 49 degrees F.

Typical Pedon

Ascalon fine sandy loam, in an area of grassland:

A—0 to 4 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; moderate very fine granular structure; soft, very friable; 3 percent pebbles; neutral (pH 7.0); clear smooth boundary.
BA—4 to 7 inches; grayish brown (10YR 5/2) 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; few faint clay films on faces of peds; 3 percent pebbles; neutral (pH 7.2); clear smooth boundary.
Bt1—7 to 14 inches; brown (10YR 5/3) sandy clay loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; very hard, very friable; many distinct clay films on faces of peds; 3 percent pebbles; neutral (pH 7.2); gradual smooth boundary.
Bt2—14 to 18 inches; brown (10YR 5/3) sandy clay loam, brown (10YR 4/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; very hard, very friable; common distinct clay films on faces of peds and in root channels; slightly alkaline (pH 7.4); clear smooth boundary.
Bk1—18 to 25 inches; light gray (2.5Y 7/2) loam, light olive brown (2.5Y 5/3) moist; weak medium subangular blocky structure; hard, very friable; concretions, thin seams, and streaks of calcium carbonate; few faint clay films on faces of some peds; 5 percent pebbles; strongly effervescent; moderately alkaline (pH 8.2); gradual smooth boundary.
Bk2—25 to 60 inches; pale yellow (2.5Y 7/3) fine

sandy loam, light olive brown (2.5Y 5/3) moist; massive; slightly hard, very friable; 5 percent pebbles; concretions, thin seams, and streaks of calcium carbonate; violently effervescent; moderately alkaline (pH 8.2).

Type Location

Washington County, Colorado; on the north side of Highway 34, 5 miles east of Akron; about 2,280 feet north and 100 feet east of the southwest corner of sec. 8, T. 2 N., R. 51 W.

Range in Characteristics

Thickness of the mollic epipedon: 7 to 20 inches
Depth to calcareous material: 8 to 30 inches
Depth to argillic horizon: 15 to 24 inches
Content of organic carbon: 0.6 to 2.0 percent in the mollic epipedon; decreases uniformly with increasing depth
Content of rock fragments: 0 to 15 percent; typically less than 5 percent

A horizon:
Hue—2.5Y or 10YR
Value—4 or 5 (2 or 3 moist)
Chroma—2 or 3
Texture—loamy sand, sandy loam, fine sandy loam, or loam
Structure—primarily granular or subangular blocky
Consistence—soft or slightly hard
Reaction—neutral or slightly alkaline (pH 6.6 to 7.6)

Bt horizon:
Hue—2.5Y to 7.5YR
Value—4 to 6 (3 or 4 moist)
Chroma—2 to 4
Texture—sandy clay loam
Content of clay—18 to 35 percent
Content of silt—5 to 30 percent
Content of sand—50 to 75 percent (more than 35 percent fine sand or coarser; only minor amounts of medium to coarse angular granitic sand)
Reaction—neutral or slightly alkaline (pH 6.8 to 7.8)

Bk horizon:
Hue—2.5Y or 10YR
Value—5 to 7
Chroma—2 to 4
Texture—fine sandy loam, sandy loam, or loam
Reaction—moderately alkaline or strongly alkaline (pH 8.0 to 8.6)
Calcium carbonate equivalent—5 to 15 percent
Content of rock fragments—variable below a depth of 40 inches

C horizon (if it occurs):
Hue—2.5Y or 10YR
Value—6 or 7 (5 or 6 moist)
Chroma—2 to 4
Texture—loamy fine sand, sandy loam, or sandy clay loam

Ashollow Series

The Ashollow series consists of very deep, well drained, moderately rapidly permeable soils on upland backslopes and footslopes. These soils formed in loamy and sandy residuum derived from calcareous sandstone. Slopes range from 3 to 60 percent. The mean annual temperature is about 49 degrees F, and the mean annual precipitation is about 17 inches.

Typical Pedon

Ashollow very fine sandy loam, on a convex, southwest-facing slope of 22 percent, in an area of native grass. When described, the soil was dry throughout.

A—0 to 3 inches; grayish brown (10YR 5/2) very fine sandy loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; slightly hard, very friable; slight effervescence; moderately alkaline; clear smooth boundary.

AC—3 to 10 inches; brown (10YR 5/3) very fine sandy loam, dark grayish brown (10YR 4/2) moist; weak coarse prismatic structure; slightly hard, very friable; 2 percent sandstone gravel, by volume; violent effervescence; moderately alkaline; gradual smooth boundary.

C1—10 to 32 inches; pale brown (10YR 6/3) very fine sandy loam, brown (10YR 4/3) moist; massive; slightly hard, very friable; 2 percent sandstone gravel, by volume; violent effervescence; moderately alkaline; gradual smooth boundary.

C2—32 to 80 inches; light yellowish brown (10YR 6/4) very fine sandy loam, brown (10YR 5/3) moist; massive; slightly hard, very friable; 3 percent sandstone gravel, by volume; violent effervescence; moderately alkaline.

Type Location

Garden County, Nebraska; about 5 miles southeast of Lewellen on State Highway 26; 1,100 feet east and 100 feet south of the northwest corner of sec. 23, T. 15 N., R. 42 W.; Ruthton topographic quadrangle; lat. 41

degrees 15 minutes 53 seconds north and long. 102 degrees 6 minutes 31 seconds west.

Range in Characteristics

Depth to carbonates: 0 to 10 inches
Content of carbonates: Tends to increase uniformly with increasing depth
Content of sandstone gravel: Typically less than 5 percent but ranges from 2 to 15 percent, by volume, throughout the particle-size control section

A horizon:
Hue—10YR
Value—4 or 5 (3 or 4 moist)
Chroma—2 or 3
Note—horizons having value of less than 5.5 dry and 3.5 moist are less than 7 inches thick.
Texture—very fine sandy loam, fine sandy loam, or loamy very fine sand
Reaction—slightly alkaline or moderately alkaline

AC horizon (if it occurs):
Hue—10YR
Value—4 to 6 (4 or 5 moist)
Chroma—2 to 4
Texture—very fine sandy loam, loamy very fine sand, or fine sandy loam
Reaction—slightly alkaline or moderately alkaline

C horizon:
Hue—10YR or 2.5Y
Value—6 to 8 (4 to 7 moist)
Chroma—2 to 4
Texture—very fine sandy loam, fine sandy loam, or loamy very fine sand
Reaction—slightly alkaline or moderately alkaline

Blueridge Series

The Blueridge series consists of excessively drained, very rapidly permeable soils that are shallow or very shallow over bedded gravelly coarse sand. These soils formed in sandy and gravelly soil material deposited over gravelly sand on upland hillslopes. Slopes range from 6 to 60 percent. Mean annual temperature is about 50 degrees F, and mean annual precipitation is about 17 inches at the type location.

Typical Pedon

Blueridge coarse sand, on a convex, south-facing slope of 20 percent, in an area of rangeland. When described, the soil was moist throughout.

A—0 to 4 inches; grayish brown (10YR 5/2) coarse sand, dark grayish brown (10YR 4/2) moist; single grain; loose; 9 percent gravel, by volume; moderately acid; clear wavy boundary.
C1—4 to 40 inches; light gray (10YR 7/2) gravelly coarse sand, light brownish gray (10YR 6/2) moist; single grain; loose; 18 percent gravel, by volume; moderately acid; clear wavy boundary.
C2—40 to 80 inches; light gray (10YR 7/2) gravelly coarse sand, light brownish gray (10YR 6/2) moist; single grain; loose; 23 percent gravel, by volume; slightly acid.

Type Location

Garden County, Nebraska; about 9 miles north and 1 mile west of Lewellen; 4,050 feet west and 2,500 feet south of the northeast corner of sec. 4, T. 17 N., R. 42 W.

Range in Characteristics

Mean annual soil temperature: 49 to 55 degrees F
Depth to secondary calcium carbonate: Typically no free carbonates; a layer of gravel coated with carbonates (typically on the underside) in some pedons
Content of rock fragments in the particle-size control section (weighted average): Averages 15 to 35 percent gravel, by volume, but layers can contain more than 35 percent or less than 15 percent
Other features: Some pedons have an AC horizon that ranges from about 3 to 10 inches thick and is intermediate between the A and C horizons in color and texture.

A horizon:
Hue—10YR
Value—3 to 6 (2 to 5 moist)
Chroma—1 to 3
Texture—coarse sand, loamy coarse sand, loamy sand, gravelly loamy sand, gravelly sandy loam, or gravelly loam
Content of clay—0 to 10 percent
Content of rock fragments—5 to 35 percent gravel, by volume
Reaction—moderately acid to neutral

C horizon:
Hue—10YR or 2.5Y
Value—5 to 8 (4 to 7 moist)
Chroma—2 to 4
Texture—dominantly gravelly coarse sand but ranges from sand to very gravelly coarse sand
Content of clay—0 to 3 percent

Content of rock fragments—averages about 15 to 35 percent, by volume
Reaction—moderately acid to slightly alkaline

Broadwater Series

The Broadwater series consists of very deep, excessively drained soils on valley flood plains. These soils formed in stratified sandy and gravelly alluvium. Slopes range from 0 to 2 percent. The mean annual precipitation is about 17 inches at the type location, and the mean annual air temperature is about 50 degrees F.

Typical Pedon

Broadwater loamy sand, on a slope of 1 percent, on a channeled flood plain in an area of rangeland:

A—0 to 3 inches; light brownish gray (10YR 6/2) loamy sand, brown (10YR 4/3) moist; weak fine granular structure; soft, very friable; 3 percent gravel, by volume; strong effervescence; slightly alkaline; clear smooth boundary.
C1—3 to 9 inches; pale brown (10YR 6/3) loamy sand, brown (10YR 5/3) moist; single grain; soft, very friable; thin strata of loamy very fine sand; 3 percent gravel, by volume; strong effervescence; slightly alkaline; abrupt smooth boundary.
2C2—9 to 32 inches; pale brown (10YR 6/3) gravelly coarse sand, brown (10YR 5/3) moist; single grain; loose; thin strata of loamy very fine sand; 18 percent gravel, by volume; strong effervescence; slightly alkaline; abrupt smooth boundary.
2C3—32 to 60 inches; very pale brown (10YR 7/3) gravelly coarse sand, pale brown (10YR 6/3) moist; single grain; loose; thin strata of coarse sand; 31 percent gravel, by volume; strong effervescence; slightly alkaline.

Type Location

Garden County, Nebraska; about 3.5 miles south and 0.5 mile west of Oshkosh; 1,600 feet south and 900 feet west of the northeast corner of sec. 21, T. 16 N., R. 44 W.; Barn Butte topographic quadrangle; lat. 41 degrees 20 minutes 50 seconds north and long. 102 degrees 21 minutes 45 seconds west.

Range in Characteristics

Mean annual soil temperature: 49 to 55 degrees F
Depth to secondary calcium carbonate: 0 to 80 inches
Texture of the particle-size control section: Sandy

A horizon:
Hue—10YR
Value—5 or 6 (3 to 5 moist)
Chroma—2 to 4
Texture—loamy sand or loamy fine sand
Content of clay—3 to 10 percent
Content of rock fragments—2 to 5 percent, by volume, sandstone and granitic gravel
Reaction—neutral or slightly alkaline

C horizon:
Hue—10YR
Value—5 to 7 (4 to 6 moist)
Chroma—2 to 4
Texture—loamy sand or sand with strata of finer textured material
Content of clay—3 to 10 percent
Content of rock fragments—2 to 5 percent gravel, by volume
Calcium carbonate equivalent—0 to 10 percent
Reaction—neutral or slightly alkaline

2C horizon:
Hue—10YR
Value—5 to 7 (4 to 6 moist)
Chroma—2 to 4
Texture—coarse sand or gravelly coarse sand
Content of rock fragments—typically 15 to 35 percent gravel, but ranges from 5 to 35 percent, by volume
Content of clay—0 to 3 percent
Calcium carbonate equivalent—0 to 10 percent
Reaction—neutral or slightly alkaline

Calamus Series

The Calamus series consists of very deep, moderately well drained, rapidly permeable soils on river valley flood plains. These soils formed in sandy alluvium. Slopes range from 0 to 3 percent. Mean annual air temperature is about 49 degrees F, and mean annual precipitation is about 20 inches.

Typical Pedon

Calamus loamy fine sand, on a slope of less than 2 percent, in an area of rangeland:

A—0 to 5 inches; grayish brown (10YR 5/2) loamy fine sand, very dark gray (10YR 3/1) moist; weak medium and fine granular structure; soft, very friable; slightly acid; clear smooth boundary.
AC—5 to 14 inches; light brownish gray (10YR 6/2) fine sand, dark grayish brown (10YR 4/2) moist; weak medium granular structure; soft, very friable; slightly acid; clear smooth boundary.
C1—14 to 21 inches; light gray (10YR 7/2) sand, light

brownish gray (10YR 6/2) moist; single grain; loose; few thin strata of fine sandy loam and coarse sand; slightly acid; clear smooth boundary.

C2—21 to 30 inches; light gray (10YR 7/2) sand, light brownish gray (10YR 6/2) moist; single grain; loose; few thin strata of fine sandy loam and coarse sand; about 3 percent gravel, by volume; slightly acid; clear smooth boundary.

C3—30 to 55 inches; light gray (10YR 7/2), stratified fine sand, sand, and coarse sand, light brownish gray (10YR 6/2) moist; few medium distinct yellowish brown (10YR 5/6) iron masses in soil matrix; single grain; loose; about 10 percent gravel, by volume; slightly acid; clear smooth boundary.

C4—55 to 60 inches; light gray (10YR 7/2) gravelly coarse sand, light brownish gray (10YR 6/2) moist; few medium distinct yellowish brown (10YR 5/6) iron masses in soil matrix; single grain; loose; about 18 percent gravel, by volume; slightly acid.

Type Location

Loup County, Nebraska; about 12 miles north and 11 miles west of Taylor; 2,300 feet west and 200 feet north of the southeast corner of sec. 32, T. 23 N., R. 20 W.

Range in Characteristics

Mean annual soil temperature: 49 to 55 degrees F
Depth to secondary calcium carbonate: Typically no free carbonates
Depth to redox concentrations: 20 to 40 inches
Depth to endosaturation: 36 to 72 inches
Thickness of the solum: 6 to 20 inches
Content of clay in the particle-size control section (weighted average): 1 to 10 percent

A horizon:
Hue—10YR
Value—4 to 7 (2 to 5 moist)
Chroma—1 to 4
Texture—loamy fine sand, loamy sand, fine sand, sand, or coarse sand
Content of clay—1 to 10 percent
Reaction—moderately acid to slightly alkaline

AC horizon:
Hue—10YR
Value—5 or 6 (4 or 5 moist)
Chroma—1 to 3
Texture—fine sand, loamy fine sand, or sand
Content of clay—3 to 10 percent
Reaction—slightly acid to slightly alkaline

C horizon:
Hue—10YR
Value—6 to 8 (5 to 7 moist)
Chroma—2 to 4
Texture—sand or coarse sand with 1- to 3-inch strata of very fine sandy loam to gravelly coarse sand
Content of rock fragments—5 to 25 percent gravel, by volume
Content of clay—1 to 8 percent
Reaction—slightly acid to slightly alkaline
Other features—few to many faint to prominent redoximorphic concentrations with hue of 5YR to 10YR and chroma of 4 to 6

Canyon Series

The Canyon series consists of well drained soils that are shallow over weakly cemented limestone or very fine grained sandstone. These soils formed in loamy, calcareous residuum on uplands. Permeability is moderate. Slopes range from 0 to 60 percent. Mean annual precipitation is about 16 inches, and mean annual air temperature is about 50 degrees F.

Typical Pedon

Canyon loam (fig. 4), on a convex slope of 8 percent, in an area of rangeland:

A—0 to 4 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium granular structure; slightly hard, very friable; slightly alkaline; abrupt smooth boundary.

AC—4 to 9 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; weak medium prismatic structure; slightly hard, friable; 5 percent, by volume, sandstone gravel; strong effervescence; moderately alkaline; clear smooth boundary.

C—9 to 16 inches; very pale brown (10YR 8/3) very fine sandy loam, pale brown (10YR 6/3) moist; massive; slightly hard, friable; 10 percent, by volume, sandstone gravel; strong effervescence; moderately alkaline; abrupt wavy boundary.

Cr—16 to 80 inches; very pale brown (10YR 8/3), weakly cemented, fine grained sandstone; violent effervescence.

Type Location

Box Butte County, Nebraska; 9 1/2 miles south and 6 miles west of Hemingford; 80 feet east and 2,140 feet north of the southwest corner of sec. 32, T. 26 N., R. 50 W.

Range in Characteristics

Thickness of the solum: 6 to 12 inches

Figure 4.—A profile of a Canyon soil.

Depth to bedrock: Typically about 16 inches; ranges from 6 to 20 inches
Depth to free carbonates: 0 to 6 inches
Reaction: Slightly alkaline or moderately alkaline throughout
Content of sandstone gravel: Typically 0 to 15 percent; ranges from 0 to 25 percent

A horizon:
Hue—10YR
Value—4 to 7 (3 to 6 moist)
Chroma—2 or 3
Texture—loam, silt loam, sandy loam, fine sandy loam, very fine sandy loam, gravelly loam, or gravelly sandy loam

AC horizon (if it occurs):
Hue—10YR
Value—5 to 8 (4 to 7 moist)
Chroma—1 to 4
Textures—same as those in the A horizon

C horizon (if it occurs):
Hue—10YR or 2.5Y
Value—6 to 8 (4 to 7 moist)
Chroma—2 to 4
Texture—loam, very fine sandy loam, silt loam, or gravelly loam; contains 12 to 25 percent clay

Chappell Series

The Chappell series consists of well drained soils that are moderately deep over coarse sand or gravelly sand. Permeability is moderately rapid in the solum and rapid or very rapid in the underlying material. These soils formed in loamy colluvium and alluvium deposited over coarse sand or gravelly sand. They are on river valley terraces and upland hillslopes. Slopes range from 0 to 15 percent. Mean annual temperature is about 51 degrees F, and mean annual precipitation is about 15 inches.

Typical Pedon

Chappell fine sandy loam, in an area of native grass:

A1—0 to 7 inches; dark grayish brown (10YR 4/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; slightly hard, friable; neutral; abrupt smooth boundary.
A2—7 to 17 inches; dark grayish brown (10YR 4/2) fine sandy loam, very dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, friable; neutral; clear smooth boundary.
Bw—17 to 25 inches; light brown (10YR 5/3) fine sandy loam, dark grayish brown (10YR 4/2) moist; weak fine and medium prismatic and subangular blocky structure; slightly hard, friable; slightly alkaline; clear smooth boundary.
C1—25 to 35 inches; pale brown (10YR 6/3) fine sandy loam, brown (10YR 4/3) moist; massive; slightly hard, friable; strong effervescence; moderately alkaline; gradual smooth boundary.
2C2—35 to 60 inches; very pale brown (10YR 7/4) gravelly coarse sand, light yellowish brown (10YR 6/4) moist; single grain; loose; slightly alkaline; slight effervescence.

Type Location

Keith County, Nebraska, about 1 mile south and 7 miles west of Big Springs; 2,700 feet west and 2,100 feet north of the southeast corner of sec. 30, T. 13 N., R. 40 W.

Range in Characteristics

Mean annual soil temperature: 49 to 57 degrees F
Depth to abrupt textural change: 20 to 40 inches
Depth to secondary calcium carbonate: 15 to 30 inches; averages about 25 inches (but some pedons are noncalcareous)
Depth to cambic horizon: 10 to 20 inches
Thickness of the mollic epipedon: 10 to 20 inches; includes the A horizon and part of the upper B horizon
Thickness of the solum: 15 to 30 inches
Content of clay in the particle-size control section (weighted average): 5 to 18 percent

A horizon:
Hue—10YR or 7.5YR
Value—3 to 5 (2 or 3 moist)
Chroma—2 or 3
Texture—fine sandy loam or sandy loam; less commonly loam or loamy sand
Reaction—slightly acid or neutral

Bw horizon:
Hue—10YR or 7.5YR
Value—3 to 6 (2 to 4 moist)
Chroma—2 or 3
Texture—fine sandy loam or sandy loam
Reaction—slightly acid to moderately alkaline

C horizon:
Hue—10YR or 7.5YR
Value—5 to 8 (4 to 6 moist)
Chroma—2 to 4
Texture—fine sandy loam or sandy loam
Reaction—neutral to moderately alkaline

2C horizon:
Hue—10YR or 7.5YR
Value—5 to 8 (4 to 6 moist)
Chroma—2 to 4
Texture—gravelly coarse sand, gravelly sand, or gravelly loamy sand
Reaction—neutral to moderately alkaline

Duroc Series

The Duroc series consists of very deep, well drained soils in swales, on toeslopes, and on stream terraces. These soils formed in loamy alluvium and eolian deposits. Slopes range from 0 to 6 percent. The average annual precipitation is about 16 inches, and the average annual air temperature is about 46 degrees F.

Typical Pedon

Duroc loam (fig. 5), in an area of grassland:

Figure 5.—A profile of a Duroc soil.

A—0 to 6 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; strong very fine granular structure; soft, very friable, slightly sticky and slightly plastic; neutral (pH 7.2); clear smooth boundary.
Bw1—6 to 20 inches; grayish brown (10YR 5/2) 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 slightly plastic; slightly alkaline (pH 7.4); clear smooth boundary.
Bw2—20 to 28 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; slightly effervescent; disseminated calcium carbonate; moderately alkaline (pH 8.0); gradual smooth boundary.
Bk—28 to 80 inches; light brownish gray (10YR 6/2)

loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; strongly effervescent; calcium carbonate occurring as soft masses and thin seams and streaks; moderately alkaline (pH 8.3).

Type Location

Goshen County, Wyoming; 1,900 feet north and 1,950 feet east of the southwest corner of sec. 12, T. 22 N., R. 61 W.

Range in Characteristics

Depth to carbonates: 15 to 36 inches
Mean annual soil temperature: 47 to 58 degrees F
Thickness of the mollic epipedon: 20 to 50 inches
Content of organic carbon: Decreases uniformly with increasing depth
Texture of the particle-size control section: Loam, silt loam; content of clay ranges from 18 to 35 percent, content of silt from 30 to 70 percent, and content of sand from 10 to 45 percent with less than 15 percent fine sand or coarser
Content of rock fragments: Typically none but ranges from 0 to 10 percent
Other features: Some pedons have an AC horizon, which has properties similar to those of the A horizon.

A horizon:
Hue—10YR
Value—4 or 5 (2 or 3 moist)
Chroma—1 to 3
Reaction—neutral to moderately alkaline
Texture—loam, silt loam, or very fine sandy loam

Bw horizon:
Hue—10YR
Value—3 to 6 (2 to 4 moist)
Chroma—2 or 3
Reaction—neutral or slightly alkaline
Texture—loam, silt loam, or very fine sandy loam

Bk horizon (if it occurs):
Hue—10YR
Value—5 to 7 (3 to 5 moist)
Chroma—2 or 3
Reaction—moderately alkaline or strongly alkaline
Texture—loam, silt loam, or very fine sandy loam

C horizon (if it occurs):
Hue—10YR
Value—5 to 7 (3 to 7 moist)
Chroma—2 or 3
Reaction—slightly alkaline to strongly alkaline
Texture—loam, silt loam, or very fine sandy loam

Eckley Series

The Eckley series consists of very deep, well drained soils that formed in Tertiary pedisediments. These soils are on upland hillslopes. Slopes range from 1 to 30 percent. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 49 degrees F.

Typical Pedon

Eckley gravelly loam, in an area of grassland:

A—0 to 4 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable; 20 percent pebbles; neutral; gradual smooth boundary.

Bt—4 to 12 inches; grayish brown (10YR 5/2) gravelly sandy clay loam, very dark grayish brown (10YR 3/2) moist; weak or moderate medium prismatic structure parting to moderate medium subangular blocky; hard, very friable; common distinct clay films on peds; 20 percent pebbles; neutral; clear smooth boundary.

BC—12 to 15 inches; pale brown (10YR 6/3) gravelly sandy loam, dark brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, very friable; few faint clay films on horizontal and vertical faces of peds and some clay bridging between sand grains; 30 percent pebbles; slightly alkaline; gradual wavy boundary.

2C—15 to 60 inches; very pale brown (10YR 7/4) very gravelly sand, yellowish brown (10YR 5/4) moist; single grain; loose; 40 percent pebbles; slightly alkaline.

Type Location

Phillips County, Colorado; 270 feet south and 55 feet east of the N1/4 corner of sec. 17, T. 7 N., R. 47 W.

Range in Characteristics

Mean annual soil temperature: 49 to 52 degrees F
Depth to contrasting gravelly or very gravelly sand: 12 to 20 inches
Depth to argillic horizon: 4 to 7 inches
Depth to secondary calcium carbonate: Generally noncalcareous to a depth of more than 60 inches but may be calcareous below a depth of 30 inches and have some weak accumulation of secondary calcium carbonate in some pedons
Content of organic carbon in the mollic epipedon: 0.7 to 3 percent; decreases uniformly with increasing depth

Base saturatation in the solum: Typically base saturated but ranges from 90 to 100 percent
Content of clay in the particle-size control section (weighted average): 20 to 35 percent
Content of rock fragments: Typically 15 to 20 percent, by volume, but ranges from 5 to 35 percent

A horizon:
Hue—10YR or 7.5YR
Value—4 or 5 (2 or 3 moist)
Chroma—1 to 3
Texture—loam, gravelly loam, or gravelly sandy loam
Content of clay—10 to 25 percent
Reaction—neutral or slightly alkaline

Bt horizon:
Hue—10YR or 7.5YR
Value—4 to 6
Chroma—2 to 4
Texture—clay loam, gravelly sandy clay loam, or sandy clay loam
Content of clay—20 to 35 percent
Content of sand—more than 35 percent fine or coarser sand
Reaction—neutral or slightly alkaline

BC horizon:
Hue—10YR or 7.5YR
Value—4 to 6
Chroma—2 to 4
Texture—gravelly sandy loam
Reaction—neutral or slightly alkaline

2C horizon:
Hue—2.5Y to 7.5YR
Value—5 to 7 (4 or 5 moist)
Chroma—3 or 4
Texture—gravelly sand, gravelly loamy sand, or very gravelly sand
Content of rock fragments—5 to 50 percent; dominantly pebble sized
Reaction—neutral or slightly alkaline

Glenberg Series

The Glenberg series consists of very deep, well drained soils that formed in stratified calcareous alluvium derived from mixed sources. These soils are on flood plains and low terraces. Slopes range from 0 to 8 percent. Mean annual precipitation is about 12 inches, and mean annual air temperature is about 52 degrees F.

Typical Pedon

Glenberg sandy loam, in an area of grassland:

A—0 to 6 inches; light brownish gray (10YR 6/2) sandy loam, dark grayish brown (10YR 4/2) moist; moderate fine granular structure; soft, very friable; moderately alkaline (pH 8.0); gradual smooth boundary.

C—6 to 60 inches; light brownish gray (10YR 6/2) sandy loam stratified with thin lenses of loam and loamy sand; dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable; weak and inconsistent accumulations of secondary calcium carbonate as small concretions; moderately alkaline (pH 8.2).

Type Location

Crowley County, Colorado; 200 feet south and 720 feet east of the N1/4 corner of sec. 17, T. 22 S., R. 58 W.

Range in Characteristics

Mean annual soil temperature: 47 to 53 degrees F
Mean summer soil temperature: 65 to 74 degrees F
Depth to bedrock or strongly contrasting substratum: More than 40 inches
Estimated content of organic carbon in the surface horizon: 0.5 to 1.5 percent; decreases irregularly with increasing depth
Texture of the control section: Dominantly sandy loam; content of clay ranges from 5 to 18 percent, content of silt from 5 to 40 percent, and content of sand from 50 to 75 percent with more than 35 percent fine or coarser sand
Content of rock fragments: Ranges from 0 to 15 percent but is commonly less than 5 percent. Some pedons may have up to 30 percent rock fragments in any one horizon, but the weighted average in the particle-size control section is less than 15 percent.
Visible secondary calcium carbonate: Occurs as soft concretions or thin seams inconsistently at any depth
Other features: Typically, these soils are calcareous throughout, but they may be leached for a few inches in some pedons.

A horizon:
Hue—2.5Y or 10YR
Value—4 to 7 (3 to 5 moist)
Chroma—2 to 4
Texture—fine sandy loam or sandy loam
Reaction—neutral to moderately alkaline

C horizon:
Hue—2.5Y or 10YR
Value—5 to 7 (4 or 5 moist)
Chroma—2 to 4

Texture—variable; stratified loamy sand to clay loam
Reaction—slightly alkaline to strongly alkaline
Calcium carbonate equivalent—ranges from less than 1 percent to 3 percent but is variable from pedon to pedon and from stratum to stratum within a single pedon

Gothenburg Series

The Gothenburg series consists of poorly drained soils that are very shallow over gravelly coarse sand. Permeability is rapid or very rapid in the underlying material. These soils formed in alluvium on river valley flood plains. Slopes range from 0 to 3 percent. Mean annual temperature is about 51 degrees F, and mean annual precipitation is about 23 inches at the type location.

Typical Pedon

Gothenburg loamy sand, on a slope of 0 to 2 percent. When described, the soil was moist throughout.

A—0 to 3 inches; grayish brown (10YR 5/2) loamy sand, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable; many fine and medium roots; neutral; clear wavy boundary.
C—3 to 8 inches; light brownish gray (10YR 6/2) coarse sand, grayish brown (10YR 5/2) moist; single grain; loose; 3 percent gravel, by volume; neutral; abrupt wavy boundary.
2Cg—8 to 80 inches; light gray (10YR 7/2) gravelly coarse sand, pale brown (10YR 6/3) moist; common medium prominent strong brown (7.5YR 5/6 moist) iron masses in the soil matrix; single grain; loose; 30 percent gravel, by volume; neutral.

Type Location

Kearney County, Nebraska; 10 miles north and 9 miles west of Minden; 1,000 feet north and 2,300 feet east of the southwest corner of sec. 16, T. 8 N., R. 16 W.; Alfalfa Center topographic quadrangle; lat. 40 degrees 39 minutes 30 seconds north and long. 99 degrees 7 minutes 51 seconds west.

Range in Characteristics

Mean annual soil temperature: 52 to 55 degrees F
Depth to gravelly sand: Typically less than 10 inches; ranges from 1 to 20 inches
Depth to secondary calcium carbonate: Calcium carbonate is in the upper part of the profile.
Depth to endosaturation: 0 to 1.5 feet; highest in early spring and winter, when stream flow is highest, and may recede to a depth of several feet during midsummer

A horizon:
Hue—10YR
Value—3 to 5 (2 or 3 moist)
Chroma—1 or 2
Texture—loam, fine sandy loam, sandy loam, loamy fine sand, loamy sand, fine sand, or sand; thin layers of clay loam in some pedons
Content of clay—2 to 8 percent
Content of rock fragments—0 to 5 percent
Reaction—neutral to moderately alkaline

C horizon:
Hue—10YR or 2.5Y
Value—6 to 8 (4 to 7 moist)
Chroma—1 to 3
Texture—fine sand, sand, or coarse sand; loam, fine sandy loam, loamy fine sand, or loamy sand in the upper part in some pedons
Depth to redox concentrations—distinct or prominent brown or yellowish brown iron masses in the matrix in most places
Content of rock fragments—0 to 15 percent gravel, by volume
Reaction—neutral to moderately alkaline

2Cg horizon:
Hue—10YR
Value—6 to 8 (4 to 7 moist)
Chroma—1 to 3
Texture—sand, gravelly coarse sand, or coarse sand
Content of rock fragments—some pedons contain thin strata of material that ranges up to 50 percent gravel, by volume
Reaction—neutral or slightly alkaline

Jankosh Series

The Jankosh series consists of somewhat poorly drained, loamy alluvial soils that are moderately deep over gravelly sand. These soils are on river valley flood plains. Permeability is moderate in the loamy upper part and very rapid in the gravelly lower part. Slopes range from 0 to 2 percent. The mean annual temperature is 50 degrees F, and the mean annual precipitation is 17 inches at the type location.

Typical Pedon

Jankosh loam, 0 to 2 percent slopes, in an area of native grass:

A—0 to 2 inches; gray (10YR 5/1) loam, very dark gray (10YR 3/1) moist; weak fine granular structure; slightly hard, friable; slight effervescence; slightly alkaline; sodium adsorption ratio 8; abrupt smooth boundary.

E—2 to 4 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; slightly hard, friable; slight effervescence; slightly alkaline; sodium adsorption ratio 5; abrupt smooth boundary.

Btn—4 to 14 inches; grayish brown (10YR 5/2) sandy clay loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; hard, firm; violent effervescence; very strongly alkaline; sodium adsorption ratio 19; clear smooth boundary.

Bkn1—14 to 18 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; weak coarse prismatic structure; hard, firm; few fine distinct yellowish brown (10YR 5/6) irregularly shaped masses of iron accumulation with sharp to diffuse boundaries in the matrix; violent effervescence; sodium adsorption ratio 25; very strongly alkaline; clear smooth boundary.

Bkn2—18 to 33 inches; very pale brown (10YR 7/3) very fine sandy loam, pale brown (10YR 6/3) moist; moderate medium prismatic structure; slightly hard, friable; few fine and medium distinct yellowish brown (10YR 5/6) irregularly shaped masses of iron accumulation with sharp to diffuse boundaries in the matrix; sodium adsorption ratio 15; few fine calcium carbonate accumulations; violent effervescence; very strongly alkaline; abrupt wavy boundary.

2Cg—33 to 80 inches; very pale brown (10YR 8/2) gravelly coarse sand, light gray (10YR 7/2) moist; single grain; loose; 26 percent gravel, by volume; neutral.

Type Location

Garden County, Nebraska; about 0.5 mile south and 0.5 mile west of Oshkosh; 200 feet north and 2,575 feet east of the southwest corner of sec. 35, T. 17 N., R. 44 W.; Oshkosh topographic quadrangle; lat. 41 degrees 23 minutes 43 seconds north and long. 102 degrees 21 minutes 25 seconds west.

Range in Characteristics

Mean annual soil temperature: 51 to 53 degrees F
Calcium carbonates: Typically at the surface
Redox concentrations: Occurring in the lower part of the Btn and Bkn horizons
Depth to endosaturation: 1.5 to 3.0 feet
Thickness of the solum: 20 to 36 inches
Mollic epipedon: 7 to 20 inches thick; may extend into the upper part of the Btn horizon
Content of clay in the particle-size control section (weighted average): 10 to 18 percent
Depth to coarse sand or gravelly coarse sand: 24 to 48 inches; averages 36 inches

A horizon:
Hue—10YR
Value—4 or 5 (3 or 4 moist)
Chroma—1 or 2
Texture—loam or very fine sandy loam
Content of clay—10 to 18 percent
Calcium carbonate equivalent—1 to 15 percent
SAR—0 to 9
Reaction—slightly alkaline or moderately alkaline

E horizon:
Hue—10YR
Value—6 or 7 (4 or 5 moist)
Chroma—6 or 7 (4 or 5 moist)
Texture—loam or very fine sandy loam
Content of clay—10 to 18 percent
Calcium carbonate equivalent—1 to 15 percent
SAR—0 to 9
Reaction—slightly alkaline or moderately alkaline

Btn horizon:
Hue—10YR
Value—4 to 6 (3 or 4 moist)
Chroma—2 or 3
Texture—very fine sandy loam, sandy clay loam, clay loam, or loam
Content of clay—10 to 18 percent
Calcium carbonate equivalent—5 to 15 percent
SAR—13 to 30
Reaction—strongly alkaline or very strongly alkaline

Bkn horizon:
Hue—10YR
Value—5 to 7 (4 to 6 moist)
Chroma—2 or 3
Texture—very fine sandy loam or loam
Content of clay—10 to 18 percent
Calcium carbonate equivalent—5 to 15 percent
SAR—13 to 30
Reaction—strongly alkaline or very strongly alkaline

2Cg horizon:
Hue—10YR
Value—5 to 7 (4 to 6 moist)
Chroma—2 or 3
Texture—very fine sandy loam or loam
Content of rock fragments—5 to 25 percent gravel, by volume

Calcium carbonate equivalent—0 to 5 percent
SAR—0 to 6
Reaction—neutral or slightly alkaline

Jayem Series

The Jayem series consists of very deep, well drained to somewhat excessively drained soils that formed in sediments weathered from noncalcareous sandstone. These soils are on uplands. Slopes range from 0 to 20 percent. The mean annual precipitation is about 15 inches, and the mean annual air temperature is about 48 degrees F.

Typical Pedon

Jayem fine sandy loam, in an area of rangeland:

A—0 to 10 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; strong fine granular structure; soft, very friable, nonsticky and nonplastic; neutral (pH 7.2); clear smooth boundary.
Bw—10 to 22 inches; brown (10YR 5/3) fine sandy loam, brown (10YR 4/3) moist; weak coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, very friable, nonsticky and nonplastic; very few faint clay bridges between sand grains; neutral (pH 7.2); gradual wavy boundary.
C—22 to 60 inches; light brownish gray (10YR 6/2) fine sandy loam, grayish brown (10YR 5/2) moist; massive; slightly hard, very friable; slightly alkaline (pH 7.4).

Type Location

Goshen County, Wyoming; 1,850 feet south and 45 feet west of the northeast corner of sec. 16, T. 30 N., R. 60 W.; lat. 42 degrees 34 minutes 40 seconds north and long. 104 degrees 3 minutes 51 seconds west.

Range in Characteristics

Texture of the particle-size control section: Loamy very fine sand, fine sandy loam, or very fine sandy loam with 5 to 18 percent clay, 5 to 35 percent silt, and 50 to 80 percent sand (more than 15 percent fine sand or coarser)
Content of rock fragments: 0 to 15 percent
Reaction: Neutral or slightly alkaline
Mean annual soil temperature: 47 to 56 degrees F
Mean summer soil temperature: 60 to 76 degrees F
Thickness of the mollic epipedon: 7 to 20 inches
Other features: Some pedons have buried horizons in the lower part of the series control section.

A horizon:
Hue—2.5Y or 10YR
Value—4 or 5 (2 or 3 moist)
Chroma—2 or 3
Texture—fine sandy loam or sandy loam; loamy sand, loamy fine sand, or loamy very fine sand in some pedons

Bw horizon:
Hue—2.5Y to 7.5YR
Value—4 to 6 (3 to 5 moist)
Chroma—2 to 4
Texture—fine sandy loam, sandy loam, loamy very fine sand, or very fine sandy loam; loam, silt loam, and sandy clay loam in some pedons in Nebraska

C horizon:
Hue—2.5Y to 7.5YR
Value—5 to 7 (4 to 6 moist)
Chroma—2 to 6 (dry and moist)
Texture—fine sandy loam, sandy loam, very fine sandy loam, or loamy very fine sand; some pedons have loamy sand, loamy fine sand, fine sand, or sand below a depth of 40 inches
Other features—less than 5 percent free carbonates below a depth of 40 inches in some pedons

Johnstown Series

The Johnstown series consists of very deep, well drained soils that formed in loess and loamy sediments deposited on gravelly sand in the uplands. Permeability is moderate in the solum and rapid or very rapid in the underlying material. Slopes range from 0 to 6 percent. Mean annual temperature is about 48 degrees F, and mean annual precipitation is about 20 inches.

Typical Pedon

Johnstown loam, on a level slope of less than 1 percent, in an irrigated field of cultivated crops:

Ap—0 to 8 inches; dark gray (10YR 4/1) loam, very dark gray (10YR 3/1) moist; weak medium platy structure parting to weak fine granular; slightly hard, very friable; few fine and very fine roots; moderately acid; abrupt smooth boundary.
A—8 to 21 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; few fine and very fine roots; slightly acid; clear smooth boundary.

Bt—21 to 27 inches; grayish brown (10YR 5/2) clay loam, dark brown (10YR 3/3) moist; moderate coarse prismatic structure parting to moderate fine and medium subangular blocky; hard, firm; few fine and very fine roots; patchy dark grayish brown (10YR 3/2) clay films on faces of peds; neutral; clear smooth boundary.

Btb1—27 to 36 inches; very dark grayish brown (10YR 3/2) silty clay loam, very dark brown (10YR 2/2) moist; moderate coarse prismatic structure parting to moderate fine and medium subangular blocky; hard, firm; patchy clay films on faces of peds; few fine and very fine roots; neutral; clear smooth boundary.

Btb2—36 to 44 inches; light yellowish brown (2.5Y 6/4) silty clay loam, olive brown (2.5Y 4/4) moist; moderate coarse prismatic structure parting to moderate medium subangular blocky; hard, firm; patchy clay films on faces of peds; few very fine roots; grayish brown (10YR 5/2) worm castings; neutral; clear smooth boundary.

BCb—44 to 50 inches; light yellowish brown (2.5Y 6/4) silty clay loam, olive brown (2.5Y 4/4) moist; weak coarse prismatic structure parting to weak medium subangular blocky; hard, friable; few very fine roots; few fine soft accumulations of carbonates; slight effervescence; slightly alkaline; abrupt wavy boundary.

2C—50 to 60 inches; light yellowish brown (10YR 6/4) gravelly coarse sand, yellowish brown (10YR 5/4) moist; single grain; loose; neutral.

Type Location

Brown County, Nebraska; about 4 miles east and 2 miles north of Ainsworth; 500 feet east and 100 feet south of the northwest corner of sec. 14, T. 30 N., R. 21 W.

Range in Characteristics

Thickness of the mollic epipedon: 20 to 44 inches
Thickness of the solum: 30 to 55 inches
Depth to the 2C horizon: 40 to 60 inches
Depth to carbonates: 30 to more than 60 inches
Depth to buried soil: 14 to 36 inches
Other features: Some pedons have a BCkb horizon.

A horizon:
Hue—10YR
Value—4 or 5 (2 or 3 moist)
Chroma—1 to 3
Texture—loam, fine sandy loam, clay loam, or silt loam
Reaction—moderately acid to neutral

Bt horizon:
Hue—10YR
Value—4 or 5 (3 moist)
Chroma—2 or 3
Texture—clay loam or silty clay loam; averages between 27 and 35 percent clay
Reaction—slightly acid or neutral

Btb1 horizon:
Hue—10YR
Value—3 or 4 (2 or 3 moist)
Chroma—1 or 2
Texture—clay loam or silty clay loam
Reaction—slightly acid or neutral

Btb2 horizon:
Hue—10YR or 2.5Y
Value—4 to 6 (3 to 5 moist)
Chroma—2 to 4
Texture—silty clay loam or clay loam; averages between 27 and 35 percent clay
Reaction—neutral or silghtly alkaline

BCb horizon and C horizon (if it occurs):
Hue—10YR or 2.5Y
Value—5 to 7 (4 to 6 moist)
Chroma—2 to 4
Texture—loam, very fine sandy loam, silt loam, or silty clay loam
Reaction—neutral to moderately alkaline

2C horizon:
Hue—10YR or 2.5Y
Value—5 to 7 (4 to 6 moist)
Chroma—2 to 4
Texture—gravelly coarse sand, coarse sand, sand, fine sand, loamy fine sand, or loamy sand
Content of rock fragments—0 to 35 percent gravel, by volume
Reaction—neutral or slightly alkaline

Keith Series

The Keith series consists of very deep, well drained, moderately permeable soils that formed in loess. These soils are on upland hillslopes, tabeland plains, and valley terraces. Slopes range from 0 to 11 percent. Mean annual air temperature is 52 degrees F, and mean annual precipitation is 19 inches at the type location.

Typical Pedon

Keith silt loam, on a slope of 1 percent, in a cultivated field:

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, friable; slightly acid; abrupt smooth boundary.

A—5 to 9 inches; dark grayish brown (10YR 4/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; slightly hard, friable; slightly acid; clear smooth boundary.

Bt1—9 to 14 inches; dark grayish brown (10YR 4/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate medium and coarse prismatic structure parting to weak medium and coarse subangular blocky; slightly hard, friable; few thin patchy clay films; neutral; clear smooth boundary.

Bt2—14 to 23 inches; grayish brown (10YR 5/2) silt loam, dark grayish brown (10YR 4/2) moist; moderate medium and coarse prismatic structure parting to weak medium subangular blocky; slightly hard, friable; few thin patchy clay films; neutral; clear smooth boundary.

BC—23 to 33 inches; light gray (10YR 7/2) silt loam, pale brown (10YR 6/3) moist; weak coarse subangular blocky structure; soft, very friable; violent effervescence; moderately alkaline; gradual smooth boundary.

C—33 to 60 inches; light gray (10YR 7/2) silt loam, pale brown (10YR 6/3) moist; massive; soft, very friable; few accumulations and streaks of carbonate; strong effervescence; moderately alkaline.

Type Location

Hitchcock County, Nebraska; 8 miles south and 5 miles west of Trenton; 1,100 feet south and 110 feet east of the northwest corner of sec. 13, T. 1 N., R. 34 W.

Range in Characteristics

Mean annual soil temperature: 48 to 55 degrees F
Depth to argillic horizon: 6 to 20 inches
Depth to secondary calcium carbonate: 15 to 38 inches
Thickness of the mollic epipedon: 7 to 20 inches; typically the upper part of the B horizon
Thickness of the solum: 15 to 48 inches
Content of clay in the particle-size control section (weighted average): 20 to 35 percent

A horizon:
Hue—10YR
Value—4 or 5 (2 or 3 moist)
Chroma—1 to 3
Texture—silt loam; less commonly loam, very fine sandy loam, or fine sandy loam
Content of clay—14 to 20 percent
Reaction—slightly acid or neutral

Bt1 horizon:
Hue—10YR or 7.5YR
Value—4 or 5 (2 to 4 moist)
Chroma—2 or 3
Texture—silt loam, silty clay loam, loam, or clay loam
Content of clay—20 to 35 percent
Reaction—neutral or slightly alkaline

Bt2 horizon:
Hue—10YR or 7.5YR
Value—5 or 6 (4 or 5 moist)
Chroma—2 or 3
Texture—silt loam, silty clay loam, loam, or clay loam
Content of clay—20 to 35 percent
Reaction—neutral or slightly alkaline

BC, Bk, and BCk horizons:
Hue—10YR or 2.5Y
Value—5 to 7 (3 to 6 moist)
Chroma—2 or 3
Texture—loam, very fine sandy loam, silty clay loam, silt loam, or clay loam
Reaction—slightly alkaline or moderately alkaline; accumulations of secondary carbonates in the Bk and BCk horizons

C horizon:
Hue—10YR or 2.5Y
Value—6 to 8 (5 or 6 moist)
Chroma—2 to 4
Texture—silt loam, loam, or very fine sandy loam; a buried soil is below a depth of 40 inches in some pedons
Calcium carbonate equivalent—5 to 15 percent
Reaction—slightly alkaline or moderately alkaline in the upper part and strongly alkaline in the lower part; accumulations of carbonate in some pedons

Kuma Series

The Kuma series consists of very deep, well drained soils that formed in medium or moderately fine textured, calcareous eolian deposits. An age discontinuity is marked by a paleosol. These soils are on tableland plains and upland hillslopes. Slopes range from 0 to 8 percent. The mean annual precipitation is about 16 inches, and the mean annual temperature is about 50 degrees F.

Typical Pedon

Kuma silt loam (fig. 6), in a cultivated area:

Ap—0 to 5 inches; grayish brown (10YR 5/2) silt loam,

Figure 6.—A profile of a Kuma soil.

very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to fine granular; soft, very friable, slightly sticky and slightly plastic; neutral (pH 7.0); clear smooth boundary.

BA—5 to 10 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few faint clay films on faces of peds and few faint clay films on the inside of some root channels and pores; neutral (pH 7.0); gradual smooth boundary.

Bt—10 to 20 inches; grayish brown (10YR 5/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic structure parting to medium subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; common faint clay films on faces of peds and clay films filling root channels and pores; neutral (pH 7.2); abrupt smooth boundary.

Btb—20 to 30 inches; dark gray (10YR 4/1) silt loam, black (10YR 2/1) moist; strong fine prismatic structure parting to fine subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; common distinct clay films on faces of peds and filling root channels and pores; slightly alkaline (pH 7.4); clear smooth boundary.

Btkb1—30 to 45 inches; light yellowish brown (2.5Y 6/3) silt loam, olive brown (2.5Y 4/3) moist; moderate fine prismatic structure parting to fine subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; few faint clay films on faces of peds and filling root channels and pores; visible secondary calcium carbonate occurring mostly as concretions or as coatings on faces of peds; faces of peds are strongly effervescent, but interiors are not effervescent; moderately alkaline (pH 8.2); clear smooth boundary.

Btkb2—45 to 50 inches; light yellowish brown (2.5Y 6/3) silt loam, olive brown (2.5Y 4/3) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few faint clay films on faces of peds and in root channels and pores; visible secondary calcium carbonate in structural cracks and on faces of peds; peds are effervescent throughout; violently effervescent; moderately alkaline (pH 8.2); clear smooth boundary.

Bkb—50 to 60 inches; light yellowish brown (2.5Y 6/3) silt loam, olive brown (2.5Y 4/3) moist; massive; hard, very friable, slightly sticky and slightly plastic; secondary calcium carbonate occurring as soft masses, concretions, and thin seams and streaks; violently effervescent; moderately alkaline (pH 8.2).

Type Location

Washington County, Colorado; 2,140 feet west and 70 feet north of the southeast corner of sec. 1, T. 2 N., R. 52 W.

Range in Characteristics

Mean annual soil temperature: 48 to 53 degrees F
Depth to the base of the argillic horizon: 27 to 60 inches
Depth to secondary calcium carbonate: 10 to 40 inches
Depth to continuous subhorizons of visible secondary calcium carbonate and/or sulfate: 20 to 40 inches
Depth to the mollic epipedon: 20 to 50 inches
Content of clay in the particle-size control section (weighted average): 18 to 35 percent

A horizon:
Hue—2.5Y to 7.5YR
Value—3 to 5 (2 or 3 moist)
Chroma—1 to 3
Texture—silt loam, loam, or very fine sandy loam
Reaction—slightly acid to slightly alkaline

Bt horizon:
Hue—2.5Y to 7.5YR
Value—3 to 5 (2 or 3 moist)
Chroma—1 to 3 (2 or 3 moist)
Texture—loam, clay loam, silt loam, or silty clay loam
Content of clay—18 to 35 percent
Content of silt—35 to 70 percent
Content of sand—5 to 40 percent; less than 15 percent fine or coarser sand
Reaction—neutral to moderately alkaline

Btb and Btkb horizons:
Hue—5Y to 7.5YR; subhorizons redder than 7.5YR in some pedons
Value—4 to 7 (2 to 6 moist)
Chroma—1 to 4
Texture—silt loam, loam, or silty clay loam
Content of clay—18 to 35 percent
Content of silt—35 to 70 percent
Content of sand—5 to 40 percent; less than 15 percent fine or coarser sand
Reaction—neutral to moderately alkaline; visible secondary carbonate commonly occurs in some part
Calcium carbonate equivalent—0 to 14 percent

Bk horizon:
Hue—5Y to 7.5YR; subhorizons redder than 7.5YR in some pedons
Value—4 to 7 (2 to 6 moist)
Chroma—1 to 4
Texture—loam, silt loam, or silty clay loam
Content of clay—10 to 35 percent
Content of silt—30 to 70 percent
Content of sand—5 to 50 percent; less than 35 percent fine or coarser sand
Reaction—neutral to moderately alkaline

C horizon:
Hue—5Y to 7.5YR
Value—4 to 7 (2 to 6 moist)
Chroma—1 to 4
Texture—loam, silt loam, or silty clay loam
Calcium carbonate equivalent—1 to 14 percent
Reaction—moderately alkaline or strongly alkaline

Las Animas Series

The Las Animas series consists of deep, poorly drained and somewhat poorly drained soils that formed in thick, calcareous, stratified alluvial materials derived from mixed sources. These soils are on valley flood plains and low stream terraces. Slopes range from 0 to 6 percent. The mean annual precipitation is about 15 inches, and the mean annual temperature is about 53 degrees F.

Typical Pedon

Las Animas sandy loam, in an area of grassland:

A—0 to 6 inches; gray (N 5/0) sandy loam, dark gray (N 4/0) moist; moderate fine granular structure; soft, very friable; strongly effervescent; moderately alkaline (pH 8.2); clear smooth boundary.

ACg—6 to 10 inches; light brownish gray (2.5Y 6/2) sandy loam stratified with loamy sand and loam; grayish brown (2.5Y 5/2) moist; common medium prominent yellowish brown (10YR 5/4 moist) mottles; weak coarse subangular blocky structure parting to weak fine granular; slightly hard, very friable; strongly effervescent; moderately alkaline (pH 8.2); gradual smooth boundary.

Ckyg—10 to 60 inches; light brownish gray (2.5Y 6/2) sandy loam stratified with loamy sand and loam; grayish brown (2.5Y 5/2) moist; many coarse prominent light olive brown (2.5Y 5/6 moist) and gray (N 5/0 moist) mottles; massive; soft, very friable; accumulation of visible secondary carbonate and sulfate in the form of crystals and concretions; strongly effervescent; moderately alkaline (pH 8.2).

Type Location

Bent County, Colorado; 2,640 feet south of the northwest corner of sec. 6, T. 23 S., R. 51 W.

Range in Characteristics

Mean annual soil temperature: 49 to 55 degrees F
Mean summer soil temperature: 73 degrees F
Depth to secondary calcium carbonate: 10 to 18 inches
Depth to endosaturation: 0 to 3.5 feet
Conductivity: 2 to more than 15 mmhos/cm; typically ranges from 4 to 16 mmhos/cm
Content of gypsum in the particle-size control section (weighted average): 0 to 5 percent
Other features: Continuous subhorizons with visible salt accumulation may occur at any depth.

A horizon:
Hue—5Y to 7.5YR or N
Value—4 to 6 (3 or 4 moist)
Chroma—0 to 2
Texture—loam or fine sandy loam
Reaction—moderately alkaline

C horizon:
Hue—5Y to 7.5YR
Value—3 to 7 (5 or 6 moist)
Chroma—1 to 3
Texture—fine sandy loam or sandy loam with strata of fine sand, silt loam, loam, loamy sand, or loamy fine sand
Content of clay—8 to 18 percent
Calcium carbonate equivalent—1 to 10 percent
Reaction—moderately alkaline

Lexsworth Series

The Lexsworth series consists of very deep, moderately well drained soils on river valley flood plains. These soils formed in 20 to 40 inches of loamy alluvium deposited over coarse sand or gravelly coarse sand. Permeability is moderate in the solum and very rapid in the substratum. Slopes range from 0 to 2 percent. Mean annual temperature is about 50 degrees F, and mean annual precipitation is about 17 inches at the type location.

Typical Pedon

Lexsworth loam, on a slope of less than 1 percent, in an area of irrigated cropland:

Ap—0 to 12 inches; gray (10YR 5/1) loam, very dark gray (10YR 3/1) moist; moderate medium and fine granular structure; hard, friable; slightly alkaline; abrupt smooth boundary.

C1—12 to 19 inches; gray (10YR 5/1) sandy clay loam, very dark grayish brown (10YR 4/2) moist; massive; violent effervescence; moderately alkaline; clear wavy boundary.

C2—19 to 26 inches; coarse sandy loam, brown (10YR 5/3) moist; few fine distinct brown (7.5YR 4/4) redox features; massive; violent effervescence; moderately alkaline; clear wavy boundary.

C3—26 to 33 inches; coarse sand, light yellowish brown (2.5Y 6/3) moist; single grain; violent effervescence; common medium distinct brown (7.5YR 4/4) redox features; slightly alkaline; abrupt wavy boundary.

C4—33 to 52 inches; stratified coarse sand, pale brown (10YR 6/3) moist; single grain; common medium prominent light olive brown (2.5Y 5/6) redox features; slightly alkaline; abrupt wavy boundary.

C5—52 to 60 inches; stratified fine sand, light brownish gray (10YR 6/2) moist; single grain; common medium prominent light olive brown (2.5Y 5/6) redox features; neutral; abrupt wavy boundary.

C6—60 to 80 inches; stratified coarse sand, pale brown (10YR 6/3) moist; neutral; single grain.

Type Location

Deuel County, Nebraska, 1 mile south of Big Springs; 600 feet west and 600 feet south of the northeast corner of sec. 2, T. 12 N., R. 42 W.; USGS topographic quadrangle Big Springs NECO; lat. 41 degrees 2 minutes 43 seconds north and long. 102 degrees 4 minutes 23 seconds west.

Range in Characteristics

Mean annual soil temperature: 51 to 53 degrees F
Depth to secondary calcium carbonate: 10 to 20 inches
Depth to endosaturation: 5 to 8 feet
Thickness of the mollic epipedon: 10 to 20 inches
Depth to coarse sand or gravelly coarse sand: 20 to 40 inches
Other features: Some pedons have an AC horizon.

A horizon:
Hue—10YR
Value—3 to 5 (2 or 3 moist)
Chroma—1 to 3 (dry or moist)
Texture—loam or clay loam
Reaction—neutral to moderately alkaline

Upper part of C horizon:
Hue—10YR or 2.5Y
Value—5 to 7 (4 to 6 moist)
Chroma—1 to 3 (dry or moist)
Texture—sandy clay loam, loam, clay loam, coarse sandy loam, fine sandy loam, or sandy loam; commonly stratified with varying colors and textures
Content of clay—8 to 18 percent
Reaction—slightly acid to moderately alkaline
Other features—common distinct or prominent redoximorphic features with hue of 2.5YR or 7.5YR, value of 3 to 6 moist, and chroma of 3 to 8 (dry or moist)

Lower part of C horizon:
Hue—10YR or 2.5Y
Value—6 to 8 (5 to 7 moist)
Chroma—2 to 4 (dry or moist)

Texture—coarse sand, fine sand, sand, or gravelly coarse sand
Reaction—neutral to moderately alkaline
Content of gravel—15 to 35 percent, by volume

Lodgepole Series

The Lodgepole series consists of very deep, somewhat poorly drained, very slowly permeable soils that formed in loess and loamy sediments. These soils are in upland depressions and on playas. Slopes are 0 to 1 percent. Mean annual air temperature is about 51 degrees F, and mean annual precipitation is about 17 inches at the type location.

Typical Pedon

Lodgepole silty clay loam, on a concave slope of less than 1 percent, in a cultivated field:

Ap—0 to 5 inches; gray (10YR 5/1) silty clay loam, very dark gray (10YR 3/1) moist; weak fine granular structure; slightly hard, friable; many very fine roots; slightly acid; abrupt smooth boundary.

Bt1—5 to 9 inches; dark gray (10YR 4/1) silty clay, black (10YR 2/1) moist; strong fine and medium angular blocky structure; very hard, very firm; patchy clay films on faces of peds; many very fine roots; slightly acid; clear smooth boundary.

Bt2—9 to 24 inches; dark gray (10YR 4/1) silty clay, black (10YR 2/1) moist; few fine distinct brown (7.5YR 4/4 moist) iron masses in the soil matrix; strong coarse prismatic structure parting to strong fine subangular blocky; very hard, very firm; patchy clay films on faces of peds; few very fine roots; slightly acid; diffuse wavy boundary.

Bt3—24 to 38 inches; dark grayish brown (10YR 4/2) silty clay, very dark brown (10YR 2/2) moist; common fine distinct brown (7.5YR 4/4 moist) iron masses in the soil matrix; strong coarse prismatic structure parting to moderate medium and fine subangular blocky; very hard, very firm; patchy clay films on faces of peds; neutral; clear wavy boundary.

Bt4—38 to 45 inches; grayish brown (10YR 5/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; moderate coarse prismatic structure parting to moderate medium subangular blocky; hard, firm; dark organic stains on faces of peds; neutral; gradual wavy boundary.

BC—45 to 54 inches; grayish brown (10YR 5/2) silty clay loam, dark grayish brown (10YR 4/2) moist; weak coarse prismatic structure parting to weak medium subangular blocky; slightly hard, friable; dark organic stains on ped faces; neutral; gradual wavy boundary.

C—54 to 80 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 4/3) moist; massive; soft, very friable; slightly alkaline.

Type Location

Dundy County, Nebraska; about 17 miles north and 4 miles east of Benkelman; 2,500 feet east and 750 feet north of the southwest corner of sec. 24, T. 4 N., R. 37 W.; USGS topographic quadrangle; lat. 40 degrees 17 minutes 40 seconds north and long. 101 degrees 26 minutes 46 seconds west.

Range in Characteristics

Mollic epipedon: 20 to 50 inches thick; extends through the Bt horizon
Depth to carbonates: Typically more than 40 inches; ranges from 30 to more than 60 inches
Other features: Pedons in undisturbed areas commonly have a thin E horizon. Some pedons have a Bk horizon.

A horizon:
Hue—10YR
Value—4 or 5 (2 or 3 moist)
Chroma—1 or 2
Texture—silt loam or silty clay loam
Reaction—slightly acid to slightly alkaline

Bt horizon:
Hue—10YR or 2.5Y
Value—3 to 5 (2 to 4 moist)
Chroma—1 or 2
Texture—silty clay or silty clay loam averaging between 35 and 50 percent clay; the range includes clay and clay loam
Reaction—slightly acid to slightly alkaline

BC horizon (if it occurs):
Colors and textures—intermediate between those of the Bt and C horizons; dark organic stains common on faces of peds
Reaction—neutral to moderately alkaline

C horizon:
Hue—10YR or 2.5Y
Value—5 to 8 (4 to 7 moist)
Chroma—2 to 4
Texture—silt loam, loam, or very fine sandy loam; fine sandy loam, sandy loam, loamy very fine sand, loamy fine sand, or loamy sand below a depth of 40 inches in some pedons
Other features—coatings of carbonates on cleavage planes in some pedons

Reaction—neutral to moderately alkaline

McConaughy Series

The McConaughy series consists of deep, well drained, moderately permeable soils on upland hillslopes. These soils formed in calcareous loess. Slopes range from 3 to 15 percent. Mean annual precipitation is about 18 inches, and mean annual temperature is about 50 degrees F at the type location.

Typical Pedon

McConaughy loam, on a slope of 12 percent; on a lower backslope in an area of rangeland:

A1—0 to 6 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to weak fine granular; slightly hard, friable; neutral; clear smooth boundary.

A2—6 to 13 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to weak fine granular; slightly hard, friable; neutral; clear smooth boundary.

Bw1—13 to 17 inches; brown (10YR 5/3) loam, brown (10YR 4/3) moist; weak coarse prismatic structure parting to weak medium subangular blocky; slightly hard, friable; slight effervescence; slightly alkaline; clear smooth boundary.

Bw2—17 to 22 inches; pale brown (10YR 6/3) very fine sandy loam, brown (10YR 5/3) moist; weak coarse prismatic structure parting to weak medium subangular blocky; slightly hard, friable; strong effervescence; moderately alkaline; gradual wavy boundary.

BC—22 to 34 inches; very pale brown (10YR 7/3) loam, brown (10YR 5/3) moist; weak coarse prismatic structure parting to weak medium subangular blocky; slightly hard, friable; few small soft white accumulations of carbonates; violent effervescence; strongly alkaline; gradual wavy boundary.

C1—34 to 40 inches; very pale brown (10YR 7/3) very fine sandy loam, brown (10YR 5/3) moist; massive; slightly hard, friable; few small soft white accumulations of carbonates; strong effervescence; moderately alkaline; diffuse wavy boundary.

C2—40 to 60 inches; very pale brown (10YR 7/3) very fine sandy loam, brown (10YR 5/3) moist; massive; slightly hard, friable; few small soft white accumulations of carbonates; strong effervescence; strongly alkaline.

Type Location

Keith County, Nebraska; about 7 miles west and 8 miles north of Brule; 475 feet east and 1,260 feet south of the northwest corner of sec. 4, T. 14 N., R. 41 W.

Range in Characteristics

Mean annual soil temperature: 51 to 53 degrees F
Thickness of the mollic epipedon: 7 to 20 inches
Depth to secondary calcium carbonate: 10 to 18 inches
Depth to cambic horizon: 7 to 20 inches
Content of clay: 10 to 18 percent
Other features: Some pedons have a Bk horizon.

A horizon:
Hue—10YR
Value—4 or 5 (2 or 3 moist)
Chroma—2 or 3
Texture—loam or very fine sandy loam
Reaction—neutral or slightly alkaline

Bw horizon:
Hue—10YR
Value—5 to 7 (4 or 5 moist)
Chroma—2 or 3
Texture—loam or very fine sandy loam
Content of clay—10 to 18 percent
Reaction—slightly alkaline or moderately alkaline

BC and C horizons:
Hue—10YR
Value—5 to 7 (4 or 5 moist)
Chroma—2 to 4
Texture—loam or very fine sandy loam
Calcium carbonate equivalent—1 to 5 percent
Reaction—moderately alkaline or strongly alkaline

Merrick Series

The Merrick series consists of very deep, moderately well drained soils on river valley flood plains. These soils formed in stratified silty and loamy alluvium. Permeability is moderate. Slopes range from 0 to 2 percent. Mean annual temperature is 52 degrees F, and mean annual precipitation is 25 inches at the type location.

Typical Pedon

Merrick loam, on a slope of less than 1 percent, in a field of irrigated cropland:

Ap—0 to 7 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium granular structure; slightly hard, friable; slightly acid; abrupt smooth boundary.

A1—7 to 12 inches; dark gray (10YR 4/1) loam, very dark gray (10YR 3/1) moist; weak fine and medium granular structure; slightly hard, friable; neutral; clear smooth boundary.

A2—12 to 30 inches; dark grayish brown (10YR 4/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak medium granular structure; slightly hard, friable; neutral; clear smooth boundary.

C1—30 to 42 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; weak medium blocky structure; slightly hard, friable; neutral; clear smooth boundary.

C2—42 to 48 inches; grayish brown (10YR 5/2) silt loam, dark grayish brown (10YR 4/2) moist; few fine faint yellowish brown (10YR 5/4 moist) iron masses in matrix; weak coarse blocky structure; hard, friable; neutral; clear smooth boundary.

C3—48 to 80 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; few fine distinct yellowish brown (10YR 5/4 moist) iron masses in matrix; massive; slightly hard, friable; slightly acid.

Type Location

Merrick County, Nebraska; about 1/2 mile south and 1 1/2 miles east of Chapman; 100 feet south and 100 feet east of the northwest corner of sec. 16, T. 12 N., R. 7 W.

Range in Characteristics

Mean annual soil temperature: 51 to 55 degrees F
Thickness of the mollic epipedon: 20 to 38 inches
Depth to secondary calcium carbonate: 40 to 60 inches
Depth to redox concentrations: 20 to 38 inches
Depth to endosaturation: 4 to 6 feet
Thickness of the solum: 20 to 38 inches
Content of clay: 27 to 35 percent
Other features: Some pedons have thin strata of alluvium, between depths of 30 and 60 inches, that contain small amounts of free carbonates. Some pedons have an AC horizon, which has textures similar to those of the A horizon and has slightly lighter colors.

A horizon:
Hue—10YR
Value—4 or 5 (2 or 3 moist)
Chroma—1 or 2 (dry or moist)
Texture—loam, silt loam, clay loam, or sandy clay loam
Reaction—slightly acid or neutral

C horizon:
Hue—10YR or 2.5Y
Value—5 to 7 (4 to 6 moist)
Chroma—2 or 3 (dry or moist)
Texture—loam or silt loam; clay loam, fine sandy loam, sandy loam, and coarser textures below a depth of 40 inches in some pedons
Reaction—slightly acid or neutral throughout the C horizon; strata that are slightly calcareous are slightly alkaline or moderately alkaline
Other features—few or common faint or distinct iron masses in the matrix below a depth of 30 inches

Platte Series

The Platte series consists of somewhat poorly drained soils that are shallow over coarse sand or gravelly coarse sand. These soils formed in sandy and loamy alluvium deposited over coarse sand or gravelly sand on river valley flood plains. Permeability is moderate or moderately rapid in the upper part and very rapid in the lower part. Slopes range from 0 to 3 percent. Mean annual temperature is about 51 degrees F, and mean annual precipitation is about 25 inches at the type location.

Typical Pedon

Platte loam, on a slope of less than 1 percent, in an area of irrigated cropland. When described, the soil was moist throughout.

Ap—0 to 5 inches; dark gray (10YR 4/1) loam, very dark gray (10YR 3/1) moist; weak fine granular structure; soft, friable; strong effervescence; moderately alkaline; abrupt smooth boundary.

A—5 to 8 inches; dark gray (10YR 4/1) very fine sandy loam, very dark gray (10YR 3/1) moist; common medium distinct brown (7.5YR 5/4) iron masses in the soil matrix; weak medium and fine granular structure; soft, very friable; strong effervescence; moderately alkaline; clear smooth boundary.

C—8 to 16 inches; light gray (10YR 7/2) very fine sandy loam, grayish brown (10YR 5/2) moist; common fine to coarse distinct brown (7.5YR 5/4) iron masses in the matrix; massive; soft, very friable; strata of loamy sand in the lower part; strong effervescence; moderately alkaline; gradual smooth boundary.

2Cg—16 to 80 inches; light gray (10YR 7/2) gravelly coarse sand, light brownish gray (10YR 6/2) moist; single grain; loose; slightly alkaline.

Type Location

Adams County, Nebraska; about 4 miles north and $2^1/_2$ miles west of Kenesaw; about 1,300 feet west and 1,050 feet north of the southeast corner of sec. 6, T. 8 N., R. 12 W.; Denman topographic quadrangle; lat. 40 degrees 41 minutes 9 seconds north and long. 98 degrees 42 minutes 35 seconds west.

Range in Characteristics

Mean annual soil temperature: 49 to 56 degrees F
Thickness of mollic colors: 6 to 9 inches; corresponds to the thickness of the A horizon
Depth to coarse sand, gravelly coarse sand, or gravelly sand: 10 to 20 inches
Depth to secondary calcium carbonate: Calcium carbonate typically disseminated throughout the A horizon; does not occur in some pedons
Depth to endosaturation: 1 to 3 feet
Content of gravel: Typically 15 to 35 percent, by volume, at a depth of more than 20 inches; ranges from 2 to 35 percent
Other features: Some pedons have an AC horizon.

A horizon:
Hue—10YR or 2.5Y
Value—4 or 5 (2 or 3 moist)
Chroma—1 or 2 (dry or moist)
Texture—loam, fine sandy loam, silty clay loam, silt loam, very fine sandy loam, sandy loam, loamy fine sand, or loamy sand
Reaction—dominantly moderately alkaline but ranges from neutral to moderately alkaline

C horizon:
Hue—10YR or 2.5Y
Value—6 to 8 (4 to 6 moist)
Chroma—1 to 3 (dry or moist)
Texture—loam, very fine sandy loam, fine sandy loam, or sandy loam; loamy fine sand, loamy sand, or sand in the lower part in some pedons
Content of rock fragments—0 to 5 percent gravel, by volume
Calcium carbonate equivalent—0 to 10 percent
Reaction—dominantly moderately alkaline but ranges from neutral to moderately alkaline
Other features—grayish and brownish redoximorphic features

2Cg horizon:
Hue—10YR or 2.5Y
Value—6 to 8 (4 to 6 moist)
Chroma—1 to 4 (dry or moist)
Texture—coarse sand, gravelly coarse sand, or gravelly sand
Content of rock fragments—typically 15 to 35 percent gravel, by volume, but ranges from 2 to 35 percent; the upper part commonly contains less gravel than the lower part; stratification of the sandy and gravelly layers is common
Calcium carbonate equivalent—0 to 5 percent
Reaction—dominantly neutral or slightly alkaline but ranges from neutral to moderately alkaline

Ralton Series

The Ralton series consists of very deep, moderately well drained, moderately permeable soils that formed in stratified, calcareous alluvium. These soils are on valley flood plains. Slopes range from 0 to 3 percent. Mean annual temperature is 49 degrees F, and mean annual precipitation is 17 inches at the type location.

Typical Pedon

Ralton loam, on a slope of less than 1 percent, in a cultivated field:

Ap1—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; violent effervescence; slightly alkaline; abrupt smooth boundary.
Ap2—6 to 14 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; soft, very friable; violent effervescence; slightly alkaline; abrupt smooth boundary.
C1—14 to 24 inches; grayish brown (10YR 5/2) and light brownish gray (10YR 6/2), stratified very fine sandy loam and loam, brown (10YR 4/3 and 5/3) moist; weak fine granular structure; soft, very friable; violent effervescence; moderately alkaline; abrupt smooth boundary.
C2—24 to 34 inches; light brownish gray (10YR6/2) and light gray (10YR 7/2) very fine sandy loam, brown (10YR 5/3) and pale brown (10YR 6/3) moist; massive; soft, very friable; violent effervescence; moderately alkaline; abrupt smooth boundary.
C3—34 to 51 inches; stratified dark grayish brown (10YR 4/2), grayish brown (10YR 5/2), light brownish gray (10YR 6/2), and light gray (10YR 7/2) loam, black (10YR 2/1), very dark brown (10YR 2/2), very dark grayish brown (10YR 3/2), and dark grayish brown (10YR 4/2) moist; moderate coarse prismatic structure parting to weak fine granular; soft, very friable; violent effervescence; moderately alkaline; abrupt smooth boundary.

C4—51 to 71 inches; stratified light gray (2.5Y 7/1 and 10YR 7/2) very fine sandy loam, grayish brown (2.5Y 5/2) and light brownish gray (2.5Y 6/2) moist; massive; soft, very friable; violent effervescence; slightly alkaline; abrupt smooth boundary.
C5—71 to 80 inches; light gray (2.5Y 7/2) gravelly loamy coarse sand, gray (2.5Y 5/1) moist; single grain; loose; slightly alkaline.

Type Location

Deuel County, Nebraska; 1.5 miles south and 0.5 mile east of Chappell; 2,500 feet south and 1,800 feet east of the northwest corner of sec. 26, T. 13 N., R. 45 W.; USGS topographic quadrangle Chappell NE; lat. 41 degrees 4 minutes 13 seconds north and long. 102 degrees 27 minutes 00 seconds west.

Range in Characteristics

Mean annual soil temperature: 49 to 55 degrees F
Depth to secondary calcium carbonate: 0 to 10 inches
Depth to endosaturation: 3 to 6 feet
Thickness of the solum: 10 to 24 inches
Thickness of the mollic epipedon: 10 to 20 inches

A horizon:
Hue—10YR
Value—4 or 5 (2 or 3 moist)
Chroma—1 or 2
Texture—loam or very fine sandy loam
Calcium carbonate equivalent—0 to 10 percent
Reaction—neutral to moderately alkaline

AC horizon:
Hue—10YR
Value—4 to 7 (3 to 6 moist)
Chroma—2 or 3
Texture—loam or very fine sandy loam
Reaction—slightly alkaline or moderately alkaline

C horizon:
Hue—10YR
Value—4 to 7 (3 to 6 moist)
Chroma—2 or 3
Texture—loam or very fine sandy loam; sandy loam and coarser textures below a depth of 60 inches in some areas
Reaction—slightly alkaline or moderately alkaline
Other features—a buried soil or thin strata of slightly coarser or finer textured material in the C horizon in most pedons

Richfield Series

The Richfield series consists of very deep, well drained, moderately slowly permeable soils. These soils formed in calcareous loess on tableland plains.

Typical Pedon

Richfield silt loam, in a cultivated field:

Ap—0 to 6 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; slightly hard, friable, slightly plastic and slightly sticky; neutral; clear smooth boundary.
Bt—6 to 16 inches; dark grayish brown (10YR 4/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; hard, firm, plastic and sticky; common fine faint clay films; slightly alkaline; gradual smooth boundary.
BCk1—16 to 20 inches; grayish brown (10YR 5/2) silty clay loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; hard, firm; few soft accumulations of carbonate; strong effervescence; moderately alkaline; clear smooth boundary.
BCk2—20 to 30 inches; light gray (10YR 7/2) silty clay loam, grayish brown (10YR 5/2) moist; weak granular structure; slightly hard, friable; few soft accumulations of carbonate; strong effervescence; moderately alkaline; gradual smooth boundary.
C—30 to 60 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; massive; slightly hard, friable; porous; strong effervescence; strongly alkaline.

Type Location

Grant County, Kansas; 9 miles east and 3 miles north of Ulysses; 1,000 feet west and 100 feet south of the northeast corner of sec. 12, T. 28 S., R. 36 W.

Range in Characteristics

Mean annual soil temperature: 47 to 59 degrees F
Depth to secondary calcium carbonate: 10 to 24 inches
Thickness of the mollic epipedon: 9 to 20 inches
Thickness of the solum: 16 to 37 inches
Other features: CEC/clay ratios are less than 90 me/100g in the solum. Eroded and dry phases are recognized.
Content of clay in the particle-size control section (weighted average): 35 to 42 percent

Other features: Some pedons have a thin transitional horizon between the A and Bt horizons.

A horizon:
Hue—10YR
Value—4 or 5 (2 or 3 moist)
Chroma—2 or 3
Texture—silt loam, silty clay loam, clay loam, loam, very fine sandy loam, or fine sandy loam
Reaction—neutral or slightly alkaline

Bt horizon:
Hue—10YR
Value—4 or 5 (3 or 4 moist)
Chroma—2 or 3
Texture—silty clay loam or silty clay (averages 35 to 42 percent clay)
Content of clay—35 to 42 percent
Reaction—neutral to moderately alkaline

Bk or BCk horizon:
Hue—10YR
Value—5 to 7 (4 to 6 moist)
Chroma—2 or 3
Texture—silty clay loam or silt loam
Content of clay—20 to 32 percent
Reaction—slightly alkaline or moderately alkaline

C horizon:
Hue—10YR
Value—6 to 8 (4 to 6 moist)
Chroma—2 to 4
Texture—silty clay loam, clay loam, or silt loam
Calcium carbonate equivalent—10 to 15 percent
Reaction—moderately alkaline or strongly alkaline
Other features—the horizon is typically calcareous loess, but in some pedons where the loess mantle is thin, contrasting material is between depths of 40 and 60 inches. In some pedons the substratum has buried horizons.

Rosebud Series

The Rosebud series consists of well drained soils that are moderately deep to weakly cemented, fine grained sandstone. These soils formed in loess and loamy, calcareous residuum derived from weakly cemented, fine grained sandstone. They are on tableland plains and upland hillslopes. Permeability is moderate. Slopes range from 0 to 20 percent. Mean annual precipitation is about 16 inches, and mean annual temperature is about 51 degrees F.

Typical Pedon

Rosebud loam (fig. 7), on a slope of less than 1 percent, in a cultivated field:

Figure 7.—Profile of Rosebud loam, which formed in loess and sandstone residuum.

Ap—0 to 6 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable; slightly alkaline; abrupt smooth boundary.
Bt—6 to 11 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; weak medium prismatic structure parting to moderate medium subangular blocky; hard, firm; thin discontinuous films on faces of peds; common very dark grayish brown (10YR 3/2) wormcasts; slightly alkaline; clear smooth boundary.
Bk1—11 to 15 inches; very pale brown (10YR 7/3) clay loam, pale brown (10YR 6/3) moist; weak medium subangular blocky structure; slightly hard, friable; few fine pebbles; secondary calcium carbonates occurring as soft masses of lime; violent effervescence; moderately alkaline; clear smooth boundary.
Bk2—15 to 19 inches; very pale brown (10YR 7/3)

sandy clay loam, brown (10YR 5/3) moist; weak coarse subangular blocky structure; soft, very friable; secondary calcium carbonates occurring as soft masses of lime; violent effervescence; moderately alkaline; clear smooth boundary.

C—19 to 30 inches; very pale brown (10YR 7/3) sandy loam, light yellowish brown (10YR 6/4) moist; massive; soft, very friable; many pebbles and hard caliche fragments; disseminated lime and lime coatings on pebbles; violent effervescence; moderately alkaline; abrupt wavy boundary.

Cr—30 to 80 inches; reddish yellow (7.5YR 6/6), weakly cemented sandstone; few small pebbles; violent effervescence; moderately alkaline.

Type Location

Kimball County, Nebraska; about 8 miles south and 2 miles east of Kimball; 1,920 feet west and 150 feet north of the southeast corner of sec. 4, T. 13 N., R. 55 W.

Range in Characteristics

Mean annual soil temperature: 49 to 55 degrees F
Depth to paralithic contact: 20 to 40 inches
Depth to secondary calcium carbonate: 9 to 30 inches
Thickness of the solum: 12 to 34 inches
Thickness of the mollic epipedon: 7 to 20 inches
Content of clay in the particle-size control section (weighted average): 23 to 35 percent

A horizon:
Hue—10YR
Value—4 or 5 (2 or 3 moist)
Chroma—2 or 3
Texture—loam; less commonly silt loam or fine sandy loam
Reaction—neutral to moderately alkaline

Bt horizon:
Hue—10YR
Value—4 to 7 (3 to 6 moist)
Chroma—2 or 3
Texture—clay loam or loam
Content of clay—23 to 35 percent
Reaction—neutral to moderately alkaline

Bk or BC horizon:
Hue—10YR
Value—5 to 7 (4 to 6 moist)
Chroma—2 or 3
Texture—loam or sandy clay loam
Calcium carbonate equivalent—0 to 5 percent
Reaction—slightly alkaline or moderately alkaline

C horizon:
Hue—10YR
Value—6 or 7 (5 or 6 moist)
Chroma—3 or 4
Texture—sandy clay loam or sandy loam; less commonly very fine sandy loam or loam
Calcium carbonate equivalent—1 to 15 percent
Reaction—slightly alkaline or moderately alkaline

Cr horizon:
Value—7 or 8 (6 or 7 moist)
Chroma—1 to 6
Reaction—slightly alkaline or moderately alkaline

Sarben Series

The Sarben series consists of very deep, well drained, moderately rapidly permeable soils that formed in reworked loamy and sandy sediments in the sand-loess transition areas. These soils are on uplands. Slopes range from 0 to 60 percent. Mean annual temperature is about 49 degrees F, and mean annual precipitation is about 16 inches.

Typical Pedon

Sarben loamy very fine sand, on a convex slope of 5 percent, in an area of native grassland:

A—0 to 7 inches; brown (10YR 5/3) loamy very fine sand, brown (10YR 4/3) moist; weak fine granular structure; soft, very friable; neutral; clear smooth boundary.

AC—7 to 16 inches; pale brown (10YR 6/3) loamy very fine sand, brown (10YR 5/3) moist; weak medium prismatic structure parting to weak fine granular; soft, very friable; neutral; clear smooth boundary.

C1—16 to 29 inches; very pale brown (10YR 7/3) loamy very fine sand, brown (10YR 5/3) moist; massive; soft, very friable; slightly alkaline; clear smooth boundary.

C2—29 to 80 inches; very pale brown (10YR 7/3) loamy very fine sand, brown (10YR 5/3) moist; massive; soft, very friable; slight effervescence; moderately alkaline.

Type Location

Banner County, Nebraska; about 12 miles east and 6 miles north of Harrisburg; 600 feet west and 600 feet north of the southeast corner of sec. 2, T. 19 N., R. 54 W.; Wright Gap topographic quadrangle; lat. 41 degrees 38 minutes 36 seconds north and long. 103 degrees 30 minutes 15 seconds west.

Range in Characteristics

Depth to carbonates: 15 to 40 inches

A horizon:
Hue—10YR
Value—4 to 6 (3 to 5 moist)
Chroma—2 or 3
Texture—very fine sandy loam, fine sandy loam, loamy very fine sand, or loamy fine sand
Reaction—slightly acid or neutral

AC horizon (if it occurs):
Hue—10YR
Value—5 or 6 (4 or 5 moist)
Chroma—2 or 3
Texture—fine sandy loam, loamy very fine sand, or very fine sandy loam
Reaction—neutral or slightly alkaline

C horizon:
Hue—10YR
Value—5 to 8 (4 to 6 moist)
Chroma—2 or 3
Texture—fine sandy loam, loamy very fine sand, or very fine sandy loam; strata of sandy loam below a depth of 30 inches in some pedons; sandy textures below a depth of 40 inches in some pedons
Reaction—neutral or slightly alkaline in the upper part and slightly alkaline or moderately alkaline in the lower part

Satanta Series

The Satanta series consists of very deep, well drained, moderately permeable soils that formed in loamy eolian material or loamy alluvium that has been partially reworked by wind. These soils are on uplands, plains, or high stream terraces. Slopes range from 0 to 15 percent. Mean annual temperature is 55 degrees F, and mean annual precipitation is 18 inches.

Typical Pedon

Satanta loam, in a cultivated field:

A—0 to 9 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; slightly hard, friable, slightly plastic and slightly sticky; many wormcasts in the lower part; neutral; gradual smooth boundary.

BA—9 to 13 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium prismatic structure parting to moderate fine subangular blocky; slightly hard, friable, slightly plastic and slightly sticky; few wormcasts; neutral; clear smooth boundary.

Bt—13 to 23 inches; grayish brown (10YR 5/2) clay loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; slightly hard, friable, plastic and sticky; thin discontinuous clay films on faces of some peds; few wormcasts; slightly alkaline; gradual smooth boundary.

Bk—23 to 34 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; weak coarse subangular blocky structure; slightly hard, friable, slightly plastic and slightly sticky; few or common threads and films of segregated lime; strong effervescence; moderately alkaline; gradual smooth boundary.

C—34 to 60 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; massive; slightly hard, friable, slightly plastic; porous; strong effervescence; moderately alkaline.

Type Location

Haskell County, Kansas; 14 miles north of Tice; 800 feet south and 100 feet east of the northwest corner of sec. 9, T. 27 S., R. 31 W.

Range in Characteristics

Thickness of the mollic epipedon: 8 to 20 inches
Depth to free carbonates: 12 to 36 inches
Calcium carbonate equivalent: Less than 15 percent in the series control section
Content of gravel: 0 to 10 percent, by volume, throughout the profile
Phases recognized: Sandy substratum, gravelly substratum, dry, and elevation greater than 4,000 feet
Other features: Some pedons have a BCk horizon. This horizon has few carbonates occurring as seams, threads, or concretions.

A horizon:
Value—4 or 5 (2 or 3 moist)
Chroma—2 or 3
Texture—loam, very fine sandy loam, clay loam, or fine sandy loam
Reaction—slightly acid to slightly alkaline

Bt horizon:
Hue—7.5YR, 10YR, or 2.5Y
Value—4 to 6 (3 to 5 moist)
Chroma—2 to 4
Texture—loam, sandy clay loam, or clay loam with 15 to 35 percent fine and coarser sand and less than 50 percent sand
Reaction—neutral or slightly alkaline

Bk horizon:
Colors and textures—similar to those of the Bt horizon
Reaction—slightly alkaline or moderately alkaline

C or BCk horizon:
Hue—10YR or 2.5Y
Value—5 to 7 (4 to 6 moist)
Chroma—2 to 4
Texture—loam, silt loam, clay loam, sandy clay loam, very fine sandy loam, loamy fine sand, or fine sandy loam
Reaction—slightly alkaline or moderately alkaline

Scoville Series

The Scoville series consists of deep, somewhat excessively drained soils that formed in wind-worked sandy alluvium over loamy alluvium. These soils are on stream terraces. Permeability is rapid in the upper part and moderate in the lower part. Slopes range from 0 to 3 percent. Mean annual air temperature is about 48 degrees F, and mean annual precipitation is about 15 inches at the type location.

Typical Pedon

Scoville fine sand, on a slope of 1 percent, in a cultivated field:

Ap—0 to 8 inches; brown (10YR 5/3) fine sand, dark grayish brown (10YR 4/2) moist; weak fine granular structure; loose; slightly alkaline; abrupt smooth boundary.
AC—8 to 15 inches; yellowish brown (10YR 5/4) loamy fine sand, dark brown (10YR 4/3) moist; single grain; loose; slightly alkaline; gradual wavy boundary.
C1—15 to 49 inches; light yellowish brown (10YR 6/4) loamy fine sand, brown (10YR 5/3) moist; single grain; loose; slightly alkaline; abrupt wavy boundary.
2C2—49 to 60 inches; light gray (10YR 7/2) very fine sandy loam, brown (10YR 5/3) moist; weak coarse prismatic structure; soft, very friable; violent effervescence; few fine accumulations of carbonates; moderately alkaline.

Type Location

Sioux County, Nebraska; about 2 miles north of Morrill; 1,700 feet west and 150 feet north of the southeast corner of sec. 33, T. 24 N., R. 57 W.

Range in Characteristics

Depth to the 2C horizon and carbonates: Typically 40 to 55 inches; may be less than 40 inches in some pedons

Other features: A calcareous phase is recognized. Reaction in this phase is slightly alkaline or moderately alkaline throughout the series control section, and the depth to carbonates ranges from 0 to 10 inches.

A horizon:
Hue—10YR
Value—4 to 6 (3 to 5 moist)
Chroma—2 or 3
Note—horizons having value of less than 5.5 dry and 3.5 moist are less than 10 inches thick.
Texture—sand, fine sand, loamy sand, or loamy fine sand
Reaction—slightly acid to slightly alkaline

AC horizon (if it occurs):
Colors and textures—intermediate between those of the A and C horizons

C horizon:
Hue—10YR
Value—5 or 6 (4 to 6 moist)
Chroma—2 to 4
Texture—sand, fine sand, loamy sand, or loamy fine sand
Reaction—neutral or slightly alkaline

2C horizon:
Hue—10YR
Value—6 to 8 (5 to 7 moist)
Chroma—2 to 4
Texture—very fine sandy loam, fine sandy loam, or loam with less than 18 percent clay
Reaction—slightly alkaline or moderately alkaline
Other features—strata of sand to loamy fine sand in the lower part of the series control section in some places; dark buried layers at a depth of more than 40 inches in some pedons

Sidney Series

The Sidney series consists of well drained, moderately permeable soils on upland hillslopes. These soils formed in loamy, calcareous residuum derived from weakly cemented, fine grained sandstone and are deep over weakly cemented, calcareous, fine grained sandstone. Slopes range from 3 to 20 percent. Mean annual precipitation is about 17 inches, and mean annual air temperature is about 51 degrees F at the type location.

Typical Pedon

Sidney loam, in an area of Sidney-Canyon loams, 3 to 9 percent slopes, on a convex, east-facing side slope of 5 percent, in a cultivated field:

Ap—0 to 7 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable; common very fine and few fine roots; strong effervescence; 2 percent calcareous sandstone gravel, by volume; slightly alkaline; abrupt smooth boundary.

Bw—7 to 16 inches; brown (10YR 5/3) very fine sandy loam, dark grayish brown (10YR 4/2) moist; weak coarse prismatic structure parting to weak medium subangular blocky; soft, very friable; common very fine and fine roots; strong effervescence; 2 percent calcareous sandstone gravel, by volume; moderately alkaline; gradual smooth boundary.

Bk—16 to 26 inches; light brownish gray (10YR 6/2) silt loam, grayish brown (10YR 5/2) moist; weak medium and coarse subangular blocky structure; slightly hard, very friable; common fine roots; violent effervescence; 2 percent calcareous sandstone gravel, by volume; many mycelia-like threads and seams of calcium carbonate; moderately alkaline; clear wavy boundary.

C—26 to 48 inches; very pale brown (10YR 7/3) very fine sandy loam, pale brown (10YR 6/3) moist; massive; soft, very friable; few fine roots; strong effervescence; 5 percent calcareous sandstone gravel, by volume; moderately alkaline; clear wavy boundary.

Cr—48 to 80 inches; very pale brown (10YR 8/2), weakly cemented, fine grained sandstone, light gray (10YR 7/2) moist; violent effervescence; moderately alkaline.

Type Location

Banner County, Nebraska; about 7 miles south and 5 miles east of Harrisburg; 2,500 feet east and 1,700 feet north of the southwest corner of sec. 10, T. 17 N., R. 55 W.

Range in Characteristics

Mean annual soil temperature: 49 to 55 degrees F
Depth to paralithic contact: 40 to 60 inches
Depth to secondary calcium carbonate: 0 to 18 inches; typically 0 to 10 inches
Thickness of the mollic epipedon: 7 to 20 inches
Thickness of the solum: 7 to 30 inches
Content of clay in the particle-size control section (weighted average): 5 to 20 percent
Texture of the control section: Silt loam, loam, very fine sandy loam, or fine sandy loam that generally averages less than 65 percent total sand and about 35 percent or less very fine sand
Content of rock fragments: The content of calcareous sandstone is typically less than 5 percent, by volume, but ranges from 0 to 15 percent. Some pedons contain volcanic ash with glass shards that make up 20 to 80 percent, by volume, of the very fine sand and coarse silt. In some pedons a few granitic pebbles are throughout the profile.
Other features: Some pedons have an AC horizon. This horizon has colors and textures intermediate between those of the A and C horizons.

A horizon:
Hue—10YR
Value—4 or 5 (2 or 3 moist)
Chroma—2 or 3
Texture—loam, very fine sandy loam, or fine sandy loam
Reaction—typically slightly alkaline or moderately alkaline; neutral or slightly alkaline in pedons that are leached of carbonates

Bw horizon:
Hue—10YR
Value—4 to 6 (3 to 5 moist)
Chroma—2 or 3
Texture—silt loam, loam, very fine sandy loam, or fine sandy loam
Calcium carbonate equivalent—1 to 10 percent
Reaction—slightly alkaline or moderately alkaline

Bk horizon:
Hue—10YR
Value—5 to 8 (4 to 7 moist)
Chroma—1 to 3
Texture—silt loam, loam, very fine sandy loam, or fine sandy loam
Calcium carbonate equivalent—5 to 25 percent
Reaction—slightly alkaline or moderately alkaline

C horizon:
Hue—10YR
Value—7.5YR or 10YR
Chroma—1 to 3
Texture—loam, very fine sandy loam, fine sandy loam, or sandy loam
Calcium carbonate equivalent—1 to 15 percent
Reaction—slightly alkaline to strongly alkaline

Cr horizon:
Hue—7.5YR or 10YR
Value—6 to 8 (5 to 7 moist)
Chroma—1 to 4

Sulco Series

The Sulco series consists of very deep, well drained soils that formed in loess on uplands and tablelands. Permeability is moderate. Slopes range from 3 to 60 percent. Mean annual precipitation is about 18 inches, and mean annual air temperature is about 50 degrees F.

Typical Pedon

Sulco loam, on a convex, east-facing slope of 14 percent, in an area of native grass. When described, the soil was dry throughout.

A—0 to 3 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; weak medium granular structure; slightly hard, friable; slightly alkaline; clear smooth boundary.

Bw—3 to 6 inches; brown (10YR 5/3) loam, brown (10YR 4/3) moist; moderate coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, friable; strongly effervescent; 3 percent calcium carbonate equivalent; moderately alkaline; clear smooth boundary.

Bk1—6 to 16 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; moderate coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, friable; many fine and medium soft accumulations of carbonate; violently effervescent; 13 percent calcium carbonate equivalent; moderately alkaline; diffuse wavy boundary.

Bk2—16 to 27 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; moderate coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, friable; many fine and medium soft accumulations of carbonate; violently effervescent; 12 percent calcium carbonate equivalent; strongly alkaline; clear smooth boundary.

C1—27 to 40 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; massive; soft, very friable; strongly effervescent; 8 percent calcium carbonate equivalent; strongly alkaline; diffuse wavy boundary.

C2—40 to 50 inches; light yellowish brown (10YR 6/4) loam, yellowish brown (10YR 5/4) moist; massive; soft, very friable; strongly effervescent; 7 percent calcium carbonate equivalent; strongly alkaline; diffuse wavy boundary.

C3—50 to 80 inches; very pale brown (10YR 7/3) loam, pale brown (10YR 6/3) moist; massive; soft, very friable; strongly effervescent; 6 percent calcium carbonate equivalent; strongly alkaline.

Type Location

Dundy County, Nebraska; about 15 miles north of Benkelman; 1,800 feet east and 500 feet north of the southwest corner of sec. 29, T. 4 N., R. 37 W.; USGS Ough topographic quadrangle; lat. 40 degrees 18 minutes 55 seconds north and long. 101 degrees 34 minutes 16 seconds west.

Range in Characteristics

Control section: 8 to 17 percent clay, 30 to 55 percent silt, 30 to 60 percent sand; 85 percent or more of the total sand consists of very fine sand; particle-size distribution is relatively uniform throughout

Depth to carbonates: 0 to 6 inches

Carbonate equivalent in the series control section: 5 to 15 percent; most carbonates occur as accumulations

Other features: These soils typically have a Bw horizon that is too thin to qualify for a cambic horizon. Some pedons have an AC horizon that ranges up to 15 inches in thickness. Some pedons in cultivated areas do not have an AC or Bw horizon.

A horizon:

Hue—10YR
Value—4 to 6 (3 to 5 moist)
Chroma—2 or 3
Reaction—slightly alkaline or moderately alkaline
Texture—silt loam, loam, very fine sandy loam, or fine sandy loam

Bw horizon:

Hue—10YR or 2.5Y
Value—5 to 7 (4 to 6 moist)
Chroma—2 or 3
Reaction—slightly alkaline or moderately alkaline
Texture—silt loam, loam, or very fine sandy loam

Bk horizon (if it occurs):

Hue—10YR or 2.5Y
Value—5 to 7 (4 to 6 moist)
Chroma—2 or 3
Accumulations of carbonates—few or common
Reaction—moderately alkaline or strongly alkaline
Texture—silt loam, loam, or very fine sandy loam

C horizon:

Hue—10YR or 2.5Y
Value—5 to 7 (4 to 6 moist)
Chroma—2 to 4
Reaction—moderately alkaline or strongly alkaline
Texture—silt loam, loam, or very fine sandy loam

Tassel Series

The Tassel series consists of shallow, well drained soils that formed in residuum derived from sandstone. These soils are on uplands. Permeability is moderately rapid. Slopes range from 0 to 70 percent. The mean annual precipitation is about 15 inches, and the mean annual air temperature is about 48 degrees F at the type location.

Typical Pedon

Tassel fine sandy loam, on a slope of 15 percent, in an area of rangeland:

A—0 to 8 inches; light brownish gray (10YR 6/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; weak medium granular structure; soft, very friable; 3 percent sandstone gravel, by volume; strong effervescence; slightly alkaline; gradual smooth boundary.

C—8 to 15 inches; light gray (10YR 7/2) fine sandy loam, grayish brown (10YR 5/2) moist; massive; slightly hard, friable; 10 percent sandstone gravel and cobbles, by volume; violent effervescence; moderately alkaline; gradual smooth boundary.

Cr—15 to 80 inches; light gray (10YR 7/2), partially consolidated, soft sandstone; violent effervescence.

Type Location

Scotts Bluff County, Nebraska; about 4 miles south and 9 miles west of Gering; 1,850 feet west and 2,110 feet north of the southeast corner of sec. 29, T. 21 N., R. 56 W.

Range in Characteristics

Depth to free carbonates: 0 to 3 inches
Texture of the particle-size control section: Typically 5 to 12 percent clay and 52 to 75 percent sand
Depth to the Cr horizon: Typically 10 to 20 inches; ranges from 6 to 20 inches
Reaction: Slightly alkaline or moderately alkaline throughout the profile
Other features: Where the A horizon has mollic colors, it lacks sufficient thickness to qualify for a mollic epipedon. Some pedons have an AC horizon that has colors and textures intermediate between those of the A and C horizons.

A horizon:
Hue—10YR or 2.5Y
Value—4 to 7 (3 to 6 moist)
Chroma—2 to 4
Texture—fine sandy loam, very fine sandy loam, loamy very fine sand, sandy loam, loamy sand, or loamy fine sand

C horizon:
Hue—10YR, 2.5Y, or 5Y
Value—5 to 8 (4 to 7 moist)
Chroma—2 or 3
Texture—fine sandy loam, very fine sandy loam with less than 12 percent clay, sandy loam, loamy very fine sand, or loamy fine sand

Valent Series

The Valent series consists of very deep, excessively drained soils that formed in mixed eolian material. These soils are in areas of nearly level or dunelike topography. Slopes range from 0 to 60 percent. The mean annual precipitation is about 16 inches, and the mean annual air temperature is about 50 degrees F.

Typical Pedon

Valent sand, in an area of grassland:

A—0 to 4 inches; grayish brown (10YR 5/2) sand, dark grayish brown (10YR 4/2) moist; single grain; loose; neutral (pH 7.2); gradual smooth boundary.

C—4 to 60 inches; pale brown (10YR 6/3) fine sand, brown (10YR 5/3) moist; single grain; loose; neutral (pH 7.2).

Type Location

Washington County, Colorado; 805 feet east and 1,900 feet south of the northwest corner of sec. 5, T. 1 S., R. 49 W.

Range in Characteristics

Mean annual soil temperature ranges from 47 to 58 degrees F, and mean summer soil temperature ranges from 59 to 78 degrees F. Depth to calcareous material is 40 to more than 60 inches. The content of organic carbon ranges from 0.3 to 1.5 percent in the surface horizon and decreases uniformly with increasing depth. The control section is uniform fine sand or loamy sand but ranges from 0 to 15 percent clay, 0 to 30 percent silt, and 70 to 100 percent sand. The content of rock fragments is typically less than 2 percent; the rock fragments are limited mainly to scattered pebbles. Some pedons have a weak AC horizon.

A or AC horizon:
Hue—2.5Y to 7.5YR

Value—4 to 6 (3 to 5 moist)
Chroma—2 to 4
Texture—sand, loamy sand, loamy fine sand, or fine sand
Reaction—neutral or slightly alkaline
Content of organic carbon—less than 0.6 percent

C horizon:
Hue—2.5Y to 7.5YR
Value—5 to 7 (4 or 5 moist)
Chroma—2 to 4
Reaction—neutral or slightly alkaline
Texture—loamy fine sand, fine sand, sand, or loamy sand

Table 5.--Classification of the Soils

Soil name	Family or higher taxonomic class
Alice	Coarse-loamy, mixed, superactive, mesic Aridic Haplustolls
Alliance	Fine-silty, mixed, superactive, mesic Aridic Argiustolls
Altvan	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, mesic Aridic Argiustolls
Ascalon	Fine-loamy, mixed, superactive, mesic Aridic Argiustolls
Ashollow	Coarse-loamy, mixed (calcareous), superactive, mesic Aridic Ustorthents
Blueridge	Mixed, mesic Aridic Ustipsamments
Broadwater	Sandy, mixed, mesic Aridic Ustifluvents
Calamus	Mixed, mesic Oxyaquic Ustipsamments
Canyon	Loamy, mixed (calcareous), superactive, mesic, shallow Ustic Torriorthents
Chappell	Coarse-loamy, mixed, superactive, mesic Aridic Haplustolls
Duroc	Fine-silty, mixed, superactive, mesic Pachic Haplustolls
Eckley	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, mesic Aridic Argiustolls
Glenberg	Coarse-loamy, mixed (calcareous), superactive, mesic Ustic Torrifluvents
Gothenburg	Mixed, mesic Typic Psammaquents
Jankosh	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, mesic Aquic Natrustolls
Jayem	Coarse-loamy, mixed, superactive, mesic Aridic Haplustolls
Johnstown	Fine-silty, mixed, superactive, mesic Pachic Argiustolls
Keith	Fine-silty, mixed, superactive, mesic Aridic Argiustolls
Kuma	Fine-silty, mixed, superactive, mesic Pachic Argiustolls
Las Animas	Coarse-loamy, mixed (calcareous), superactive, mesic Typic Fluvaquents
Lexsworth	Coarse-loamy, mixed, superactive, mesic Aridic Haplustolls
Lodgepole	Fine, smectitic, mesic Vertic Argiaquolls
McConaughy	Coarse-silty, mixed, superactive, mesic Aridic Haplustolls
Merrick	Fine-loamy, mixed, superactive, mesic Cumulic Haplustolls
Platte	Sandy, mixed, mesic Aeric Fluvaquents
Ralton	Coarse-silty, mixed, superactive, mesic Fluventic Haplustolls
Richfield	Fine, smectitic, mesic Aridic Argiustolls
Rosebud	Fine-loamy, mixed, superactive, mesic Calcidic Argiustolls
Sarben	Coarse-loamy, mixed, superactive, nonacid, mesic Aridic Ustorthents
Satanta	Fine-loamy, mixed, superactive, mesic Aridic Argiustolls
Scoville	Mixed, mesic Aridic Ustipsamments
Sidney	Coarse-loamy, mixed, superactive, mesic Aridic Calciustolls
Sulco	Coarse-silty, mixed (calcareous), superactive, mesic Aridic Ustorthents
Tassel	Loamy, mixed (calcareous), superactive, mesic, shallow Ustic Torriorthents
Valent	Mixed, mesic Ustic Torripsamments

Formation of the Soils

This section describes how the factors of soil formation have affected the soils in Deuel County.

Soil forms through processes acting on deposited or accumulated geologic material. The characteristics of the soil at any given point are determined by the physical and mineralogical composition of the parent material; the climate under which the soil material has accumulated and existed since accumulation; the plant and animal life on and in the soil; the relief, or lay of the land; and the length of time the forces of soil formation have acted on the soil material.

Climate and plant and animal life, mainly plants, are the active factors of soil formation. They act on parent material and slowly change it into a natural body that has genetically related horizons. The effects of climate and plant and animal life are conditioned by relief. The parent material also influences the kind of soil profile that forms and, in extreme cases, determines it almost entirely.

Finally, time is needed to change the parent material into a soil profile. A long time is normally 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 effect of any one factor unless conditions are specified for the other four.

Parent Material

Parent material is the unconsolidated material in which a soil forms. It determines the mineralogical and chemical composition of the soil. The soils in Deuel County formed in parent material that was transported by wind or water or moved by gravity or that weathered from underlying geologic formations.

Loess is wind-deposited silty material that mantles the tablelands and some dissected uplands in Deuel County. It is yellowish brown, calcareous material ranging from a few feet to 50 feet in thickness. Keith, Kuma, Alliance, Johnstown, Richfield, Sulco, and Satanta soils are the major soils that formed in loess.

Alluvium is material deposited by water on flood plains and stream terraces in broad river valleys or in narrow upland drainageways. It has a wide range in texture because of differences in the material from which it was derived and in the manner in which it was deposited. Duroc soils formed in alluvium on stream terraces. Scoville soils formed in wind-worked alluvium on stream terraces. Gothenburg, Las Animas, Lexsworth, Merrick, Platte, Broadwater, and Ralton soils formed in alluvium on flood plains.

Colluvium is material that accumulated as a result of the combined forces of gravity and water. In Deuel County, colluvial material occurs on footslopes of dissected uplands. Ashollow soils formed in colluvium.

The Ogallala Sandstone Formation extends throughout much of the northwestern part of the county. In some places it is at the surface, and in other places it is only a few feet below the surface. It is composed of beds of silty to gravelly material that ranges from soft or loose to very hard. The rock that formed in this material ranges from friable or loose and only partly indurated to relatively hard, resistant, ledge-forming mortar beds. Canyon, Rosebud, and Sidney soils formed in parent material weathered from the Ogallala Formation.

Climate

Climate has had an important effect on soil formation in Deuel County. It affects soils directly through its influence on the parent material and indirectly through its influence on vegetation and micro-organisms.

The climatic factors that affect the weathering of parent material are rainfall, fluctuating temperatures, and wind. The climate of Deuel County is characterized by cold winters and hot summers. Rainfall is heaviest in late spring and early summer. The annual precipitation averages about 17 inches. Because the amount of rainfall is relatively low, the soils generally are not leached to a significant depth. Runoff of rainwater removes, relocates, and sorts soil material. The wind also removes, sorts, and redeposits soil material. The deposits of eolian sands in the county are examples of the importance of wind as an agent of deposition. Drying promotes the development of granular structure in the surface layer, which is common in the soils of Deuel County.

Alternating periods of freezing and thawing hasten the physical disintegration of the parent material and enhance the development of soil structure.

Micro-organisms in the soil are most active within a certain range in temperature. Thus, the rate at which organic material is decomposed into humus varies, depending on the climatic conditions. Changes in temperature and moisture activate the weathering of parent material, which results in chemical and physical changes in the soil.

Because the humidity in Deuel County is generally low, a fairly high amount of water is lost through evaporation and transpiration. This loss reduces the amount of water available for leaching, plant growth, decomposition of organic material, and chemical weathering.

Plant and Animal Life

Plants, burrowing animals, micro-organisms, earthworms, and other living organisms affect soil formation. The soils in Deuel County formed mainly under a mixture of short, mid, and tall grasses. Each year, the grasses formed new growth above the ground and their fibrous roots penetrated the upper few feet of the soil. In time, a dark layer developed at the surface. This layer gradually became thicker as more organic material decayed into humus. Because of the additional humus, the soils developed granular structure and good tilth. Plant roots bring nutrients to the surface. Calcium, in particular, helps to keep the soils porous. The decomposition of organic material forms organic acids that, in solution, hasten the leaching process. Soils that formed in sandy parent materials resistant to weathering and that have a low available water capacity, such as Valent soils, tend to develop more slowly than soils that provide a more favorable medium for plants and animals, such as Keith soils.

The activity of micro-organisms helps to change undecomposed organic material into humus. Some bacteria take in nitrogen from the air. When they die, the nitrogen becomes available to plants. Other bacteria oxidize sulfur, which then becomes available to plants. The plants, in turn, complete the cycle by producing more organic material. Other living organisms, such as algae, fungi, protozoa, and actinomycetes, affect soil formation physically and chemically. Larger animals, such as gophers and moles, earthworms, millipedes, spiders, and other insects help to mix the soil and add organic material when they die.

Human activities also affect soil formation. They have an immediate effect on the rate and the direction of the changes caused by the soil-forming processes. Additions of fertilizer and irrigation water change the soil. Cultivation can result in soil loss unless erosion is controlled. Conservation tillage practices and terraces have beneficial effects on the soils.

Relief

Relief affects soil formation mainly through its influence on runoff, erosion, aeration, and drainage. The rate of runoff is more rapid on steep and very steep soils than on the less sloping soils. Consequently, plant growth generally is less vigorous on the steeper soils, less water penetrates the surface, soil horizons are thinner and less distinct, and calcium carbonate is not so deeply leached. Also, the hazard of erosion is more severe on the steeper soils if all other factors are equal.

Relief can contribute to differences in the color, thickness, and horizonation of soils that formed in the same kind of parent material. For example, differences among Sulco, McConaughy, Keith, and Lodgepole soils, all of which formed in Peoria Loess, can be attributed mainly to differences in relief. The gradient, shape, length, and direction of the slopes influence the amount of moisture in the soil. The steep and very steep Sulco soils are weakly developed, have a thin surface layer, and have lime at or near the surface. In McConaughy soils, which are less steep than the Sulco soils, the surface layer is thicker, lime is leached to a greater depth, and a thin subsoil has formed. In the nearly level and gently sloping Keith soils, the surface layer is dark and thick, the subsoil is well developed, and lime is leached to a greater depth than is typical in the McConaughy soils. Lodgepole soils, which formed in depressions, are the most strongly developed soils in Deuel County.

The soils on flood plains, such as Gothenburg, Platte, and Broadwater soils, are characterized by low relief. They commonly receive new sediment during periods of flooding. Each flood provides new parent material and starts a new cycle of soil formation.

Time

Time enables relief, climate, and plant and animal life to change the parent material into a soil. If the parent material has been in place for only a short time, the soils are weakly developed. The degree of profile development depends on the intensity of the soil-forming factors. Differences in the length of time that geological material has been in place are commonly reflected in the distinctness of horizons in the soil profile.

The time needed for soil formation depends mainly on the kinds of parent material and the climate. The resistance to weathering of the parent material partly determines the length of time that is needed. Generally, soils in warm, humid areas form faster than soils in cool, dry areas.

Soil maturity is related not only to time but also to the other four soil-forming factors. Soils that do not have a B horizon are commonly considered immature, and soils that have a well developed B horizon are considered mature. The maturity of a soil, however, depends on the interaction of all five soil-forming factors. Thus, a very steep Sulco soil that does not have a B horizon might be as mature as it can be on its particular slope and under its particular climate.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as rangeland and forestland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; for agricultural waste management; and as wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Interpretive Ratings

The interpretive tables in this survey rate the soils in the survey area for various uses. Many of the tables identify the limitations that affect specified uses and indicate the severity of those limitations. The ratings in these tables are both verbal and numerical.

Rating Class Terms

Rating classes are expressed in the tables in terms that indicate the extent to which the soils are limited by all of the soil features that affect a specified use or in terms that indicate the suitability of the soils for the use. Thus, the tables may show limitation classes or suitability classes. Terms for the limitation classes are ***not limited, somewhat limited,*** and ***very limited***. In some tables, ***slight***, ***moderate***, and ***severe*** are used. The suitability ratings are expressed as ***good, fair,*** and ***poor***.

Numerical Ratings

Numerical ratings in the tables indicate the relative 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 and the point at which the soil feature is not a limitation. The limitations appear in order from the most limiting to the least limiting. Thus, if more than one limitation is identified, the most severe limitation is listed first and the least severe one is listed last.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The estimated yields of the main crops and pasture plants are listed, the system of land capability classification used by the Natural Resources Conservation Service is explained, and prime farmland is described.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading “Detailed Soil Map Units.” Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

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. The 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. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forestland, or for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit.

Capability classes, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have slight limitations that restrict their use.

Class 2 soils have moderate limitations that restrict the choice of plants or that require moderate conservation practices.

Class 3 soils have severe limitations that restrict the choice of plants or that require special conservation practices, or both.

Class 4 soils have very severe limitations that restrict the choice of plants or that require very careful management, or both.

Class 5 soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 6 soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 7 soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

Class 8 soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or esthetic purposes.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, ***e, w, s,*** or ***c,*** to the class numeral, for example, 2e. The letter ***e*** shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; ***w*** shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); ***s*** shows that the soil is limited mainly because it is shallow, droughty, or stony; and ***c,*** used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class 1 there are no subclasses because the 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 to pasture, rangeland, forestland, wildlife habitat, or recreation.

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, 2e-4 and 3e-6.

The capability classification of map units in this survey area is given in the section “Detailed Soil Map Units” and in the yields table.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of map units in the survey area also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations also are considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good-quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

The estimated yields reflect the productive capacity of each soil for each of the principal crops (fig. 8). Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Table 7 is a relative rating of the capacity of a soil to produce a specific plant under a defined management system. The index in table 7 is determined from soil properties. It is used to rank the map units based on potential yield capability and can be used to estimate the net returns from crops, estimate land assessment values, and perform risk analysis when land management decisions are made.

Prime Farmland

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, forestland, or other land, but it is not urban or built-up land or water areas. The soil qualities, growing season, and moisture supply are

Figure 8.—Winter wheat grown in a wheat-fallow rotation is the most common cropping system in the county. The major areas for winter wheat production are in areas of soils that formed in wind-deposited sediments on tablelands.

those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, 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 either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

A recent trend in land use in some parts of the survey area 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 and cannot be easily cultivated.

The map units in the survey area that are considered prime farmland are listed in table 8. This list does not constitute a recommendation for a particular land use. On some soils included in the list, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps. The soil qualities that affect use and management are described under the heading “Detailed Soil Map Units.”

Rangeland

In areas that have similar climate and topography, differences in the kind and amount of rangeland or forest understory vegetation are closely related to the kind of soil. Effective management is based on the relationship between the soils and vegetation and water.

Table 9 shows, for each soil that supports vegetation suitable for grazing, the ecological site; the total annual production of vegetation in favorable, normal, and unfavorable years; the characteristic vegetation; and the average percentage of each species. An explanation of the column headings in table 9 follows.

An ***ecological site*** is the product of all the environmental factors responsible for its development. It has characteristic soils that have developed over time throughout the soil development process; a characteristic hydrology, particularly infiltration and runoff, that has developed over time; and a characteristic plant community (kind and amount of vegetation). The hydrology of the site is influenced by development of the soil and plant community. The vegetation, soils, and hydrology are all interrelated. Each is influenced by the others and influences the development of the others. The plant community on an ecological site is typified by an association of species that differs from that of other ecological sites in the kind and/or proportion of species or in total production. Descriptions of ecological sites are provided in the Field Office Technical Guide, which is available in local offices of the Natural Resources Conservation Service.

Total dry-weight production is the amount of vegetation that can be expected to grow annually in a well managed area that is supporting the potential natural plant community. It includes all vegetation, whether or not it is palatable to grazing animals. It includes the current year’s growth of leaves, twigs, and fruits of woody plants. It does not include the increase in stem diameter of trees and shrubs. It is expressed in pounds per acre of air-dry vegetation for favorable, normal, and unfavorable years. In a favorable year, the amount and distribution of precipitation and the temperatures make growing conditions substantially better than average. In a normal year, growing conditions are about average. In an unfavorable year, growing conditions are well below average, generally because of low available soil moisture. Yields are adjusted to a common percent of air-dry moisture content.

Characteristic vegetation—the grasses, forbs, and shrubs that make up most of the potential natural plant community on each soil—is listed by common name. Under ***maximum rangeland composition***, the expected percentage of the total annual production is given for each species making up the characteristic vegetation. The amount that can be used as forage depends on the kinds of grazing animals and on the grazing season.

Range management requires a knowledge of the kinds of soil and of the potential natural plant community. It also requires an evaluation of the present range similarity index and rangeland trend. Range similarity index is determined by comparing the present plant community with the potential natural plant community on a particular rangeland ecological site. The more closely the existing community resembles the potential community, the higher the range similarity index. Rangeland trend is defined as the direction of change in an existing plant community relative to the potential natural plant community. Further information about the range similarity index and rangeland trend is available in chapter 4 of the National Range and Pasture Handbook, which is available in local offices of the Natural Resources Conservation Service.

The objective in range management is to control grazing so that the plants growing on a site are about the same in kind and amount as the potential natural plant community for that site. Such management generally results in the optimum production of vegetation, control of undesirable brush species, conservation of water, and control of erosion. Sometimes, however, an area with a range similarity index somewhat below the potential meets grazing needs, provides wildlife habitat, and protects soil and water resources.

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, yards, fruit trees, gardens, and cropland from wind and snow; help to keep snow on fields; and provide food and cover for wildlife. Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil.

Environmental plantings help to beautify and screen houses and other buildings and to 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 planted properly on a well prepared site and maintained in good condition.

Table 10 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in table 10 are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from the local office of the Natural Resources Conservation Service or of the Cooperative Extension Service or from a commercial nursery.

Recreation

Prepared by Alan J. Stuebe, soil scientist, Natural Resources Conservation Service.

Deuel County offers a wide variety of recreational activities for all types of people. The county provides many types of outdoor opportunities, such as hunting, fishing, hiking, camping, and picnicking. Sightseeing and photography can also be particularly enjoyable at the many natural, scenic, and historical sites in Deuel County and nearby areas.

Hunting is very popular in Deuel County. Regular hunting seasons include ring-necked pheasant, sharp-tailed grouse, rabbit, squirrel, raccoon, and coyote. Mourning doves are also common throughout the county and provide early hunting opportunities in the fall season. White-tailed deer, mule deer, and antelope are plentiful.

Chappell, the county seat, offers additional recreational activities. A nine-hole golf course is south of Chappell. The community also has playgrounds, a museum, and a swimming pool. The Pony Express Recreational Area provides additional opportunities, ranging from fishing to picnicking.

Many interesting places near Deuel County offer recreational opportunities. The Ash Hollow Historical Park, just northeast of Chappell, commemorates the important role of the area in the settlement of the West. Included in the park are remnants of the famous Oregon Trail, where covered wagons once traveled. Lake McConaughy also is nearby. This lake is approximately 35,000 surface acres in size and is Nebraska’s largest reservoir. Water-skiing, boating, fishing, picnicking, camping, and swimming are available.

Deuel County is a beautiful and unique area of Nebraska. From flat fertile farmlands to rugged breaks, the county is characterized by a wide variety of natural features that enhance recreational opportunities. Additional information may be obtained through the Nebraska State Historical Society and the town of Chappell.

The soils of the survey area are rated in tables 11a and 11b according to limitations that affect their suitability for recreation. 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 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 is not considered in the ratings.

Wildlife Habitat

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 12, 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; in selecting soils that are 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.

The potential of the soil is rated good, fair, poor, or very poor. A rating of ***good*** indicates that the element or 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 that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of ***poor*** indicates that limitations are severe for the designated element or 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 that restrictions for the element or kind of habitat are very severe and that 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. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture also are considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture also are considerations. Examples of grasses and legumes are fescue, lovegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture also are considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and grama.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated ***good*** are Russian olive, autumn olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, 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 root zone, available water capacity, salinity, and soil moisture. Examples of shrubs are bitterbrush, mountainmahogany, snowberry, and big sagebrush.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, saltgrass, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous and/or coniferous plants and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Habitat for rangeland wildlife consists of areas of shrubs and wild herbaceous plants. Wildlife attracted to rangeland include antelope, deer, sage grouse, meadowlark, and lark bunting.

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, agricultural waste management, construction materials, and water management. The ratings are based on observed performance of the soils and on the data in the tables described under the heading “Soil Properties.”

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; evaluate sites for agricultural waste management; 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. Tables 13a and 13b 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. ***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).

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

Tables 14a and 14b 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. ***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).

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.

Agricultural Waste Management

Soil properties are important considerations in areas where soils are used as sites for the treatment and disposal of organic waste and wastewater. Selection of soils with properties that favor waste management can help to prevent environmental damage.

Tables 15a and 15b show the degree and kind of soil limitations affecting the treatment of agricultural waste, including municipal and food-processing wastewater and effluent from lagoons or storage ponds. Municipal wastewater is the waste stream from a municipality. It contains domestic waste and may contain industrial waste. It may have received primary or secondary treatment. It is rarely untreated sewage. Food-processing wastewater results from the preparation of fruits, vegetables, milk, cheese, and meats for public consumption. In places it is high in content of sodium and chloride. In the context of these tables, the effluent in lagoons and storage ponds is from facilities used to treat or store food-processing wastewater or domestic or animal waste. Domestic and food-processing wastewater is very dilute, and the effluent from the facilities that treat or store it commonly is very low in content of carbonaceous and nitrogenous material; the content of nitrogen commonly ranges from 10 to 30 milligrams per liter. The wastewater from animal waste treatment lagoons or storage ponds, however, has much higher concentrations of these materials, mainly because the manure has not been diluted as much as the domestic waste. The content of nitrogen in this wastewater generally ranges from 50 to 2,000 milligrams per liter. When wastewater is applied, checks should be made to ensure that nitrogen, heavy metals, and salts are not added in excessive amounts.

The ratings in the tables are for waste management systems that not only dispose of and treat organic waste or wastewater but also are beneficial to crops (application of manure and food-processing waste, application of sewage sludge, and disposal of wastewater by irrigation) and for waste management systems that are designed only for the purpose of wastewater disposal and treatment (overland flow of wastewater, rapid infiltration of wastewater, and slow rate treatment of wastewater).

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 agricultural waste management. ***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).

Application of manure and food-processing waste not only disposes of waste material but also can improve crop production by increasing the supply of nutrients in the soils where the material is applied. Manure is the excrement of livestock and poultry, and food-processing waste is damaged fruit and vegetables and the peelings, stems, leaves, pits, and soil particles removed in food preparation. The manure and food-processing waste are either solid, slurry, or liquid. Their nitrogen content varies. A high content of nitrogen limits the application rate. Toxic or otherwise dangerous wastes, such as those mixed with the lye used in food processing, are not considered in the ratings.

The ratings are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, the rate at which the waste is applied, and the method by which the waste is applied. The properties that affect absorption include permeability, depth to a water table, ponding, the sodium adsorption ratio, depth to bedrock or a cemented pan, and available water capacity. The properties that affect plant growth and microbial activity include reaction, the sodium adsorption ratio, salinity, and bulk density. The wind erodibility group, the soil erodibility factor K, and slope are considered in estimating the likelihood that wind erosion or water erosion will transport the waste material from the application site. Stones, cobbles, a water table, ponding, and flooding can hinder the application of waste. Permanently frozen soils are unsuitable for waste treatment.

Application of sewage sludge not only disposes of waste material but also can improve crop production by increasing the supply of nutrients in the soils where the material is applied. In the context of this table, sewage sludge is the residual product of the treatment of municipal sewage. The solid component consists mainly of cell mass, primarily bacteria cells that developed during secondary treatment and have incorporated soluble organics into their own bodies. The sludge has small amounts of sand, silt, and other solid debris. The content of nitrogen varies. Some sludge has constituents that are toxic to plants or hazardous to the food chain, such as heavy metals and exotic organic compounds, and should be analyzed chemically prior to use.

The content of water in the sludge ranges from about 98 percent to less than 40 percent. The sludge is considered liquid if it is more than about 90 percent water, slurry if it is about 50 to 90 percent water, and solid if it is less than about 50 percent water.

The ratings in the table are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, the rate at which the sludge is applied, and the method by which the sludge is applied. The properties that affect absorption, plant growth, and microbial activity include permeability, depth to a water table, ponding, the sodium adsorption ratio, depth to bedrock or a cemented pan, available water capacity, reaction, salinity, and bulk density. The wind erodibility group, the soil erodibility factor K, and slope are considered in estimating the likelihood that wind erosion or water erosion will transport the waste material from the application site. Stones, cobbles, a water table, ponding, and flooding can hinder the application of sludge. Permanently frozen soils are unsuitable for waste treatment.

Disposal of wastewater by irrigation not only disposes of municipal wastewater and wastewater from food-processing plants, lagoons, and storage ponds but also can improve crop production by increasing the amount of water available to crops. The ratings in the table are based on the soil properties that affect the design, construction, management, and performance of the irrigation system. The properties that affect design and management include the sodium adsorption ratio, depth to a water table, ponding, available water capacity, permeability, slope, and flooding. The properties that affect construction include stones, cobbles, depth to bedrock or a cemented pan, depth to a water table, and ponding. The properties that affect performance include depth to bedrock or a cemented pan, bulk density, the sodium adsorption ratio, salinity, reaction, and the cation-exchange capacity, which is used to estimate the capacity of a soil to adsorb heavy metals. Permanently frozen soils are not suitable for disposal of wastewater by irrigation.

Overland flow of wastewater is a process in which wastewater is applied to the upper reaches of sloped land and allowed to flow across vegetated surfaces, sometimes called terraces, to runoff-collection ditches. The length of the run generally is 150 to 300 feet. The application rate ranges from 2.5 to 16.0 inches per week. It commonly exceeds the rate needed for irrigation of cropland. The wastewater leaves solids and nutrients on the vegetated surfaces as it flows downslope in a thin film. Most of the water reaches the collection ditch, some is lost through evapotranspiration, and a small amount may percolate to the ground water.

The ratings in the table are based on the soil properties that affect absorption, plant growth, microbial activity, and the design and construction of the system. Reaction and the cation-exchange capacity affect absorption. Reaction, salinity, and the sodium adsorption ratio affect plant growth and microbial activity. Slope, permeability, depth to a water table, ponding, flooding, depth to bedrock or a cemented pan, stones, and cobbles affect design and construction. Permanently frozen soils are unsuitable for waste treatment.

Rapid infiltration of wastewater is a process in which wastewater applied in a level basin at a rate of 4 to 120 inches per week percolates through the soil. The wastewater may eventually reach the ground water. The application rate commonly exceeds the rate needed for irrigation of cropland. Vegetation is not a necessary part of the treatment; hence, the basins may or may not be vegetated. The thickness of the soil material needed for proper treatment of the wastewater is more than 72 inches. As a result, geologic and hydrologic investigation is needed to ensure proper design and performance and to determine the risk of ground-water pollution.

The ratings in the table are based on the soil properties that affect the risk of pollution and the design, construction, and performance of the system. Depth to a water table, ponding, flooding, and depth to bedrock or a cemented pan affect the risk of pollution and the design and construction of the system. Slope, stones, and cobbles also affect design and construction. Permeability and reaction affect performance. Permanently frozen soils are unsuitable for waste treatment.

Construction Materials

Tables 16a and 16b give information about the soils as potential sources of gravel, sand, topsoil, reclamation material, and roadfill. Normal compaction, minor processing, and other standard construction practices are assumed.

Gravel and ***sand*** 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. In table 16a, only the likelihood 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 bottom layer of the soil contains sand or gravel, the soil is considered a likely 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 gravel and sand. 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, reclamation material, 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, reclamation material, 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.

Reclamation material is used in areas that have been drastically disturbed by surface mining or similar activities. When these areas are reclaimed, layers of soil material or unconsolidated geological material, or both, are replaced in a vertical sequence. The reconstructed soil favors plant growth. The ratings in the table do not apply to quarries and other mined areas that require an offsite source of reconstruction material. The ratings are based on the soil properties that affect erosion and stability of the surface and the productive potential of the reconstructed soil. These properties include the content of sodium, salts, and calcium carbonate; reaction; available water capacity; erodibility; texture; content of rock fragments; and content of organic matter and other features that affect fertility.

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

Table 17 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 limitations are considered ***slight*** if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; ***moderate*** if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and ***severe*** if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

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.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, a cemented pan, or other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, and sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind erosion or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts and sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Table 6.--Land Capability and Yields per Acre of Crops

(Yields in the "N" columns are for nonirrigated areas; those in the "I" columns are for irrigated areas. Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil.)

Map symbol and soil name	Land capability		Alfalfa hay		Corn		Winter wheat-fallow	
	N	I	N	I	N	I	N	I
			Tons		Bu		Bu	
1130:								
Alliance--------	2c	1-4	---	5.8	---	145	42	---
1146:								
Alliance--------	2e	2e-4	---	5.5	---	140	40	---
Rosebud---------	3e	3e-7	---	4.7	---	130	36	---
1198:								
Altvan----------	4e	4e-7	---	3.5	---	125	30	---
Eckley----------	6e	---	---	2.5	---	95	17	---
Satanta---------	4e	4e-4	---	4.5	---	135	32	---
1295:								
Ashollow--------	6e	---	---	---	---	---	---	---
Tassel----------	6s	---	---	---	---	---	---	---
1588:								
Blueridge-------	6s	---	---	---	---	---	---	---
Altvan----------	6e	---	---	---	---	---	---	---
1782:								
Broadwater------	6w	---	---	---	---	---	---	---
1944:								
Calamus---------	6s	4s-14	---	3.8	---	100	26	---
2072:								
Chappell--------	3e	2e-9	---	4.5	---	130	30	---
Alice-----------	3e	2e-8	5.0	5.0	---	135	35	---
Broadwater------	6w	---	2.5	---	---	75	18	---
2630:								
Duroc-----------	2c	1-6	---	6.0	---	155	46	---
2638:								
Duroc-----------	2c	1-6	---	6.0	---	155	46	---
2639:								
Duroc-----------	2e	2e-6	---	5.5	---	150	45	---
3050:								
Glenberg--------	3e	2e-8	---	4.5	---	130	30	---
3140:								
Gothenburg------	7s	---	---	---	---	---	---	---

Table 6.--Land Capability and Yields per Acre of Crops--Continued

Map symbol and soil name	Land capability N	Land capability I	Alfalfa hay N	Alfalfa hay I	Corn N	Corn I	Winter wheat-fallow N	Winter wheat-fallow I
			Tons		Bu		Bu	
3952:								
Jankosh---------	6s	4s-6	---	2.5	---	80	20	---
4028:								
Jayem-----------	3e	2e-8	---	4.8	---	130	42	---
4070:								
Johnstown-------	2c	1-4	---	5.6	---	145	43	---
Satanta---------	2c	1-4	---	5.6	---	145	40	---
Richfield-------	2c	1-4	---	5.0	---	135	38	---
4151:								
Keith-----------	2e	2e-4	---	5.6	---	140	42	---
4152:								
Keith-----------	3e	3e-4	---	5.0	---	135	32	---
4310:								
Kuma------------	2c	1-4	---	6.0	---	155	46	---
4311:								
Kuma------------	2e	2e-4	---	5.8	---	150	42	---
4472:								
Las Animas------	5w	---	---	---	---	---	---	---
4475:								
Las Animas------	2w	2w-8	---	5.5	---	125	35	---
4592:								
Lexsworth-------	3w	3w-7	---	5.0	---	140	35	---
4655:								
Lodgepole-------	3w	4w-2	3.0	---	---	90	35	---
5212:								
Merrick---------	2c	1-6	---	6.0	---	150	44	---
6132:								
Platte----------	6w	4w-13	---	3.6	---	80	30	---
6248:								
Ralton----------	2c	1-6	---	5.6	---	150	42	---
6625:								
Sarben----------	4e	3e-10	---	3.8	---	115	28	---
6626:								
Sarben----------	4e	4e-10	---	3.8	---	110	26	---
6722:								
Satanta---------	3e	3e-4	---	4.5	---	135	32	---
Altvan----------	4e	4e-7	---	4.0	---	110	28	---
6725:								
Satanta---------	3e	2e-5	---	5.4	---	140	38	---
Ascalon---------	3e	2e-5	---	5.0	---	135	35	---

Table 6.--Land Capability and Yields per Acre of Crops--Continued

Map symbol and soil name	Land capability		Alfalfa hay		Corn		Winter wheat-fallow	
	N	I	N	I	N	I	N	I
			Tons		Bu		Bu	
6727:								
Satanta---------	2e	2e-4	---	5.6	---	145	40	---
Johnstown-------	2e	2e-4	---	6.0	---	145	41	---
Altvan----------	3e	2s-7	---	4.2	---	125	34	---
6817:								
Scoville--------	4e	4e-11	---	3.6	---	110	22	---
6930:								
Sidney----------	3e	3e-6	---	4.6	---	125	30	---
6937:								
Sidney----------	4e	4e-6	---	3.2	---	100	25	---
Canyon----------	6s	---	---	1.5	---	50	10	---
7120:								
Sulco-----------	4e	3e-6	---	4.4	---	115	28	---
McConaughy------	4e	3e-6	---	4.8	---	125	30	---
7121:								
Sulco-----------	4e	4e-6	---	3.5	---	110	28	---
McConaughy------	4e	4e-6	---	3.8	---	115	28	---
7122:								
Sulco-----------	6e	---	---	---	---	---	---	---
McConaughy------	6e	---	---	---	---	---	---	---
7582:								
Valent----------	6e	4e-12	---	3.0	---	105	20	---
7586:								
Valent----------	6e	---	---	---	---	---	---	---
7588:								
Valent, rolling-	6e	---	---	---	---	---	---	---
Valent, hilly---	7e	---	---	---	---	---	---	---

Table 7.--General Crop Production Index

(The General Crop Production Index (GCPI) is a relative rating of the capacity of a soil to produce a specific plant under a defined management system. The index is determined from yield data on a few benchmark soils and is used to calculate yields, the net returns from crops, and land assessment values and to perform risk analysis when land management decisions are made.)

Map symbol	Soil name	Crop index
1130	Alliance loam, 0 to 1 percent slopes	56
1146	Alliance-Rosebud loams, 1 to 3 percent slopes	46
1198	Altvan-Eckley-Satanta complex, 3 to 9 percent slopes	38
1295	Ashollow-Tassel complex, 9 to 30 percent slopes	26
1588	Blueridge-Altvan complex, 6 to 30 percent slopes	23
1782	Broadwater loamy sand, 0 to 1 percent slopes, frequently flooded	17
1944	Calamus sand, 0 to 1 percent slopes, very rarely flooded	23
2072	Chappell-Alice-Broadwater complex, 0 to 3 percent slopes	36
2630	Duroc loam, 0 to 1 percent slopes	60
2638	Duroc loam, terrace, 0 to 1 percent slopes	59
2639	Duroc loam, terrace, 1 to 3 percent slopes	58
3050	Glenberg fine sandy loam, 0 to 1 percent slopes, rarely flooded	35
3140	Gothenburg soils, 0 to 1 percent slopes, occasionally flooded	17
3952	Jankosh loam, 0 to 1 percent slopes, rarely flooded	26
4028	Jayem fine sandy loam, 0 to 2 percent slopes	50
4070	Johnstown-Satanta-Richfield loams, 0 to 1 percent slopes	60
4151	Keith loam, 1 to 3 percent slopes	61
4152	Keith loam, 3 to 6 percent slopes	58
4310	Kuma loam, 0 to 1 percent slopes	60
4311	Kuma loam, 1 to 3 percent slopes	61
4472	Las Animas loam, 0 to 1 percent slopes, channeled, frequently flooded	31
4475	Las Animas loam, 0 to 1 percent slopes, occasionally flooded	39
4592	Lexsworth loam, 0 to 1 percent slopes, very rarely flooded	31
4655	Lodgepole silt loam, ponded	10
5212	Merrick sandy clay loam, 0 to 1 percent slopes, very rarely flooded	58
6132	Platte loam, 0 to 1 percent slopes, occasionally flooded	27
6248	Ralton loam, 0 to 1 percent slopes, very rarely flooded	49
6625	Sarben loamy fine sand, 0 to 3 percent slopes	34
6626	Sarben loamy fine sand, 3 to 6 percent slopes	33
6722	Satanta-Altvan complex, 3 to 6 percent slopes	51
6725	Satanta-Ascalon complex, 0 to 2 percent slopes	57
6727	Satanta-Johnstown-Altvan loams, 1 to 3 percent slopes	57
6817	Scoville loamy fine sand, 0 to 3 percent slopes	31
6930	Sidney loam, 3 to 6 percent slopes	51
6937	Sidney-Canyon loams, 3 to 9 percent slopes	39
7120	Sulco-McConaughy loams, 3 to 6 percent slopes, moderately eroded	52
7121	Sulco-McConaughy loams, 6 to 9 percent slopes, moderately eroded	48
7122	Sulco-McConaughy loams, 9 to 20 percent slopes, moderately eroded	41
7582	Valent fine sand, 3 to 9 percent slopes	19
7586	Valent fine sand, rolling	14
7588	Valent complex, rolling and hilly	8

Table 8.--Prime Farmland

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name.)

Map symbol	Map unit name
1130	Alliance loam, 0 to 1 percent slopes (if irrigated)
1146	Alliance-Rosebud loam, 1 to 3 percent slopes (if irrigated)
2072	Chappell-Alice-Broadwater complex, 0 to 3 percent slopes (if irrigated)
2630	Duroc loam, 0 to 1 percent slopes (if irrigated)
2638	Duroc loam, terrace, 0 to 1 percent slopes (if irrigated)
2639	Duroc loam, terrace, 1 to 3 percent slopes (if irrigated)
3050	Glenberg fine sandy loam, 0 to 1 percent slopes, rarely flooded (if irrigated)
4028	Jayem fine sandy loam, 0 to 2 percent slopes (if irrigated)
4070	Johnstown-Satanta-Richfield loams, 0 to 1 percent slopes (if irrigated)
4151	Keith loam, 1 to 3 percent slopes (if irrigated)
4152	Keith loam, 3 to 6 percent slopes (if irrigated)
4310	Kuma loam, 0 to 1 percent slopes (if irrigated)
4311	Kuma loam, 1 to 3 percent slopes (if irrigated)
4475	Las Animas loam, 0 to 1 percent slopes, occasionally flooded (if irrigated and drained)
4592	Lexsworth loam, 0 to 1 percent slopes, very rarely flooded (if irrigated)
5212	Merrick sandy clay loam, 0 to 1 percent slopes, very rarely flooded (if irrigated)
6248	Ralton loam, 0 to 1 percent slopes, very rarely flooded (if irrigated)
6722	Satanta-Altvan complex, 3 to 6 percent slopes (if irrigated)
6725	Satanta-Ascalon complex, 0 to 2 percent slopes (if irrigated)
6727	Satanta-Johnstown-Altvan loams, 1 to 3 percent slopes (if irrigated)
6930	Sidney loam, 3 to 6 percent slopes (if irrigated)
7120	Sulco-McConaughy loams, 3 to 6 percent slopes, moderately eroded (if irrigated)

Table 9.--Rangeland Productivity and Characteristic Plant Communities

(Only the soils that support rangeland vegetation suitable for grazing are listed.)

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Normal year	Unfavorable year	Characteristic vegetation	Maximum rangeland compo-sition
		Lb/acre	Lb/acre	Lb/acre		Pct
1130:						
Alliance-------	Silty; Veg. Zone 2	3,300	2,500	1,700	Western wheatgrass-----------	20
					Blue grama-------------------	15
					Needleandthread--------------	15
					Little bluestem--------------	10
					Big bluestem-----------------	5
					Buffalograss-----------------	5
					Green needlegrass------------	5
					Sedge------------------------	5
					Perennial forbs--------------	5
					Perennial grasses------------	15
1146:						
Alliance-------	Silty; Veg. Zone 2	3,300	2,500	1,700	Western wheatgrass-----------	20
					Blue grama-------------------	15
					Needleandthread--------------	15
					Little bluestem--------------	10
					Big bluestem-----------------	5
					Buffalograss-----------------	5
					Green needlegrass------------	5
					Sedge------------------------	5
					Perennial forbs--------------	5
					Perennial grasses------------	15
Rosebud--------	Silty; Veg. Zone 2	3,300	2,500	1,700	Big bluestem-----------------	5
					Little bluestem--------------	10
					Sideoats grama---------------	10
					Threadleaf sedge-------------	5
					Needleandthread--------------	15
					Blue grama-------------------	15
					Buffalograss-----------------	5
					Green needlegrass------------	10
					Perennial grasses------------	5
					Perennial forbs--------------	5
					Western wheatgrass-----------	15
1198:						
Altvan---------	Silty; Veg. Zone 2	2,100	1,700	1,300	Little bluestem--------------	10
					Blue grama-------------------	20
					Buffalograss-----------------	5
					Threadleaf sedge-------------	5
					Western wheatgrass-----------	25
					Needleandthread--------------	20
					Perennial grasses------------	10
					Perennial forbs--------------	5
Eckley---------	Shallow to Gravel; Veg. Zone 2	1,400	1,200	800	Blue grama-------------------	25
					Needleandthread--------------	10
					Sideoats grama---------------	5
					Little bluestem--------------	5
					Sedge------------------------	5
					Prairie sandreed-------------	10
					Western wheatgrass-----------	20
					Thickspike wheatgrass--------	10
					Green needlegrass------------	10

Table 9.--Rangeland Productivity and Characteristic Plant Communities--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Total dry-weight production: Normal year	Total dry-weight production: Unfavorable year	Characteristic vegetation	Maximum rangeland composition
		Lb/acre	Lb/acre	Lb/acre		Pct
1198:						
Satanta--------	Silty; Veg. Zone 2	3,200	2,500	1,800	Big bluestem-----------------	15
					Little bluestem--------------	15
					Needleandthread--------------	15
					Blue grama-------------------	20
					Sideoats grama---------------	10
					Western wheatgrass-----------	20
					Perennial grasses------------	5
1295:						
Ashollow-------	Sandy; Veg. Zone 2	2,300	1,600	1,200	Blue grama-------------------	20
					Little bluestem--------------	10
					Needleandthread--------------	15
					Prairie sandreed-------------	25
					Sand bluestem----------------	10
					Sedge------------------------	10
					Perennial grasses------------	5
					Perennial forbs--------------	5
Tassel---------	Shallow Limy; Veg. Zone 2	1,200	1,100	900	Needleandthread--------------	15
					Little bluestem--------------	20
					Threadleaf sedge-------------	10
					Prairie sandreed-------------	10
					Sand bluestem----------------	10
					Blue grama-------------------	5
					Sideoats grama---------------	10
					Plains muhly-----------------	5
					Perennial grasses------------	5
					Perennial forbs--------------	5
					Shrubs-----------------------	5
1588:						
Blueridge------	Shallow to Gravel; Veg. Zone 2	1,300	900	600	Sand bluestem----------------	15
					Little bluestem--------------	10
					Blue grama-------------------	25
					Sand dropseed----------------	5
					Prairie sandreed-------------	10
					Needleandthread--------------	10
					Perennial grasses------------	10
					Perennial forbs--------------	5
					Shrubs-----------------------	5
					Hairy grama------------------	5
Altvan---------	Silty; Veg. Zone 2	2,100	1,700	1,300	Little bluestem--------------	10
					Blue grama-------------------	20
					Buffalograss-----------------	5
					Threadleaf sedge-------------	5
					Western wheatgrass-----------	25
					Needleandthread--------------	20
					Perennial grasses------------	10
					Perennial forbs--------------	5
1782:						
Broadwater-----	Shallow to Gravel; Veg. Zone 2	1,250	900	600	Prairie sandreed-------------	10
					Sand bluestem----------------	15
					Sand dropseed----------------	10
					Sand sagebrush---------------	5
					Needleandthread--------------	10
					Blue grama-------------------	30
					Little bluestem--------------	10
					Sedge------------------------	5
					Clubmoss---------------------	5

Table 9.--Rangeland Productivity and Characteristic Plant Communities--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Normal year	Unfavorable year	Characteristic vegetation	Maximum rangeland composition
		Lb/acre	Lb/acre	Lb/acre		Pct
1944:						
Calamus	Sandy; Veg. Zone 2	2,600	2,200	1,600	Little bluestem	10
					Blue grama	20
					Sand dropseed	10
					Perennial grasses	5
					Perennial forbs	5
					Prairie sandreed	15
					Sand bluestem	10
					Needleandthread	10
					Clubmoss	5
					Hairy grama	5
					Sedge	5
2072:						
Chappell	Sandy; Veg. Zone 2	2,600	2,300	1,900	Prairie sandreed	25
					Needleandthread	10
					Blue grama	10
					Threadleaf sedge	5
					Sand bluestem	25
					Little bluestem	15
					Perennial grasses	5
					Perennial forbs	5
Alice	Sandy; Veg. Zone 2	2,300	1,600	1,100	Prairie sandreed	20
					Needleandthread	15
					Blue grama	15
					Threadleaf sedge	10
					Sand dropseed	5
					Prairie junegrass	5
					Western wheatgrass	5
					Sand bluestem	5
					Little bluestem	10
					Perennial grasses	5
					Perennial forbs	5
Broadwater	Shallow to Gravel; Veg. Zone 2	1,250	900	600	Prairie sandreed	10
					Sand bluestem	15
					Sand dropseed	10
					Sand sagebrush	5
					Needleandthread	10
					Blue grama	30
					Little bluestem	10
					Sedge	5
					Clubmoss	5
2630:						
Duroc	Silty; Veg. Zone 2	3,300	2,500	1,700	Big bluestem	15
					Blue grama	10
					Green needlegrass	10
					Little bluestem	10
					Needleandthread	15
					Threadleaf sedge	10
					Western wheatgrass	15
					Buffalograss	5
					Perennial grasses	5
					Perennial forbs	5

Table 9.--Rangeland Productivity and Characteristic Plant Communities--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Normal year	Unfavorable year	Characteristic vegetation	Maximum rangeland composition
		Lb/acre	Lb/acre	Lb/acre		Pct
2638:						
Duroc	Silty; Veg. Zone 2	3,300	2,500	1,700	Big bluestem	15
					Blue grama	10
					Green needlegrass	10
					Little bluestem	10
					Needleandthread	15
					Threadleaf sedge	10
					Western wheatgrass	15
					Buffalograss	5
					Perennial grasses	5
					Perennial forbs	5
2639:						
Duroc	Silty; Veg. Zone 2	3,300	2,500	1,700	Big bluestem	15
					Blue grama	10
					Green needlegrass	10
					Little bluestem	10
					Needleandthread	15
					Threadleaf sedge	10
					Western wheatgrass	15
					Buffalograss	5
					Perennial grasses	5
					Perennial forbs	5
3050:						
Glenberg	Sandy Lowland; Veg. Zone 1	2,800	2,100	1,300	Little bluestem	25
					Needleandthread	10
					Prairie sandreed	20
					Sand bluestem	25
					Blue grama	5
					Switchgrass	5
					Perennial grasses	5
					Perennial forbs	5
3952:						
Jankosh	Saline Subirrigated; Veg. Zone 2	2,900	2,600	2,300	Alkali sacaton	35
					Inland saltgrass	15
					Western wheatgrass	15
					Slender wheatgrass	10
					Plains bluegrass	10
					Sedge	5
					Perennial grasses	5
					Perennial forbs	5
4028:						
Jayem	Sandy; Veg. Zone 2	3,000	2,300	1,600	Blue grama	10
					Fringed sagewort	5
					Little bluestem	15
					Needleandthread	15
					Prairie sandreed	20
					Sand dropseed	5
					Threadleaf sedge	5
					Western wheatgrass	5
					Sand bluestem	15
					Switchgrass	5

Table 9.--Rangeland Productivity and Characteristic Plant Communities--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Normal year	Unfavorable year	Characteristic vegetation	Maximum rangeland composition
		Lb/acre	Lb/acre	Lb/acre		Pct
4070:						
Johnstown	Silty; Veg. Zone 2	3,200	2,500	1,800	Big bluestem	20
					Little bluestem	15
					Switchgrass	5
					Indiangrass	5
					Sideoats grama	10
					Blue grama	10
					Western wheatgrass	10
					Perennial grasses	10
					Perennial forbs	5
					Needleandthread	10
Satanta	Silty; Veg. Zone 2	3,200	2,500	1,800	Big bluestem	15
					Little bluestem	15
					Needleandthread	15
					Blue grama	20
					Sideoats grama	10
					Western wheatgrass	20
					Perennial grasses	5
Richfield	Silty; Veg. Zone 2	3,200	2,500	1,800	Big bluestem	20
					Little bluestem	15
					Switchgrass	5
					Indiangrass	5
					Sideoats grama	10
					Blue grama	10
					Western wheatgrass	10
					Perennial grasses	10
					Perennial forbs	5
					Needleandthread	10
4151:						
Keith	Silty; Veg. Zone 2	3,300	2,500	1,700	Western wheatgrass	15
					Blue grama	20
					Needleandthread	20
					Buffalograss	5
					Little bluestem	10
					Sedge	5
					Big bluestem	5
					Sideoats grama	5
					Perennial grasses	5
					Perennial forbs	5
					Green needlegrass	5
4152:						
Keith	Silty; Veg. Zone 2	3,300	2,500	1,700	Western wheatgrass	15
					Blue grama	20
					Needleandthread	20
					Buffalograss	5
					Little bluestem	10
					Sedge	5
					Big bluestem	5
					Sideoats grama	5
					Perennial grasses	5
					Perennial forbs	5
					Green needlegrass	5

Table 9.--Rangeland Productivity and Characteristic Plant Communities--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Normal year	Unfavorable year	Characteristic vegetation	Maximum rangeland composition
		Lb/acre	Lb/acre	Lb/acre		Pct
4310:						
Kuma	Silty; Veg. Zone 2	3,300	2,500	1,700	Western wheatgrass	15
					Blue grama	20
					Needleandthread	20
					Buffalograss	5
					Little bluestem	10
					Sedge	5
					Big bluestem	5
					Sideoats grama	5
					Perennial grasses	5
					Perennial forbs	5
					Green needlegrass	5
4311:						
Kuma	Silty; Veg. Zone 2	3,300	2,500	1,700	Western wheatgrass	15
					Blue grama	20
					Needleandthread	20
					Buffalograss	5
					Little bluestem	10
					Sedge	5
					Big bluestem	5
					Sideoats grama	5
					Perennial grasses	5
					Perennial forbs	5
					Green needlegrass	5
4472:						
Las Animas	Silty Overflow; Veg. Zone 2	5,000	4,500	4,000	Plains bluegrass	5
					Prairie cordgrass	15
					Perennial grasses	5
					Sedge	5
					Perennial forbs	5
					Rush	5
					Big bluestem	20
					Little bluestem	25
					Switchgrass	5
					Indiangrass	10
4475:						
Las Animas	Subirrigated; Veg. Zone 2	5,000	4,500	4,000	Bluejoint	15
					Northern reedgrass	15
					Plains bluegrass	5
					Prairie cordgrass	30
					Slender wheatgrass	10
					Perennial grasses	5
					Sedge	10
					Perennial forbs	5
					Rush	5
4592:						
Lexsworth	Silty Lowland; Veg. Zone 2	2,800	2,000	1,500	Western wheatgrass	30
					Needleandthread	15
					Blue grama	15
					Sedge	10
					Big bluestem	5
					Little bluestem	5
					Sideoats grama	5
					Buffalograss	5
					Perennial forbs	5
					Perennial grasses	5

Table 9.--Rangeland Productivity and Characteristic Plant Communities--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Normal year	Unfavorable year	Characteristic vegetation	Maximum rangeland composition
		Lb/acre	Lb/acre	Lb/acre		Pct
4655:						
Lodgepole------	Clayey Overflow; Veg. Zone 2	1,200	1,000	700	Western wheatgrass-----------	40
					Blue grama-------------------	15
					Buffalograss-----------------	10
					Green needlegrass------------	15
					Sedge------------------------	10
					Perennial grasses------------	5
					Perennial forbs--------------	5
5212:						
Merrick--------	Silty Lowland; Veg. Zone 2	3,800	3,000	2,300	Big bluestem-----------------	20
					Little bluestem--------------	15
					Switchgrass------------------	5
					Western wheatgrass-----------	20
					Needleandthread--------------	20
					Blue grama-------------------	10
					Perennial grasses------------	5
					Perennial forbs--------------	5
6132:						
Platte---------	Subirrigated; Veg. Zone 2	4,500	4,100	3,700	Big bluestem-----------------	30
					Switchgrass------------------	10
					Indiangrass------------------	10
					Little bluestem--------------	20
					Prairie cordgrass------------	10
					Other perennial grasslikes---	10
					Perennial grasses------------	5
					Perennial forbs--------------	5
6248:						
Ralton---------	Silty Lowland; Veg. Zone 2	3,800	2,800	2,300	Western wheatgrass-----------	30
					Needleandthread--------------	15
					Blue grama-------------------	15
					Sedge------------------------	10
					Big bluestem-----------------	5
					Little bluestem--------------	5
					Sideoats grama---------------	5
					Buffalograss-----------------	5
					Perennial forbs--------------	5
					Perennial grasses------------	5
6625:						
Sarben---------	Sandy; Veg. Zone 2	3,000	2,600	2,200	Prairie sandreed-------------	20
					Needleandthread--------------	20
					Blue grama-------------------	10
					Little bluestem--------------	15
					Sand bluestem----------------	10
					Sand sagebrush---------------	5
					Western wheatgrass-----------	5
					Sedge------------------------	5
					Perennial forbs--------------	10
6626:						
Sarben---------	Sandy; Veg. Zone 2	3,000	2,600	2,200	Prairie sandreed-------------	20
					Needleandthread--------------	20
					Blue grama-------------------	10
					Little bluestem--------------	15
					Sand bluestem----------------	10
					Sand sagebrush---------------	5
					Western wheatgrass-----------	5
					Sedge------------------------	5
					Perennial forbs--------------	10

Table 9.--Rangeland Productivity and Characteristic Plant Communities--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Normal year	Unfavorable year	Characteristic vegetation	Maximum rangeland composition
		Lb/acre	Lb/acre	Lb/acre		Pct
6722:						
Satanta	Silty; Veg. Zone 2	3,200	2,500	1,800	Big bluestem	15
					Little bluestem	15
					Needleandthread	15
					Blue grama	20
					Sideoats grama	10
					Western wheatgrass	20
					Perennial grasses	5
Altvan	Silty; Veg. Zone 2	2,900	2,500	2,100	Little bluestem	10
					Blue grama	20
					Buffalograss	5
					Threadleaf sedge	5
					Western wheatgrass	25
					Needleandthread	20
					Perennial grasses	10
					Perennial forbs	5
6725:						
Satanta	Silty; Veg. Zone 2	3,200	2,500	1,800	Big bluestem	15
					Little bluestem	15
					Needleandthread	15
					Blue grama	20
					Sideoats grama	10
					Western wheatgrass	20
					Perennial grasses	5
Ascalon	Sandy; Veg. Zone 2	3,000	2,300	1,600	Blue grama	10
					Fringed sagewort	5
					Little bluestem	15
					Needleandthread	15
					Prairie sandreed	20
					Sand dropseed	5
					Threadleaf sedge	5
					Western wheatgrass	5
					Sand bluestem	15
					Switchgrass	5
6727:						
Satanta	Silty; Veg. Zone 2	3,200	2,500	1,800	Big bluestem	15
					Little bluestem	15
					Needleandthread	15
					Blue grama	20
					Sideoats grama	10
					Western wheatgrass	20
					Perennial grasses	5
Johnstown	Silty; Veg. Zone 2	3,800	3,500	3,000	Big bluestem	20
					Little bluestem	15
					Switchgrass	5
					Indiangrass	5
					Sideoats grama	10
					Blue grama	10
					Western wheatgrass	10
					Perennial grasses	10
					Perennial forbs	5
					Needleandthread	10

Table 9.--Rangeland Productivity and Characteristic Plant Communities--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Normal year	Unfavorable year	Characteristic vegetation	Maximum rangeland composition
		Lb/acre	Lb/acre	Lb/acre		Pct
6727:						
Altvan	Silty; Veg. Zone 2	2,900	2,500	2,100	Little bluestem	10
					Blue grama	20
					Buffalograss	5
					Threadleaf sedge	5
					Western wheatgrass	25
					Needleandthread	20
					Perennial grasses	10
					Perennial forbs	5
6817:						
Scoville	Sandy; Veg. Zone 2	2,300	1,600	1,100	Prairie sandreed	25
					Sand bluestem	10
					Little bluestem	10
					Blue grama	15
					Needleandthread	15
					Threadleaf sedge	10
					Perennial grasses	5
					Perennial forbs	5
					Shrubs	5
6930:						
Sidney	Silty; Veg. Zone 2	2,200	1,500	1,000	Western wheatgrass	30
					Needleandthread	25
					Blue grama	20
					Sedge	5
					Perennial grasses	10
					Perennial forbs	5
					Shrubs	5
6937:						
Sidney	Silty; Veg. Zone 2	2,200	1,500	1,000	Western wheatgrass	30
					Needleandthread	25
					Blue grama	20
					Sedge	5
					Perennial grasses	10
					Perennial forbs	5
					Shrubs	5
Canyon	Shallow Limy; Veg. Zone 2	1,500	1,100	700	Little bluestem	20
					Threadleaf sedge	5
					Sideoats grama	10
					Needleandthread	15
					Blue grama	20
					Sand bluestem	10
					Western wheatgrass	10
					Perennial forbs	5
					Shrubs	5
7120:						
Sulco	Limy Upland; Veg. Zone 2	2,800	2,000	1,500	Little bluestem	25
					Sideoats grama	15
					Blue grama	15
					Western wheatgrass	5
					Big bluestem	10
					Threadleaf sedge	10
					Buffalograss	5
					Plains muhly	5
					Perennial grasses	5
					Perennial forbs	5

Table 9.--Rangeland Productivity and Characteristic Plant Communities--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Normal year	Unfavorable year	Characteristic vegetation	Maximum rangeland compo-sition
		Lb/acre	Lb/acre	Lb/acre		Pct
7120:						
McConaughy-----	Silty; Veg. Zone 2	3,250	2,500	1,700	Western wheatgrass-----------	20
					Sideoats grama---------------	5
					Little bluestem--------------	10
					Blue grama-------------------	15
					Big bluestem-----------------	10
					Needleandthread--------------	15
					Sedge------------------------	5
					Perennial forbs--------------	5
					Shrubs-----------------------	5
					Perennial grasses------------	10
7121:						
Sulco----------	Limy Upland; Veg. Zone 2	2,800	2,000	1,500	Little bluestem--------------	25
					Sideoats grama---------------	15
					Blue grama-------------------	15
					Western wheatgrass-----------	5
					Big bluestem-----------------	10
					Threadleaf sedge-------------	10
					Buffalograss-----------------	5
					Plains muhly-----------------	5
					Perennial grasses------------	5
					Perennial forbs--------------	5
McConaughy-----	Silty; Veg. Zone 2	3,250	2,500	1,700	Western wheatgrass-----------	20
					Sideoats grama---------------	5
					Little bluestem--------------	10
					Blue grama-------------------	15
					Big bluestem-----------------	10
					Needleandthread--------------	15
					Sedge------------------------	5
					Perennial forbs--------------	5
					Shrubs-----------------------	5
					Perennial grasses------------	10
7122:						
Sulco----------	Limy Upland; Veg. Zone 2	2,800	2,000	1,500	Little bluestem--------------	25
					Sideoats grama---------------	15
					Blue grama-------------------	15
					Western wheatgrass-----------	5
					Big bluestem-----------------	10
					Threadleaf sedge-------------	10
					Buffalograss-----------------	5
					Plains muhly-----------------	5
					Perennial grasses------------	5
					Perennial forbs--------------	5
McConaughy-----	Silty; Veg. Zone 2	3,250	2,500	1,700	Western wheatgrass-----------	20
					Sideoats grama---------------	5
					Little bluestem--------------	10
					Blue grama-------------------	15
					Big bluestem-----------------	10
					Needleandthread--------------	15
					Sedge------------------------	5
					Perennial forbs--------------	5
					Shrubs-----------------------	5
					Perennial grasses------------	10

Table 9.--Rangeland Productivity and Characteristic Plant Communities--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Normal year	Unfavorable year	Characteristic vegetation	Maximum rangeland composition
		Lb/acre	Lb/acre	Lb/acre		Pct
7582:						
Valent	Sands; Veg. Zone 2	2,800	2,400	1,800	Prairie sandreed	20
					Sand bluestem	25
					Little bluestem	10
					Blue grama	5
					Needleandthread	10
					Threadleaf sedge	5
					Perennial grasses	5
					Perennial forbs	5
					Shrubs	5
					Switchgrass	10
7586:						
Valent	Sands; Veg. Zone 2	2,800	2,400	1,800	Prairie sandreed	20
					Sand bluestem	25
					Little bluestem	10
					Blue grama	5
					Needleandthread	10
					Threadleaf sedge	5
					Perennial grasses	5
					Perennial forbs	5
					Shrubs	5
					Switchgrass	10
7588:						
Valent, rolling	Sands; Veg. Zone 2	2,800	2,400	1,800	Prairie sandreed	20
					Sand bluestem	25
					Little bluestem	10
					Blue grama	5
					Needleandthread	10
					Threadleaf sedge	5
					Perennial grasses	5
					Perennial forbs	5
					Shrubs	5
					Switchgrass	10
Valent, hilly	Choppy Sands; Veg. Zone 2	2,300	1,600	1,200	Prairie sandreed	20
					Sand bluestem	30
					Little bluestem	15
					Blue grama	5
					Needleandthread	5
					Perennial grasses	5
					Perennial forbs	5
					Shrubs	5
					Switchgrass	10

Table 10.--Windbreaks and Environmental Plantings

(Absence of an entry indicates that trees generally do not grow to the given height.)

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
1130:					
Alliance	Amur honeysuckle, common lilac, skunkbush sumac	Rocky Mountain juniper	Bur oak, common hackberry, eastern redcedar, Russian olive, green ash, honeylocust, ponderosa pine	Siberian elm	---
1146:					
Alliance	Amur honeysuckle, common lilac, skunkbush sumac	Rocky Mountain juniper	Bur oak, common hackberry, eastern redcedar, Russian olive, green ash, honeylocust, ponderosa pine	Siberian elm	---
Rosebud	Common lilac, Siberian peashrub, skunkbush sumac	Rocky Mountain juniper, common hackberry, eastern redcedar, green ash	Honeylocust, Russian olive, ponderosa pine, Siberian elm	---	---
1198:					
Altvan	Common lilac, Siberian peashrub, skunkbush sumac	Rocky Mountain juniper, common hackberry, eastern redcedar, green ash, Russian olive	Honeylocust, ponderosa pine, Siberian elm	---	---
Eckley	Common lilac, eastern redcedar, Rocky Mountain juniper, Russian olive, Siberian peashrub	Green ash, common hackberry, ponderosa pine, Siberian elm	---	---	---
Satanta	American plum, common chokecherry, Tatarian honeysuckle	Autumn olive, Rocky Mountain juniper	Eastern redcedar, common hackberry, green ash, black locust, honeylocust, ponderosa pine	Siberian elm	---
1295:					
Ashollow	Common lilac, Siberian peashrub, skunkbush sumac	Rocky Mountain juniper, Russian olive, black locust, common hackberry, eastern redcedar, green ash, ponderosa pine	Honeylocust, Siberian elm	---	---
Tassel.					

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
1588: Blueridge.					
Altvan	Common lilac, Siberian peashrub, skunkbush sumac	Rocky Mountain juniper, common hackberry, eastern redcedar, green ash, Russian olive	Honeylocust, ponderosa pine, Siberian elm	---	---
1782: Broadwater.					
1944: Calamus	---	Rocky Mountain juniper	Austrian pine, eastern redcedar, jack pine, ponderosa pine, Scotch pine	---	---
2072: Chappell	Common lilac, Siberian peashrub, skunkbush sumac	Rocky Mountain juniper, common hackberry, eastern redcedar, green ash, Russian olive	Honeylocust, ponderosa pine, Siberian elm	---	---
Alice	American plum, common lilac, Siberian peashrub, skunkbush sumac	Eastern redcedar, Rocky Mountain juniper, Russian olive	Common hackberry, green ash, honeylocust, ponderosa pine	Siberian elm	---
Broadwater.					
2630: Duroc	American plum, Amur honeysuckle, common lilac	---	Eastern redcedar, ponderosa pine, Rocky Mountain juniper, Russian olive, common hackberry, green ash, honeylocust	Siberian elm	Eastern cottonwood
2638: Duroc	American plum, Amur honeysuckle, common lilac	---	Eastern redcedar, ponderosa pine, Rocky Mountain juniper, Russian olive, common hackberry, green ash, honeylocust	Siberian elm	Eastern cottonwood
2639: Duroc	American plum, Amur honeysuckle, common lilac	---	Eastern redcedar, ponderosa pine, Rocky Mountain juniper, Russian olive, common hackberry, green ash, honeylocust	Siberian elm	Eastern cottonwood

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
3050:					
Glenberg	American plum, Siberian peashrub	---	Bur oak, eastern redcedar, Rocky Mountain juniper, Russian olive, common hackberry, green ash, ponderosa pine	Black locust	Eastern cottonwood
3140:					
Gothenburg.					
3952:					
Jankosh.					
4028:					
Jayem	Amur honeysuckle, common chokecherry, common lilac, Siberian peashrub	Eastern redcedar, Rocky Mountain juniper, Russian olive	Green ash, ponderosa pine, honeylocust, Siberian elm	---	---
4070:					
Johnstown	American plum, skunkbush sumac	Siberian peashrub	Bur oak, common hackberry, eastern redcedar, Russian olive, green ash, honeylocust, ponderosa pine	Siberian elm	---
Satanta	American plum, common chokecherry, Tatarian honeysuckle	Autumn olive, Rocky Mountain juniper	Eastern redcedar, common hackberry, green ash, black locust, honeylocust, ponderosa pine	Siberian elm	---
Richfield	Amur honeysuckle, common lilac	Common chokecherry	Bur oak, eastern redcedar, ponderosa pine, Russian olive, green ash, honeylocust	Siberian elm	---
4151:					
Keith	American plum, common chokecherry, common lilac, Siberian peashrub	Manchurian crabapple, Rocky Mountain juniper	Common hackberry, green ash, Russian olive, honeylocust, ponderosa pine	Siberian elm	---
4152:					
Keith	American plum, common chokecherry, common lilac, Siberian peashrub	Manchurian crabapple, Rocky mountain juniper	Common hackberry, green ash, Russian olive, honeylocust, ponderosa pine	Siberian elm	---

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
4310: Kuma	Amur honeysuckle, common lilac	Common chokecherry	Bur oak, eastern redcedar, ponderosa pine, Russian olive, green ash, honeylocust	Siberian elm	---
4311: Kuma	Amur honeysuckle, common lilac	Common chokecherry	Bur oak, eastern redcedar, ponderosa pine, Russian olive, green ash, honeylocust	Siberian elm	---
4472: Las Animas.					
4475: Las Animas.					
4592: Lexsworth	---	American plum, common lilac, Siberian peashrub	Eastern redcedar, Manchurian crabapple, ponderosa pine	Common hackberry, green ash, honeylocust, golden willow	Eastern cottonwood
4655: Lodgepole	American plum, common chokecherry, common lilac	---	Eastern redcedar, common hackberry, ponderosa pine, green ash, honeylocust, Russian mulberry	Golden willow, silver maple	---
5212: Merrick	---	American plum, common lilac, Siberian peashrub	Eastern redcedar, Manchurian crabapple, ponderosa pine	Common hackberry, green ash, honeylocust, golden willow	Eastern cottonwood
6132: Platte	American plum, redosier dogwood	Common chokecherry	Eastern redcedar, Austrian pine, common hackberry, Russian olive	Green ash, honeylocust, golden willow, silver maple	Eastern cottonwood
6248: Ralton	American plum, common lilac	---	Rocky Mountain juniper, Russian olive, eastern redcedar, ponderosa pine, common hackberry, green ash	Honeylocust, Siberian elm	Eastern cottonwood
6625: Sarben	American plum, Amur honeysuckle, common chokecherry, common lilac	---	Common hackberry, eastern redcedar, Rocky Mountain juniper, Russian mulberry, green ash, ponderosa pine, honeylocust	Siberian elm	---

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
6626:					
Sarben	American plum, Amur honeysuckle, common chokecherry, common lilac	---	Common hackberry, eastern redcedar, Rocky Mountain juniper, Russian mulberry, green ash, ponderosa pine, honeylocust	Siberian elm	---
6722:					
Satanta	American plum, common chokecherry, Tatarian honeysuckle	Autumn olive, Rocky Mountain juniper	Eastern redcedar, common hackberry, green ash, black locust, honeylocust, ponderosa pine	Siberian elm	---
Altvan	Common lilac, Siberian peashrub, skunkbush sumac	Rocky Mountain juniper, common hackberry, eastern redcedar, green ash, Russian olive	Honeylocust, ponderosa pine, Siberian elm	---	---
6725:					
Satanta	American plum, common chokecherry, Tatarian honeysuckle	Eastern redcedar, Rocky Mountain juniper	Common hackberry, green ash, ponderosa pine, black locust, honeylocust, Siberian elm	---	---
Ascalon	American plum, Amur honeysuckle, common chokecherry, common lilac	---	Common hackberry, eastern redcedar, Rocky Mountain juniper, Russian mulberry, Siberian elm, green ash, ponderosa pine, honeylocust	---	---
6727:					
Satanta	American plum, common chokecherry, Tatarian honeysuckle	Autumn olive, Rocky Mountain juniper	Eastern redcedar, common hackberry, green ash, black locust, honeylocust, ponderosa pine	Siberian elm	---
Johnstown	American plum, skunkbush sumac	Siberian peashrub	Bur oak, common hackberry, eastern redcedar, Russian olive, green ash, honeylocust, ponderosa pine	Siberian elm	---
Altvan	Common lilac, Siberian peashrub, skunkbush sumac	Rocky Mountain juniper, common hackberry, eastern redcedar, green ash, Russian olive	Honeylocust, ponderosa pine, Siberian elm	---	---

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
6817:					
Scoville	American plum, common lilac, Siberian peashrub, skunkbush sumac	Eastern redcedar, Rocky Mountain juniper, Russian olive	Common hackberry, green ash, honeylocust, ponderosa pine	Siberian elm	---
6930:					
Sidney	Common lilac, Siberian peashrub, silver buffaloberry, skunkbush sumac	Rocky Mountain juniper, Russian olive	Common hackberry, eastern redcedar, green ash, ponderosa pine, Siberian elm, honeylocust	---	---
6937:					
Sidney	Common lilac, Siberian peashrub, silver buffaloberry, skunkbush sumac	Rocky Mountain juniper, Russian olive	Common hackberry, eastern redcedar, green ash, ponderosa pine, Siberian elm, honeylocust	---	---
Canyon.					
7120:					
Sulco	Common lilac, Siberian peashrub, silver buffaloberry, Tatarian honeysuckle	Eastern redcedar, Rocky Mountain juniper	Black locust, common hackberry, green ash, honeylocust, ponderosa pine, Siberian elm	---	---
McConaughy	American plum, common lilac, Siberian peashrub, skunkbush sumac	Rocky Mountain juniper	Common hackberry, eastern redcedar, green ash, Russian olive, ponderosa pine, honeylocust	Siberian elm	---
7121:					
Sulco	Common lilac, Siberian peashrub, silver buffaloberry, Tatarian honeysuckle	Eastern redcedar, Rocky Mountain juniper	Black locust, common hackberry, green ash, honeylocust, ponderosa pine, Siberian elm	---	---
McConaughy	American plum, common lilac, Siberian peashrub, skunkbush sumac	Rocky Mountain juniper	Common hackberry, eastern redcedar, green ash, Russian olive, ponderosa pine, honeylocust	Siberian elm	---

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
7122:					
Sulco	Common lilac, Siberian peashrub, silver buffaloberry, Tatarian honeysuckle	Eastern redcedar, Rocky Mountain juniper	Black locust, common hackberry, green ash, honeylocust, ponderosa pine, Siberian elm	---	---
McConaughy	American plum, common lilac, Siberian peashrub, skunkbush sumac	Rocky Mountain juniper	Common hackberry, eastern redcedar, green ash, Russian olive, ponderosa pine, honeylocust	Siberian elm	---
7582:					
Valent	---	Eastern redcedar, Rocky Mountain juniper	Austrian pine, jack pine, ponderosa pine	---	---
7586:					
Valent	---	Eastern redcedar, Rocky Mountain juniper	Austrian pine, jack pine, ponderosa pine	---	---
7588:					
Valent, rolling	---	Eastern redcedar, Rocky Mountain juniper	Austrian pine, jack pine, ponderosa pine	---	---
Valent, hilly	---	Eastern redcedar, Rocky Mountain juniper	Austrian pine, jack pine, ponderosa pine	---	---

Table 11a.--Recreation Interpretations

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value	Playgrounds: Rating class and limiting features	Playgrounds: Value
1130:							
Alliance------------	90	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Dusty	0.50	Dusty	0.50	Dusty	0.50
1146:							
Alliance------------	65	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Dusty	0.50	Dusty	0.50	Dusty	0.50
						Slope	0.05
Rosebud-------------	25	Not limited		Not limited		Somewhat limited:	
						Slope	0.05
1198:							
Altvan--------------	45	Not limited		Not limited		Somewhat limited:	
						Slope	0.94
Eckley--------------	30	Not limited		Not limited		Somewhat limited:	
						Slope	0.94
Satanta, sandy substratum---------	20	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Dusty	0.50	Dusty	0.50	Slope	0.94
						Dusty	0.50
1295:							
Ashollow------------	65	Somewhat limited:		Somewhat limited:		Very limited:	
		Slope	0.84	Slope	0.84	Slope	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
Tassel--------------	30	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
1588:							
Blueridge-----------	50	Very limited:		Very limited:		Very limited:	
		Too sandy	1.00	Too sandy	1.00	Too sandy	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
		Gravel content	0.03	Gravel content	0.03	Gravel content	1.00
Altvan--------------	35	Somewhat limited:		Somewhat limited:		Very limited:	
		Dusty	0.50	Dusty	0.50	Slope	1.00
						Dusty	0.50
1782:							
Broadwater, frequently flooded-	90	Very limited:		Somewhat limited:		Very limited:	
		Flooding	1.00	Flooding	0.40	Flooding	1.00
		Too sandy	0.32	Too sandy	0.32	Too sandy	0.32
1944:							
Calamus, very rarely flooded-----------	95	Very limited:		Somewhat limited:		Somewhat limited:	
		Flooding	1.00	Too sandy	0.32	Too sandy	0.32
		Too sandy	0.32				

Table 11a.--Recreation Interpretations--Continued

Map symbol and soil name	Pct. of map unit	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value	Playgrounds: Rating class and limiting features	Playgrounds: Value
2072:							
Chappell-----------	38	Not limited		Not limited		Somewhat limited:	
						Slope	0.01
Alice---------------	33	Not limited		Not limited		Somewhat limited:	
						Slope	0.01
Broadwater----------	24	Very limited:		Somewhat limited:		Somewhat limited:	
		Flooding	1.00	Too sandy	0.32	Flooding	0.60
		Too sandy	0.32			Too sandy	0.32
						Slope	0.01
2630:							
Duroc---------------	90	Not limited		Not limited		Not limited	
						Slope	0.01
2638:							
Duroc---------------	90	Not limited		Not limited		Not limited	
2639:							
Duroc---------------	90	Not limited		Not limited		Somewhat limited:	
						Slope	0.01
3050:							
Glenberg, rarely flooded-----------	90	Very limited:		Not limited		Not limited	
		Flooding	1.00				
3140:							
Gothenburg, occasionally flooded-----------	85	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Too sandy	0.32	Flooding	0.60
		Too sandy	0.32			Too sandy	0.32
3952:							
Jankosh-------------	85	Very limited:		Very limited:		Very limited:	
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Flooding	1.00	Salinity	1.00	Salinity	1.00
		Salinity	1.00	Depth to saturated zone	0.03	Depth to saturated zone	0.08
		Depth to saturated zone	0.08				
4028:							
Jayem---------------	90	Not limited		Not limited		Not limited	
4070:							
Johnstown-----------	35	Not limited		Not limited		Not limited	
Satanta, sandy substratum---------	31	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Dusty	0.50	Dusty	0.50	Dusty	0.50
Richfield-----------	29	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Dusty	0.50	Dusty	0.50	Dusty	0.50
		Restricted permeability	0.45	Restricted permeability	0.45	Restricted permeability	0.45

Table 11a.--Recreation Interpretations--Continued

Map symbol and soil name	Pct. of map unit	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value	Playgrounds: Rating class and limiting features	Playgrounds: Value
4151:							
Keith	90	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Dusty	0.50	Dusty	0.50	Dusty	0.50
						Slope	0.05
4152:							
Keith	90	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Dusty	0.50	Dusty	0.50	Slope	0.64
						Dusty	0.50
4310:							
Kuma	95	Not limited		Not limited		Not limited	
4311:							
Kuma	90	Not limited		Not limited		Somewhat limited:	
						Slope	0.05
4472:							
Las Animas, frequently flooded	95	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Depth to saturated zone	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Flooding	0.40	Depth to saturated zone	1.00
4475:							
Las Animas, occasionally flooded	92	Very limited:		Somewhat limited:		Somewhat limited:	
		Flooding	1.00	Depth to saturated zone	0.03	Flooding	0.60
		Depth to saturated zone	0.08			Depth to saturated zone	0.08
4592:							
Lexsworth, very rarely flooded	85	Very limited:		Somewhat limited:		Somewhat limited:	
		Flooding	1.00	Dusty	0.50	Dusty	0.50
		Dusty	0.50				
4655:							
Lodgepole, ponded	95	Very limited:		Very limited:		Very limited:	
		Depth to saturated zone	1.00	Ponding	1.00	Depth to saturated zone	1.00
		Ponding	1.00	Depth to saturated zone	1.00	Ponding	1.00
		Restricted permeability	1.00	Restricted permeability	1.00	Restricted permeability	1.00
5212:							
Merrick, very rarely flooded	90	Very limited:		Not limited		Not limited	
		Flooding	1.00				
6132:							
Platte, occasionally flooded	90	Very limited:		Somewhat limited:		Somewhat limited:	
		Flooding	1.00	Depth to saturated zone	0.19	Flooding	0.60
		Depth to saturated zone	0.44			Depth to saturated zone	0.44

Table 11a.--Recreation Interpretations--Continued

Map symbol and soil name	Pct. of map unit	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value	Playgrounds: Rating class and limiting features	Playgrounds: Value
6248:							
Ralton, very rarely flooded	90	Very limited:		Not limited		Not limited	
		Flooding	1.00				
6625:							
Sarben	90	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Too sandy	0.12	Too sandy	0.12	Too sandy	0.12
						Slope	0.05
6626:							
Sarben	90	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Too sandy	0.12	Too sandy	0.12	Slope	0.64
						Too sandy	0.12
6722:							
Satanta	65	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Dusty	0.50	Dusty	0.50	Slope	0.64
						Dusty	0.50
Altvan	25	Not limited		Not limited		Somewhat limited:	
						Slope	0.64
6725:							
Satanta, sandy substratum	45	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Dusty	0.50	Dusty	0.50	Dusty	0.50
Ascalon	45	Not limited		Not limited		Not limited	
6727:							
Satanta, sandy substratum	60	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Dusty	0.50	Dusty	0.50	Dusty	0.50
						Slope	0.05
Johnstown	18	Not limited		Not limited		Somewhat limited:	
						Slope	0.05
Altvan	15	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Dusty	0.50	Dusty	0.50	Dusty	0.50
						Slope	0.05
6817:							
Scoville	95	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Too sandy	0.04	Too sandy	0.04	Too sandy	0.04
6930:							
Sidney	85	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Dusty	0.50	Dusty	0.50	Slope	0.64
						Dusty	0.50
6937:							
Sidney	65	Somewhat limited:		Somewhat limited:		Very limited:	
		Dusty	0.50	Dusty	0.50	Slope	1.00
						Dusty	0.50

Table 11a.--Recreation Interpretations--Continued

Map symbol and soil name	Pct. of map unit	Camp areas: Rating class and limiting features	Value	Picnic areas: Rating class and limiting features	Value	Playgrounds: Rating class and limiting features	Value
6937:							
Canyon	25	Very limited:		Very limited:		Very limited:	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Dusty	0.50	Dusty	0.50	Slope	1.00
						Dusty	0.50
7120:							
Sulco, moderately eroded	55	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Dusty	0.50	Dusty	0.50	Slope	0.77
						Dusty	0.50
McConaughy, moderately eroded	30	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Dusty	0.50	Dusty	0.50	Dusty	0.50
						Slope	0.48
7121:							
Sulco, moderately eroded	65	Somewhat limited:		Somewhat limited:		Very limited:	
		Dusty	0.50	Dusty	0.50	Slope	1.00
						Dusty	0.50
McConaughy, moderately eroded	25	Somewhat limited:		Somewhat limited:		Very limited:	
		Dusty	0.50	Dusty	0.50	Slope	1.00
						Dusty	0.50
7122:							
Sulco, moderately eroded	70	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
McConaughy, moderately eroded	20	Somewhat limited:		Somewhat limited:		Very limited:	
		Slope	0.63	Slope	0.63	Slope	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
7582:							
Valent	90	Not limited		Not limited		Somewhat limited:	
						Slope	0.94
7586:							
Valent	95	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
7588:							
Valent, rolling	50	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
Valent, hilly	45	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00

Table 11b.--Recreation Interpretations

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Paths and trails: Rating class and limiting features	Paths and trails: Value	Off-road motorcycle trails: Rating class and limiting features	Off-road motorcycle trails: Value	Golf fairways: Rating class and limiting features	Golf fairways: Value
1130:							
Alliance	90	Somewhat limited:		Somewhat limited:		Not limited	
		Dusty	0.50	Dusty	0.50		
1146:							
Alliance	65	Somewhat limited:		Somewhat limited:		Not limited	
		Dusty	0.50	Dusty	0.50		
Rosebud	25	Not limited		Not limited		Somewhat limited:	
						Depth to bedrock	0.42
1198:							
Altvan	45	Not limited		Not limited		Not limited	
Eckley	30	Not limited		Not limited		Somewhat limited:	
						Droughty	0.89
Satanta, sandy substratum	20	Somewhat limited:		Somewhat limited:		Not limited	
		Dusty	0.50	Dusty	0.50		
1295:							
Ashollow	65	Very limited:		Very limited:		Somewhat limited:	
		Water erosion	1.00	Water erosion	1.00	Slope	0.84
		Dusty	0.50	Dusty	0.50		
Tassel	30	Somewhat limited:		Not limited		Very limited:	
		Slope	0.50			Depth to bedrock	1.00
						Droughty	1.00
						Slope	1.00
1588:							
Blueridge	50	Very limited:		Very limited:		Very limited:	
		Too sandy	1.00	Too sandy	1.00	Too sandy	1.00
		Slope	0.18			Droughty	1.00
						Slope	1.00
						Gravel content	0.03
Altvan	35	Somewhat limited:		Somewhat limited:		Not limited	
		Dusty	0.50	Dusty	0.50		
1782:							
Broadwater, frequently flooded	90	Somewhat limited:		Somewhat limited:		Very limited:	
		Flooding	0.40	Flooding	0.40	Flooding	1.00
		Too sandy	0.32	Too sandy	0.32	Droughty	1.00
1944:							
Calamus, very rarely flooded	95	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Too sandy	0.32	Too sandy	0.32	Droughty	0.75

Table 11b.--Recreation Interpretations--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails: Rating class and limiting features	Value	Off-road motorcycle trails: Rating class and limiting features	Value	Golf fairways: Rating class and limiting features	Value
2072:							
Chappell-----------	38	Not limited		Not limited		Not limited	
Alice--------------	33	Not limited		Not limited		Not limited	
Broadwater----------	24	Somewhat limited:		Somewhat limited:		Very limited:	
		Too sandy	0.32	Too sandy	0.32	Droughty	1.00
						Flooding	0.60
2630:							
Duroc---------------	90	Not limited		Not limited		Not limited	
2638:							
Duroc---------------	90	Not limited		Not limited		Not limited	
2639:							
Duroc---------------	90	Not limited		Not limited		Not limited	
3050:							
Glenberg, rarely flooded-----------	90	Not limited		Not limited		Not limited	
3140:							
Gothenburg, occasionally flooded-----------	85	Very limited:		Very limited:		Very limited:	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Droughty	1.00
		Too sandy	0.32	Too sandy	0.32	Depth to saturated zone	1.00
						Flooding	0.60
3952:							
Jankosh-------------	85	Not limited		Not limited		Very limited:	
						Sodium content	1.00
						Salinity	1.00
						Depth to saturated zone	0.03
4028:							
Jayem---------------	90	Not limited		Not limited		Not limited	
4070:							
Johnstown-----------	35	Not limited		Not limited		Not limited	
Satanta, sandy substratum---------	31	Somewhat limited:		Somewhat limited:		Not limited	
		Dusty	0.50	Dusty	0.50		
Richfield-----------	29	Somewhat limited:		Somewhat limited:		Not limited	
		Dusty	0.50	Dusty	0.50		
4151:							
Keith---------------	90	Somewhat limited:		Somewhat limited:		Not limited	
		Dusty	0.50	Dusty	0.50		
4152:							
Keith---------------	90	Somewhat limited:		Somewhat limited:		Not limited	
		Dusty	0.50	Dusty	0.50		

Table 11b.--Recreation Interpretations--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails: Rating class and limiting features	Paths and trails: Value	Off-road motorcycle trails: Rating class and limiting features	Off-road motorcycle trails: Value	Golf fairways: Rating class and limiting features	Golf fairways: Value
4310:							
Kuma----------------	95	Not limited		Not limited		Not limited	
4311:							
Kuma----------------	90	Not limited		Not limited		Not limited	
4472:							
Las Animas,							
frequently flooded-	95	Very limited:		Very limited:		Very limited:	
		Depth to		Depth to		Flooding	1.00
		saturated zone	1.00	saturated zone	1.00	Depth to	
		Flooding	0.40	Flooding	0.40	saturated zone	1.00
4475:							
Las Animas,							
occasionally							
flooded------------	92	Not limited		Not limited		Somewhat limited:	
						Flooding	0.60
						Depth to	
						saturated zone	0.03
4592:							
Lexsworth, very							
rarely flooded-----	85	Somewhat limited:		Somewhat limited:		Not limited	
		Dusty	0.50	Dusty	0.50		
4655:							
Lodgepole, ponded---	95	Very limited:		Very limited:		Very limited:	
		Depth to		Depth to		Ponding	1.00
		saturated zone	1.00	saturated zone	1.00	Depth to	
		Ponding	1.00	Ponding	1.00	saturated zone	1.00
5212:							
Merrick, very rarely							
flooded------------	90	Not limited		Not limited		Not limited	
6132:							
Platte, occasionally							
flooded------------	90	Not limited		Not limited		Somewhat limited:	
						Flooding	0.60
						Depth to	
						saturated zone	0.19
						Droughty	0.05
6248:							
Ralton, very rarely							
flooded------------	90	Not limited		Not limited		Not limited	
6625:							
Sarben--------------	90	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Too sandy	0.12	Too sandy	0.12	Droughty	0.01
6626:							
Sarben--------------	90	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Too sandy	0.12	Too sandy	0.12	Droughty	0.01

Table 11b.--Recreation Interpretations--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails: Rating class and limiting features	Value	Off-road motorcycle trails: Rating class and limiting features	Value	Golf fairways: Rating class and limiting features	Value
6722:							
Satanta	65	Somewhat limited:		Somewhat limited:		Not limited	
		Dusty	0.50	Dusty	0.50		
Altvan	25	Not limited		Not limited		Not limited	
6725:							
Satanta, sandy substratum	45	Somewhat limited:		Somewhat limited:		Not limited	
		Dusty	0.50	Dusty	0.50		
Ascalon	45	Not limited		Not limited		Not limited	
6727:							
Satanta, sandy substratum	60	Somewhat limited:		Somewhat limited:		Not limited	
		Dusty	0.50	Dusty	0.50		
Johnstown	18	Not limited		Not limited		Not limited	
Altvan	15	Somewhat limited:		Somewhat limited:		Not limited	
		Dusty	0.50	Dusty	0.50		
6817:							
Scoville	95	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Too sandy	0.04	Too sandy	0.04	Droughty	0.61
6930:							
Sidney	85	Somewhat limited:		Somewhat limited:		Not limited	
		Dusty	0.50	Dusty	0.50		
6937:							
Sidney	65	Somewhat limited:		Somewhat limited:		Not limited	
		Dusty	0.50	Dusty	0.50		
Canyon	25	Somewhat limited:		Somewhat limited:		Very limited:	
		Dusty	0.50	Dusty	0.50	Droughty	1.00
						Depth to bedrock	1.00
7120:							
Sulco, moderately eroded	55	Somewhat limited:		Somewhat limited:		Not limited	
		Dusty	0.50	Dusty	0.50		
McConaughy, moderately eroded	30	Somewhat limited:		Somewhat limited:		Not limited	
		Dusty	0.50	Dusty	0.50		
7121:							
Sulco, moderately eroded	65	Somewhat limited:		Somewhat limited:		Not limited	
		Dusty	0.50	Dusty	0.50		
McConaughy, moderately eroded	25	Somewhat limited:		Somewhat limited:		Not limited	
		Dusty	0.50	Dusty	0.50		

Table 11b.--Recreation Interpretations--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails: Rating class and limiting features	Paths and trails: Value	Off-road motorcycle trails: Rating class and limiting features	Off-road motorcycle trails: Value	Golf fairways: Rating class and limiting features	Golf fairways: Value
7122:							
Sulco, moderately eroded	70	Very limited:		Very limited:		Very limited:	
		Water erosion	1.00	Water erosion	1.00	Slope	1.00
		Dusty	0.50	Dusty	0.50		
McConaughy, moderately eroded	20	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Dusty	0.50	Dusty	0.50	Slope	0.63
7582:							
Valent	90	Not limited		Not limited		Somewhat limited:	
						Droughty	0.89
7586:							
Valent	95	Somewhat limited:		Not limited		Very limited:	
		Slope	0.08			Slope	1.00
						Droughty	0.89
7588:							
Valent, rolling	50	Somewhat limited:		Not limited		Very limited:	
		Slope	0.08			Slope	1.00
						Droughty	0.89
Valent, hilly	45	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
						Droughty	0.89

Table 12.--Wildlife Habitat

(See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable.)

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
1130:												
Alliance	Good	Good	Good	Good	Good	Good	Very poor	Poor	Good	Good	Poor	Good
1146:												
Alliance	Good	Good	Good	Good	Good	Good	Very poor	Poor	Good	Good	Poor	Good
Rosebud	Good	Good	Fair	---	Good	Fair	Very poor	Very poor	Fair	---	Very poor	Fair
1198:												
Altvan	Fair	Good	Good	Good	Fair	Good	Very poor	Very poor	Good	Good	Very poor	Good
Eckley	Poor	Poor	Fair	---	---	Fair	Very poor	Very poor	Poor	---	Very poor	Fair
Satanta	Good	Good	Fair	Good	Good	Fair	Poor	Very poor	Good	Good	Very poor	Fair
1295:												
Ashollow	Poor	Poor	Fair	Poor	Fair	Fair	Very poor	Very poor	Fair	Good	Very poor	Fair
Tassel	Poor	Poor	Poor	Fair	Fair	Poor	Very poor	Very poor	Poor	Fair	Very poor	Poor
1588:												
Blueridge	Poor	Poor	Poor	Poor	Poor	Poor	Very poor	Very poor	Very poor	Poor	Very poor	Poor
Altvan	Poor	Fair	Fair	Fair	Fair	Fair	Very poor	Very poor	Good	Good	Very poor	Good
1782:												
Broadwater	Poor	Fair	Fair	---	---	Fair	Poor	Very poor	Fair	---	Very poor	Fair
1944:												
Calamus	Poor	Good	Fair	Fair	Fair	Fair	Poor	Poor	Fair	Fair	Poor	Fair
2072:												
Chappell	Fair	Good	Good	---	Good	Good	Very poor	Very poor	Fair	---	Very poor	Good
Alice	Fair	Good	Good	Good	Good	Fair	Poor	Very poor	Good	Good	Very poor	Fair
Broadwater	Poor	Fair	Fair	---	---	Fair	Poor	Very poor	Fair	---	Very poor	Fair
2630:												
Duroc	Good	Good	Fair	Good	Good	Fair	Poor	Very poor	Good	Good	Very poor	Fair
2638:												
Duroc	Good	Good	Fair	Good	Good	Fair	Poor	Very poor	Good	Good	Very poor	Fair

Table 12.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
2639:												
Duroc	Good	Good	Fair	Good	Good	Fair	Poor	Very poor	Good	Good	Very poor	Fair
3050:												
Glenberg	Good	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor	Good
3140:												
Gothenburg	Very poor	Very poor	Fair	Poor	Fair	Fair	Fair	Good	Poor	Poor	Fair	Fair
3952:												
Jankosh	Poor	Poor	Very poor	Very poor	Very poor	Very poor	Very poor	Fair	Poor	Very poor	Poor	Very poor
4028:												
Jayem	Fair	Good	Fair	Good	Good	Fair	Poor	Very poor	Fair	Good	Very poor	Fair
4070:												
Johnstown	Good	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Fair	Very poor	Good
Satanta	Good	Good	Fair	Good	Good	Fair	Poor	Very poor	Good	Good	Very poor	Fair
Richfield	Fair	Good	Fair	Poor	Fair	Poor	Very poor	Very poor	Fair	---	Very poor	Fair
4151:												
Keith	Good	Good	Good	Fair	Fair	Good	Very poor	Very poor	Good	Fair	Very poor	Good
4152:												
Keith	Good	Good	Good	Fair	Fair	Good	Very poor	Very poor	Good	Fair	Very poor	Good
4310:												
Kuma	Good	Good	Good	Fair	Good	Poor	Poor	Very poor	Fair	---	Very poor	Poor
4311:												
Kuma	Good	Good	Fair	Fair	Good	Poor	Poor	Very poor	Fair	---	Very poor	Poor
4472:												
Las Animas	Very poor	Poor	Fair	Poor	Poor	Fair	Good	Good	Poor	Poor	Good	Fair
4475:												
Las Animas	Very poor	Poor	Fair	Poor	Poor	Fair	Good	Good	Poor	Poor	Good	Fair
4592:												
Lexsworth	Fair	Fair	Good	Good	Good	Good	Poor	Poor	Fair	Good	Poor	Good
4655:												
Lodgepole	Poor	Fair	Fair	Poor	Poor	Poor	Good	Good	Fair	Poor	Good	Poor

Table 12.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
5212: Merrick	Good	Good	Good	Good	Good	Good	Poor	Poor	Poor	Good	Poor	Good
6132: Platte	Fair	Good	Fair	Poor	Fair	Good	Fair	Good	Fair	Poor	Good	Fair
6248: Ralton	Good	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor	Good
6625: Sarben	Fair	Good	Good	Fair	Fair	Good	Very poor	Very poor	Good	Fair	Very poor	Good
6626: Sarben	Fair	Good	Good	Fair	Fair	Good	Very poor	Very poor	Good	Fair	Very poor	Good
6722: Satanta	Fair	Good	Fair	Poor	Fair	Fair	Poor	Very poor	Fair	Good	Very poor	Fair
Altvan	Fair	Good	Good	Good	Fair	Good	Very poor	Very poor	Good	Good	Very poor	Good
6725: Satanta	Good	Good	Fair	Poor	Fair	Fair	Poor	Very poor	Good	Good	Very poor	Fair
Ascalon	Good	Good	Fair	Poor	Fair	Fair	Poor	Very poor	Good	---	Very poor	Fair
6727: Satanta	Good	Good	Fair	Poor	Fair	Fair	Poor	Very poor	Good	Good	Very poor	Fair
Johnstown	Good	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Fair	Very poor	Good
Altvan	Fair	Good	Good	Good	Fair	Good	Very poor	Very poor	Good	Good	Very poor	Good
6817: Scoville	Poor	Fair	Fair	Poor	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor	Very poor
6930: Sidney	Fair	Good	Good	Fair	Good	Good	Very poor	Very poor	Good	Good	Very poor	Good
6937: Sidney	Fair	Good	Good	Fair	Good	Good	Very poor	Very poor	Good	Good	Very poor	Good
Canyon	Poor	Poor	Fair	Poor	Poor	Poor	Very poor	Very poor	Poor	Fair	Very poor	Fair

Table 12.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
7120:												
Sulco	Fair	Good	Fair	Good	Good	Fair	Poor	Very poor	Fair	Good	Very poor	Fair
McConaughy	Fair	Good	Fair	Good	Good	Fair	Poor	Very poor	Fair	Good	Very poor	Fair
7121:												
Sulco	Fair	Good	Fair	Good	Good	Fair	Poor	Very poor	Fair	Good	Very poor	Fair
McConaughy	Fair	Good	Fair	Good	Good	Fair	Poor	Very poor	Fair	Good	Very poor	Fair
7122:												
Sulco	Fair	Good	Fair	Good	Good	Fair	Poor	Very poor	Fair	Good	Very poor	Fair
McConaughy	Fair	Good	Fair	Good	Good	Fair	Poor	Very poor	Fair	Good	Very poor	Fair
7582:												
Valent	Poor	Fair	Fair	Poor	Poor	Poor	Very poor	Very poor	Fair	Poor	Very poor	Fair
7586:												
Valent	Poor	Poor	Poor	Poor	Poor	Poor	Very poor	Very poor	Fair	Poor	Very poor	Fair
7588:												
Valent, rolling	Poor	Poor	Poor	Poor	Poor	Poor	Very poor	Very poor	Fair	Poor	Very poor	Fair
Valent, hilly	Very poor	Very poor	Poor	Poor	Poor	Poor	Very poor	Very poor	Poor	Poor	Very poor	Fair

Table 13a.--Building Site Development

(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: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
1130:							
Alliance	90	Not limited		Not limited		Not limited	
1146:							
Alliance	65	Not limited		Not limited		Not limited	
Rosebud	25	Not limited		Somewhat limited:		Not limited	
				Depth to soft bedrock	0.42		
1198:							
Altvan	45	Not limited		Not limited		Somewhat limited:	
						Slope	0.47
Eckley	30	Not limited		Not limited		Somewhat limited:	
						Slope	0.47
Satanta, sandy substratum	20	Not limited		Not limited		Somewhat limited:	
						Slope	0.47
1295:							
Ashollow	65	Somewhat limited:		Somewhat limited:		Very limited:	
		Slope	0.84	Slope	0.84	Slope	1.00
Tassel	30	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Depth to soft bedrock	1.00	Slope	1.00
		Depth to soft bedrock	1.00	Slope	1.00	Depth to soft bedrock	1.00
1588:							
Blueridge	50	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
Altvan	35	Not limited		Not limited		Very limited:	
						Slope	1.00
1782:							
Broadwater, frequently flooded	90	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
1944:							
Calamus, very rarely flooded	95	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
				Depth to saturated zone	0.35		

Table 13a.--Building Site Development--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
2072:							
Chappell	38	Not limited		Not limited		Not limited	
Alice	33	Not limited		Not limited		Not limited	
Broadwater	24	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
2630:							
Duroc	90	Not limited		Not limited		Not limited	
2638:							
Duroc	90	Not limited		Not limited		Not limited	
2639:							
Duroc	90	Not limited		Not limited		Not limited	
3050:							
Glenberg, rarely flooded	90	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
3140:							
Gothenburg, occasionally flooded	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
3952:							
Jankosh	85	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	0.08	Depth to saturated zone	1.00	Depth to saturated zone	0.08
4028:							
Jayem	90	Not limited		Not limited		Not limited	
4070:							
Johnstown	35	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Satanta, sandy substratum	31	Somewhat limited:		Not limited		Somewhat limited:	
		Shrink-swell	0.50			Shrink-swell	0.50
Richfield	29	Not limited		Not limited		Not limited	
4151:							
Keith	90	Somewhat limited:		Not limited		Somewhat limited:	
		Shrink-swell	0.50			Shrink-swell	0.50
4152:							
Keith	90	Not limited		Not limited		Somewhat limited:	
						Slope	0.03
4310:							
Kuma	95	Not limited		Not limited		Not limited	

Table 13a.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
4311:							
Kuma----------------	90	Somewhat limited:		Not limited		Somewhat limited:	
		Shrink-swell	0.50			Shrink-swell	0.50
4472:							
Las Animas, frequently flooded-	95	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
4475:							
Las Animas, occasionally flooded------------	92	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	0.08	Depth to saturated zone	1.00	Depth to saturated zone	0.08
4592:							
Lexsworth, very rarely flooded-----	85	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
4655:							
Lodgepole, ponded---	95	Very limited:		Very limited:		Very limited:	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		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
5212:							
Merrick, very rarely flooded------------	90	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
				Depth to saturated zone	0.15		
6132:							
Platte, occasionally flooded------------	90	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	0.44	Depth to saturated zone	1.00	Depth to saturated zone	0.44
6248:							
Ralton, very rarely flooded------------	90	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
				Depth to saturated zone	0.35		
6625:							
Sarben--------------	90	Not limited		Not limited		Not limited	

Table 13a.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
6626:							
Sarben	90	Not limited		Not limited		Somewhat limited:	
						Slope	0.03
6722:							
Satanta	65	Not limited		Not limited		Somewhat limited:	
						Slope	0.03
Altvan	25	Not limited		Not limited		Somewhat limited:	
						Slope	0.03
6725:							
Satanta, sandy substratum	45	Somewhat limited:		Not limited		Somewhat limited:	
		Shrink-swell	0.50			Shrink-swell	0.50
Ascalon	45	Not limited		Not limited		Not limited	
6727:							
Satanta, sandy substratum	60	Somewhat limited:		Not limited		Somewhat limited:	
		Shrink-swell	0.50			Shrink-swell	0.50
Johnstown	18	Somewhat limited:		Not limited		Somewhat limited:	
		Shrink-swell	0.50			Shrink-swell	0.50
Altvan	15	Not limited		Not limited		Not limited	
6817:							
Scoville	95	Not limited		Not limited		Not limited	
6930:							
Sidney	85	Not limited		Not limited		Somewhat limited:	
						Slope	0.03
6937:							
Sidney	65	Not limited		Not limited		Somewhat limited:	
						Slope	0.96
Canyon	25	Somewhat limited:		Very limited:		Somewhat limited:	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to soft bedrock	1.00
						Slope	0.96
7120:							
Sulco, moderately eroded	55	Not limited		Not limited		Somewhat limited:	
						Slope	0.12
McConaughy, moderately eroded	30	Not limited		Not limited		Not limited	

Table 13a.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
7121:							
Sulco, moderately eroded	65	Not limited		Not limited		Somewhat limited:	
						Slope	0.96
McConaughy, moderately eroded	25	Not limited		Not limited		Somewhat limited:	
						Slope	0.96
7122:							
Sulco, moderately eroded	70	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
McConaughy, moderately eroded	20	Somewhat limited:		Somewhat limited:		Very limited:	
		Slope	0.63	Slope	0.63	Slope	1.00
7582:							
Valent	90	Not limited		Not limited		Somewhat limited:	
						Slope	0.47
7586:							
Valent	95	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
7588:							
Valent, rolling	50	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
Valent, hilly	45	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00

Table 13b.--Building Site Development

(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: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
1130:							
Alliance------------	90	Somewhat limited:		Very limited:		Not limited	
		Frost action	0.50	Cutbanks cave	1.00		
1146:							
Alliance------------	65	Somewhat limited:		Somewhat limited:		Not limited	
		Frost action	0.50	Cutbanks cave	0.10		
Rosebud-------------	25	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Frost action	0.50	Depth to soft bedrock	0.42	Depth to bedrock	0.42
				Cutbanks cave	0.10		
1198:							
Altvan--------------	45	Somewhat limited:		Very limited:		Not limited	
		Frost action	0.50	Cutbanks cave	1.00		
Eckley--------------	30	Not limited		Very limited:		Somewhat limited:	
				Cutbanks cave	1.00	Droughty	0.89
Satanta, sandy substratum---------	20	Somewhat limited:		Very limited:		Not limited	
		Frost action	0.50	Cutbanks cave	1.00		
1295:							
Ashollow------------	65	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Slope	0.84	Slope	0.84	Slope	0.84
				Cutbanks cave	0.10		
Tassel--------------	30	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	Droughty	1.00
				Cutbanks cave	0.10	Slope	1.00
1588:							
Blueridge-----------	50	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Cutbanks cave	1.00	Too sandy	1.00
				Slope	1.00	Droughty	1.00
						Slope	1.00
						Gravel content	0.03
Altvan--------------	35	Somewhat limited:		Very limited:		Not limited	
		Frost action	0.50	Cutbanks cave	1.00		
1782:							
Broadwater, frequently flooded-	90	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Cutbanks cave	1.00	Flooding	1.00
				Flooding	0.80	Droughty	1.00

Table 13b.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
1944:							
Calamus, very rarely flooded	95	Somewhat limited:		Very limited:		Somewhat limited:	
		Flooding	0.20	Cutbanks cave	1.00	Droughty	0.75
				Depth to saturated zone	0.35		
2072:							
Chappell	38	Not limited		Very limited:		Not limited	
				Cutbanks cave	1.00		
Alice	33	Somewhat limited:		Somewhat limited:		Not limited	
		Frost action	0.50	Cutbanks cave	0.10		
Broadwater	24	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Cutbanks cave	1.00	Droughty	1.00
				Flooding	0.60	Flooding	0.60
2630:							
Duroc	90	Not limited		Somewhat limited:		Not limited	
				Cutbanks cave	0.10		
2638:							
Duroc	90	Not limited		Somewhat limited:		Not limited	
				Cutbanks cave	0.10		
2639:							
Duroc	90	Not limited		Somewhat limited:		Not limited	
				Cutbanks cave	0.10		
3050:							
Glenberg, rarely flooded	90	Somewhat limited:		Very limited:		Not limited	
		Frost action	0.50	Cutbanks cave	1.00		
		Flooding	0.40				
3140:							
Gothenburg, occasionally flooded	85	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Depth to saturated zone	1.00	Droughty	1.00
		Depth to saturated zone	1.00	Cutbanks cave	1.00	Depth to saturated zone	1.00
		Frost action	0.50	Flooding	0.60	Flooding	0.60
3952:							
Jankosh	85	Somewhat limited:		Very limited:		Very limited:	
		Frost action	0.50	Cutbanks cave	1.00	Sodium content	1.00
		Flooding	0.40	Depth to saturated zone	1.00	Salinity	1.00
		Depth to saturated zone	0.03			Depth to saturated zone	0.03
4028:							
Jayem	90	Not limited		Somewhat limited:		Not limited	
				Cutbanks cave	0.10		

Table 13b.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
4070:							
Johnstown-----------	35	Very limited:		Very limited:		Not limited	
		Low strength	1.00	Cutbanks cave	1.00		
		Shrink-swell	0.50				
		Frost action	0.50				
Satanta, sandy substratum---------	31	Very limited:		Very limited:		Not limited	
		Low strength	1.00	Cutbanks cave	1.00		
		Shrink-swell	0.50				
		Frost action	0.50				
Richfield-----------	29	Somewhat limited:		Somewhat limited:		Not limited	
		Low strength	0.22	Too clayey	0.12		
				Cutbanks cave	0.10		
4151:							
Keith---------------	90	Very limited:		Somewhat limited:		Not limited	
		Low strength	1.00	Cutbanks cave	0.10		
		Shrink-swell	0.50				
		Frost action	0.50				
4152:							
Keith---------------	90	Somewhat limited:		Somewhat limited:		Not limited	
		Frost action	0.50	Cutbanks cave	0.10		
4310:							
Kuma----------------	95	Somewhat limited:		Somewhat limited:		Not limited	
		Frost action	0.50	Cutbanks cave	0.10		
4311:							
Kuma----------------	90	Very limited:		Somewhat limited:		Not limited	
		Low strength	1.00	Cutbanks cave	0.10		
		Shrink-swell	0.50				
		Frost action	0.50				
4472:							
Las Animas, frequently flooded-	95	Very limited:		Very limited:		Very limited:	
		Frost action	1.00	Depth to saturated zone	1.00	Flooding	1.00
		Flooding	1.00	Cutbanks cave	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Flooding	0.80		
4475:							
Las Animas, occasionally flooded-----------	92	Very limited:		Very limited:		Somewhat limited:	
		Frost action	1.00	Cutbanks cave	1.00	Flooding	0.60
		Flooding	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.03
		Depth to saturated zone	0.03	Flooding	0.60		
4592:							
Lexsworth, very rarely flooded-----	85	Very limited:		Very limited:		Not limited	
		Frost action	1.00	Cutbanks cave	1.00		
		Flooding	0.20				

Table 13b.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
4655:							
Lodgepole, ponded---	95	Very limited:		Very limited:		Very limited:	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Frost action	1.00	Too clayey	0.12		
		Low strength	1.00	Cutbanks cave	0.10		
		Shrink-swell	1.00				
5212:							
Merrick, very rarely flooded------------	90	Very limited:		Somewhat limited:		Not limited	
		Low strength	1.00	Depth to saturated zone	0.15		
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
		Flooding	0.20				
6132:							
Platte, occasionally flooded------------	90	Very limited:		Very limited:		Somewhat limited:	
		Flooding	1.00	Cutbanks cave	1.00	Flooding	0.60
		Frost action	0.50	Depth to saturated zone	1.00	Depth to saturated zone	0.19
		Depth to saturated zone	0.19	Flooding	0.60	Droughty	0.05
6248:							
Ralton, very rarely flooded------------	90	Somewhat limited:		Somewhat limited:		Not limited	
		Frost action	0.50	Depth to saturated zone	0.35		
		Flooding	0.20	Cutbanks cave	0.10		
6625:							
Sarben--------------	90	Not limited		Somewhat limited:		Somewhat limited:	
				Cutbanks cave	0.10	Droughty	0.01
6626:							
Sarben--------------	90	Not limited		Somewhat limited:		Somewhat limited:	
				Cutbanks cave	0.10	Droughty	0.01
6722:							
Satanta-------------	65	Somewhat limited:		Very limited:		Not limited	
		Frost action	0.50	Cutbanks cave	1.00		
Altvan--------------	25	Somewhat limited:		Very limited:		Not limited	
		Frost action	0.50	Cutbanks cave	1.00		
6725:							
Satanta, sandy substratum---------	45	Very limited:		Very limited:		Not limited	
		Low strength	1.00	Cutbanks cave	1.00		
		Shrink-swell	0.50				
		Frost action	0.50				
Ascalon-------------	45	Somewhat limited:		Very limited:		Not limited	
		Frost action	0.50	Cutbanks cave	1.00		

Table 13b.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
6727:							
Satanta, sandy substratum---------	60	Very limited:		Very limited:		Not limited	
		Low strength	1.00	Cutbanks cave	1.00		
		Shrink-swell	0.50				
		Frost action	0.50				
Johnstown-----------	18	Very limited:		Very limited:		Not limited	
		Low strength	1.00	Cutbanks cave	1.00		
		Shrink-swell	0.50				
		Frost action	0.50				
Altvan--------------	15	Somewhat limited:		Very limited:		Not limited	
		Frost action	0.50	Cutbanks cave	1.00		
6817:							
Scoville------------	95	Not limited		Very limited:		Somewhat limited:	
				Cutbanks cave	1.00	Droughty	0.61
6930:							
Sidney--------------	85	Somewhat limited:		Somewhat limited:		Not limited	
		Frost action	0.50	Cutbanks cave	0.10		
6937:							
Sidney--------------	65	Somewhat limited:		Somewhat limited:		Not limited	
		Frost action	0.50	Cutbanks cave	0.10		
Canyon--------------	25	Somewhat limited:		Very limited:		Very limited:	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Droughty	1.00
						Depth to bedrock	1.00
				Cutbanks cave	0.10		
7120:							
Sulco, moderately eroded------------	55	Not limited		Somewhat limited:		Not limited	
				Cutbanks cave	0.10		
McConaughy, moderately eroded--	30	Somewhat limited:		Somewhat limited:		Not limited	
		Frost action	0.50	Cutbanks cave	0.10		
7121:							
Sulco, moderately eroded------------	65	Not limited		Somewhat limited:		Not limited	
				Cutbanks cave	0.10		
McConaughy, moderately eroded--	25	Somewhat limited:		Somewhat limited:		Not limited	
		Frost action	0.50	Cutbanks cave	0.10		
7122:							
Sulco, moderately eroded------------	70	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
				Cutbanks cave	0.10		
McConaughy, moderately eroded--	20	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Slope	0.63	Slope	0.63	Slope	0.63
		Frost action	0.50	Cutbanks cave	0.10		

Table 13b.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
7582:							
Valent	90	Not limited		Very limited:		Somewhat limited:	
				Cutbanks cave	1.00	Droughty	0.89
7586:							
Valent	95	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Cutbanks cave	1.00	Slope	1.00
				Slope	1.00	Droughty	0.89
7588:							
Valent, rolling	50	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Cutbanks cave	1.00	Slope	1.00
				Slope	1.00	Droughty	0.89
Valent, hilly	45	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
				Cutbanks cave	1.00	Droughty	0.89

Table 14a.--Sanitary Facilities

(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: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
1130:					
Alliance	90	Very limited:		Very limited:	
		Filtering capacity	1.00	Seepage	1.00
		Depth to bedrock	0.59	Depth to soft bedrock	0.13
		Restricted permeability	0.50		
1146:					
Alliance	65	Somewhat limited:		Somewhat limited:	
		Depth to bedrock	0.78	Seepage	0.53
		Restricted permeability	0.50	Depth to soft bedrock	0.42
				Slope	0.01
Rosebud	25	Very limited:		Very limited:	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Restricted permeability	0.46	Seepage	0.53
				Slope	0.01
1198:					
Altvan	45	Very limited:		Very limited:	
		Filtering capacity	1.00	Seepage	1.00
		Restricted permeability	0.46	Slope	0.91
Eckley	30	Very limited:		Very limited:	
		Filtering capacity	1.00	Seepage	1.00
				Slope	0.91
Satanta, sandy substratum	20	Very limited:		Very limited:	
		Filtering capacity	1.00	Seepage	1.00
		Restricted permeability	1.00	Slope	0.91
1295:					
Ashollow	65	Somewhat limited:		Very limited:	
		Slope	0.84	Slope	1.00
		Restricted permeability	0.50	Seepage	0.50
Tassel	30	Very limited:		Very limited:	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00
				Seepage	1.00

Table 14a.--Sanitary Facilities--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
1588:					
Blueridge	50	Very limited:		Very limited:	
		Filtering capacity	1.00	Seepage	1.00
		Slope	1.00	Slope	1.00
Altvan	35	Very limited:		Very limited:	
		Filtering capacity	1.00	Seepage	1.00
		Restricted permeability	0.46	Slope	1.00
1782:					
Broadwater, frequently flooded	90	Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00
		Filtering capacity	1.00	Seepage	1.00
1944:					
Calamus, very rarely flooded	95	Very limited:		Very limited:	
		Filtering capacity	1.00	Seepage	1.00
		Depth to saturated zone	0.84	Flooding	0.20
		Flooding	0.20	Depth to saturated zone	0.17
2072:					
Chappell	38	Very limited:		Very limited:	
		Filtering capacity	1.00	Seepage	1.00
Alice	33	Not limited		Very limited:	
				Seepage	1.00
Broadwater	24	Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00
		Filtering capacity	1.00	Seepage	1.00
2630:					
Duroc	90	Somewhat limited:		Somewhat limited:	
		Restricted permeability	0.50	Seepage	0.50
2638:					
Duroc	90	Somewhat limited:		Somewhat limited:	
		Restricted permeability	0.50	Seepage	0.50
2639:					
Duroc	90	Somewhat limited:		Somewhat limited:	
		Restricted permeability	0.50	Seepage	0.50

Table 14a.--Sanitary Facilities--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
3050:					
Glenberg, rarely flooded	90	Somewhat limited:		Very limited:	
		Flooding	0.40	Seepage	1.00
				Flooding	0.40
3140:					
Gothenburg, occasionally flooded	85	Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Seepage	1.00
		Filtering capacity	1.00	Depth to saturated zone	1.00
3952:					
Jankosh	85	Very limited:		Very limited:	
		Depth to saturated zone	1.00	Seepage	1.00
		Filtering capacity	1.00	Depth to saturated zone	1.00
		Restricted permeability	0.50	Flooding	0.40
		Flooding	0.40		
4028:					
Jayem	90	Not limited		Very limited:	
				Seepage	1.00
4070:					
Johnstown	35	Very limited:		Very limited:	
		Filtering capacity	1.00	Seepage	1.00
		Restricted permeability	1.00		
Satanta, sandy substratum	31	Very limited:		Very limited:	
		Filtering capacity	1.00	Seepage	1.00
		Restricted permeability	1.00		
Richfield	29	Very limited:		Very limited:	
		Filtering capacity	1.00	Seepage	1.00
		Restricted permeability	0.50		
4151:					
Keith	90	Somewhat limited:		Somewhat limited:	
		Restricted permeability	0.50	Seepage	0.53
				Slope	0.01
4152:					
Keith	90	Somewhat limited:		Somewhat limited:	
		Restricted permeability	0.50	Slope	0.50
				Seepage	0.50

Table 14a.--Sanitary Facilities--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
4310:					
Kuma	95	Somewhat limited:		Somewhat limited:	
		Restricted permeability	0.50	Seepage	0.50
4311:					
Kuma	90	Very limited:		Somewhat limited:	
		Restricted permeability	1.00	Seepage	0.50
				Slope	0.01
4472:					
Las Animas, frequently flooded	95	Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Seepage	1.00
		Filtering capacity	1.00	Depth to saturated zone	1.00
4475:					
Las Animas, occasionally flooded	92	Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Seepage	1.00
		Filtering capacity	1.00	Depth to saturated zone	1.00
4592:					
Lexsworth, very rarely flooded	85	Very limited:		Very limited:	
		Filtering capacity	1.00	Seepage	1.00
		Flooding	0.20	Flooding	0.20
4655:					
Lodgepole, ponded	95	Very limited:		Very limited:	
		Restricted permeability	1.00	Ponding	1.00
		Ponding	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Seepage	0.50
5212:					
Merrick, very rarely flooded	90	Very limited:		Somewhat limited:	
		Restricted permeability	1.00	Seepage	0.50
		Depth to saturated zone	0.40	Flooding	0.20
		Flooding	0.20		

Table 14a.--Sanitary Facilities--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
6132:					
Platte, occasionally flooded	90	Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Seepage	1.00
		Filtering capacity	1.00	Depth to saturated zone	1.00
6248:					
Ralton, very rarely flooded	90	Very limited:		Very limited:	
		Filtering capacity	1.00	Seepage	1.00
		Depth to saturated zone	0.84	Flooding	0.20
		Restricted permeability	0.50	Depth to saturated zone	0.17
		Flooding	0.20		
6625:					
Sarben	90	Not limited		Very limited:	
				Seepage	1.00
				Slope	0.01
6626:					
Sarben	90	Not limited		Very limited:	
				Seepage	1.00
				Slope	0.50
6722:					
Satanta	65	Very limited:		Very limited:	
		Filtering capacity	1.00	Seepage	1.00
		Restricted permeability	0.48	Slope	0.50
Altvan	25	Very limited:		Very limited:	
		Filtering capacity	1.00	Seepage	1.00
		Restricted permeability	0.50	Slope	0.50
6725:					
Satanta, sandy substratum	45	Very limited:		Very limited:	
		Filtering capacity	1.00	Seepage	1.00
		Restricted permeability	1.00		
Ascalon	45	Very limited:		Very limited:	
		Filtering capacity	1.00	Seepage	1.00

Table 14a.--Sanitary Facilities--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
6727:					
Satanta, sandy substratum	60	Very limited:		Very limited:	
		Filtering capacity	1.00	Seepage	1.00
		Restricted permeability	1.00	Slope	0.01
Johnstown	18	Very limited:		Very limited:	
		Filtering capacity	1.00	Seepage	1.00
		Restricted permeability	1.00	Slope	0.01
Altvan	15	Very limited:		Very limited:	
		Filtering capacity	1.00	Seepage	1.00
		Restricted permeability	0.50	Slope	0.01
6817:					
Scoville	95	Very limited:		Very limited:	
		Filtering capacity	1.00	Seepage	1.00
		Restricted permeability	0.48		
6930:					
Sidney	85	Somewhat limited:		Somewhat limited:	
		Depth to bedrock	0.78	Seepage	0.53
		Restricted permeability	0.46	Slope	0.50
				Depth to soft bedrock	0.42
6937:					
Sidney	65	Somewhat limited:		Very limited:	
		Depth to bedrock	0.78	Slope	1.00
		Restricted permeability	0.46	Seepage	0.53
				Depth to soft bedrock	0.42
Canyon	25	Very limited:		Very limited:	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
				Slope	1.00
7120:					
Sulco, moderately eroded	55	Somewhat limited:		Somewhat limited:	
		Restricted permeability	0.50	Slope	0.67
				Seepage	0.50
McConaughy, moderately eroded	30	Somewhat limited:		Somewhat limited:	
		Restricted permeability	0.50	Seepage	0.50
				Slope	0.33

Table 14a.--Sanitary Facilities--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
7121:					
Sulco, moderately eroded	65	Somewhat limited:		Very limited:	
		Restricted permeability	0.50	Slope	1.00
				Seepage	0.50
McConaughy, moderately eroded	25	Somewhat limited:		Very limited:	
		Restricted permeability	0.50	Slope	1.00
				Seepage	0.50
7122:					
Sulco, moderately eroded	70	Very limited:		Very limited:	
		Slope	1.00	Slope	1.00
		Restricted permeability	0.50	Seepage	0.50
McConaughy, moderately eroded	20	Somewhat limited:		Very limited:	
		Slope	0.63	Slope	1.00
		Restricted permeability	0.50	Seepage	0.50
7582:					
Valent	90	Very limited:		Very limited:	
		Filtering capacity	1.00	Seepage	1.00
				Slope	0.91
7586:					
Valent	95	Very limited:		Very limited:	
		Filtering capacity	1.00	Slope	1.00
		Slope	1.00	Seepage	1.00
7588:					
Valent, rolling	50	Very limited:		Very limited:	
		Filtering capacity	1.00	Slope	1.00
		Slope	1.00	Seepage	1.00
Valent, hilly	45	Very limited:		Very limited:	
		Filtering capacity	1.00	Slope	1.00
		Slope	1.00	Seepage	1.00

Table 14b.--Sanitary Facilities

(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
1130:							
Alliance	90	Very limited:		Not limited		Somewhat limited:	
		Depth to bedrock	1.00			Depth to bedrock	0.13
1146:							
Alliance	65	Very limited:		Not limited		Somewhat limited:	
		Depth to bedrock	1.00			Depth to bedrock	0.42
Rosebud	25	Very limited:		Very limited:		Very limited:	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
1198:							
Altvan	45	Very limited:		Not limited		Very limited:	
		Too sandy	1.00			Too sandy	1.00
						Seepage	1.00
Eckley	30	Very limited:		Not limited		Very limited:	
		Too sandy	1.00			Too sandy	1.00
						Seepage	1.00
Satanta, sandy substratum	20	Very limited:		Not limited		Very limited:	
		Too sandy	1.00			Too sandy	1.00
						Seepage	1.00
1295:							
Ashollow	65	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Slope	0.84	Slope	0.84	Slope	0.84
Tassel	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
						Seepage	0.50
1588:							
Blueridge	50	Very limited:		Very limited:		Very limited:	
		Too sandy	1.00	Slope	1.00	Too sandy	1.00
		Slope	1.00			Seepage	1.00
						Slope	1.00
						Gravel content	0.01
Altvan	35	Very limited:		Not limited		Very limited:	
		Too sandy	1.00			Too sandy	1.00
						Seepage	1.00
1782:							
Broadwater, frequently flooded	90	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00	Too sandy	1.00
		Too sandy	1.00			Seepage	1.00

Table 14b.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
1944:							
Calamus, very rarely flooded	95	Very limited:		Very limited:		Very limited:	
		Seepage	1.00	Seepage	1.00	Too sandy	1.00
		Too sandy	1.00	Depth to saturated zone	1.00	Seepage	1.00
		Depth to saturated zone	1.00	Flooding	0.20		
		Flooding	0.20				
2072:							
Chappell	38	Very limited:		Not limited		Very limited:	
		Too sandy	1.00			Too sandy	1.00
						Seepage	1.00
Alice	33	Not limited		Not limited		Somewhat limited:	
						Seepage	0.50
Broadwater	24	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00	Too sandy	1.00
		Too sandy	1.00			Seepage	1.00
2630:							
Duroc	90	Not limited		Not limited		Not limited	
2638:							
Duroc	90	Not limited		Not limited		Not limited	
2639:							
Duroc	90	Not limited		Not limited		Not limited	
3050:							
Glenberg, rarely flooded	90	Very limited:		Somewhat limited:		Somewhat limited:	
		Too sandy	1.00	Flooding	0.40	Seepage	0.50
		Flooding	0.40			Too sandy	0.50
3140:							
Gothenburg, occasionally flooded	85	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00	Too sandy	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	1.00
		Seepage	1.00	Seepage	1.00	Depth to saturated zone	1.00
		Too sandy	1.00				
3952:							
Jankosh	85	Very limited:		Very limited:		Very limited:	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too sandy	1.00
		Seepage	1.00	Seepage	1.00	Seepage	1.00
		Too sandy	1.00	Flooding	0.40	Sodium content	1.00
		Sodium content	1.00			Depth to saturated zone	0.68
		Flooding	0.40				
4028:							
Jayem	90	Not limited		Not limited		Somewhat limited:	
						Seepage	0.50

Table 14b.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
4070:							
Johnstown	35	Very limited:		Not limited		Somewhat limited:	
		Seepage	1.00			Too clayey	0.50
		Too clayey	0.50				
Satanta, sandy substratum	31	Not limited		Not limited		Not limited	
Richfield	29	Not limited		Not limited		Somewhat limited:	
						Seepage	0.50
4151:							
Keith	90	Not limited		Not limited		Not limited	
4152:							
Keith	90	Not limited		Not limited		Not limited	
4310:							
Kuma	95	Not limited		Not limited		Not limited	
4311:							
Kuma	90	Not limited		Not limited		Not limited	
4472:							
Las Animas, frequently flooded	95	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	Depth to saturated zone	1.00
		Seepage	1.00	Seepage	1.00	Too sandy	0.50
		Too sandy	1.00				
4475:							
Las Animas, occasionally flooded	92	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	Depth to saturated zone	0.68
		Seepage	1.00	Seepage	1.00	Too sandy	0.50
		Too sandy	1.00				
4592:							
Lexsworth, very rarely flooded	85	Very limited:		Somewhat limited:		Very limited:	
		Too sandy	1.00	Flooding	0.20	Too sandy	1.00
		Flooding	0.20			Seepage	1.00
4655:							
Lodgepole, ponded	95	Very limited:		Very limited:		Very limited:	
		Depth to saturated zone	1.00	Ponding	1.00	Ponding	1.00
		Ponding	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00

Table 14b.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
5212:							
Merrick, very rarely flooded	90	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	Flooding	0.20		
		Flooding	0.20				
6132:							
Platte, occasionally flooded	90	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00	Too sandy	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	1.00
		Seepage	1.00	Seepage	1.00	Depth to saturated zone	0.86
		Too sandy	1.00				
6248:							
Ralton, very rarely flooded	90	Very limited:		Very limited:		Somewhat limited:	
		Seepage	1.00	Depth to saturated zone	1.00	Seepage	0.50
		Depth to saturated zone	1.00	Flooding	0.20		
		Flooding	0.20				
6625:							
Sarben	90	Not limited		Not limited		Somewhat limited:	
						Seepage	0.50
6626:							
Sarben	90	Not limited		Not limited		Somewhat limited:	
						Seepage	0.50
6722:							
Satanta	65	Not limited		Not limited		Not limited	
Altvan	25	Very limited:		Not limited		Very limited:	
		Too sandy	1.00			Too sandy	1.00
						Seepage	1.00
6725:							
Satanta, sandy substratum	45	Not limited		Not limited		Not limited	
Ascalon	45	Very limited:		Not limited		Very limited:	
		Too sandy	1.00			Too sandy	1.00
						Seepage	1.00
6727:							
Satanta, sandy substratum	60	Not limited		Not limited		Not limited	
Johnstown	18	Very limited:		Not limited		Somewhat limited:	
		Seepage	1.00			Too clayey	0.50
		Too clayey	0.50				
Altvan	15	Very limited:		Not limited		Very limited:	
		Too sandy	1.00			Too sandy	1.00
						Seepage	1.00

Table 14b.--Sanitary Facilities--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
6817:							
Scoville-----------	95	Very limited:		Not limited		Very limited:	
		Too sandy	1.00			Too sandy	1.00
						Seepage	1.00
6930:							
Sidney-------------	85	Very limited:		Not limited		Somewhat limited:	
		Depth to bedrock	1.00			Depth to bedrock	0.42
6937:							
Sidney-------------	65	Very limited:		Not limited		Somewhat limited:	
		Depth to bedrock	1.00			Depth to bedrock	0.42
Canyon-------------	25	Very limited:		Not limited		Very limited:	
		Depth to bedrock	1.00			Depth to bedrock	1.00
7120:							
Sulco, moderately eroded------------	55	Not limited		Not limited		Not limited	
McConaughy, moderately eroded--	30	Not limited		Not limited		Not limited	
7121:							
Sulco, moderately eroded------------	65	Not limited		Not limited		Not limited	
McConaughy, moderately eroded--	25	Not limited		Not limited		Not limited	
7122:							
Sulco, moderately eroded------------	70	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
McConaughy, moderately eroded--	20	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Slope	0.63	Slope	0.63	Slope	0.63
7582:							
Valent-------------	90	Very limited:		Not limited		Very limited:	
		Too sandy	1.00			Too sandy	1.00
						Seepage	1.00
7586:							
Valent-------------	95	Very limited:		Very limited:		Very limited:	
		Too sandy	1.00	Slope	1.00	Too sandy	1.00
		Slope	1.00			Seepage	1.00
						Slope	1.00
7588:							
Valent, rolling-----	50	Very limited:		Very limited:		Very limited:	
		Too sandy	1.00	Slope	1.00	Too sandy	1.00
		Slope	1.00			Seepage	1.00
						Slope	1.00

Table 14b.--Sanitary Facilities--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
7588:							
Valent, hilly-------	45	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Too sandy	1.00			Too sandy	1.00
						Seepage	1.00

Table 15a.--Agricultural Waste 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	Application of manure and food-processing waste		Application of sewage sludge		Disposal of wastewater by irrigation	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1130:							
Alliance	90	Very limited:		Very limited:		Very limited:	
		Filtering capacity	1.00	Filtering capacity	1.00	Filtering capacity	1.00
		Restricted permeability	0.30	Restricted permeability	0.22	Restricted permeability	0.22
1146:							
Alliance	65	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Restricted permeability	0.30	Restricted permeability	0.22	Restricted permeability	0.22
Rosebud	25	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Depth to bedrock	0.42	Depth to bedrock	0.42	Depth to bedrock	0.42
		Restricted permeability	0.30	Restricted permeability	0.22	Restricted permeability	0.22
		Droughty	0.08	Droughty	0.08	Droughty	0.08
1198:							
Altvan	45	Very limited:		Very limited:		Very limited:	
		Filtering capacity	1.00	Filtering capacity	1.00	Filtering capacity	1.00
		Restricted permeability	0.30	Restricted permeability	0.22	Too steep for surface application	0.66
						Restricted permeability	0.22
Eckley	30	Very limited:		Very limited:		Very limited:	
		Filtering capacity	1.00	Filtering capacity	1.00	Filtering capacity	1.00
		Droughty	0.96	Droughty	0.96	Droughty	0.96
		Restricted permeability	0.41	Restricted permeability	0.31	Too steep for surface application	0.66
						Restricted permeability	0.31
Satanta, sandy substratum	20	Very limited:		Very limited:		Very limited:	
		Filtering capacity	1.00	Filtering capacity	1.00	Filtering capacity	1.00
		Restricted permeability	0.41	Restricted permeability	0.31	Too steep for surface application	0.66
						Restricted permeability	0.31

Table 15a.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste: Rating class and limiting features	Value	Application of sewage sludge: Rating class and limiting features	Value	Disposal of wastewater by irrigation: Rating class and limiting features	Value
1295:							
Ashollow	65	Somewhat limited:		Somewhat limited:		Very limited:	
		Slope	0.84	Slope	0.84	Too steep for surface application	1.00
						Too steep for sprinkler application	0.89
Tassel	30	Very limited:		Very limited:		Very limited:	
		Droughty	1.00	Droughty	1.00	Droughty	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Too steep for surface application	1.00
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Runoff	0.40	Filtering capacity	0.01	Too steep for sprinkler application	1.00
		Filtering capacity	0.01			Filtering capacity	0.01
1588:							
Blueridge	50	Very limited:		Very limited:		Very limited:	
		Filtering capacity	1.00	Droughty	1.00	Droughty	1.00
		Low adsorption	1.00	Filtering capacity	1.00	Filtering capacity	1.00
		Droughty	1.00	Slope	1.00	Low adsorption	1.00
		Slope	1.00			Too steep for surface application	1.00
		Leaching	0.45			Too steep for sprinkler application	1.00
Altvan	35	Very limited:		Very limited:		Very limited:	
		Filtering capacity	1.00	Filtering capacity	1.00	Filtering capacity	1.00
		Restricted permeability	0.30	Restricted permeability	0.22	Too steep for surface application	1.00
						Restricted permeability	0.22
						Too steep for sprinkler application	0.10
1782:							
Broadwater, frequently flooded	90	Very limited:		Very limited:		Very limited:	
		Filtering capacity	1.00	Filtering capacity	1.00	Filtering capacity	1.00
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Droughty	1.00	Droughty	1.00	Droughty	1.00
		Low adsorption	0.93			Low adsorption	0.93
		Leaching	0.45				

Table 15a.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste: Rating class and limiting features	Value	Application of sewage sludge: Rating class and limiting features	Value	Disposal of wastewater by irrigation: Rating class and limiting features	Value
1944:							
Calamus, very rarely flooded	95	Very limited:		Very limited:		Very limited:	
		Filtering capacity	1.00	Filtering capacity	1.00	Filtering capacity	1.00
		Droughty	0.97	Droughty	0.97	Droughty	0.97
		Leaching	0.45	Flooding	0.20		
		Flooding	0.20				
2072:							
Chappell	38	Very limited:		Very limited:		Very limited:	
		Filtering capacity	1.00	Filtering capacity	1.00	Filtering capacity	1.00
		Leaching	0.45	Droughty	0.08	Droughty	0.08
		Droughty	0.08				
Alice	33	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Filtering capacity	0.01	Filtering capacity	0.01	Filtering capacity	0.01
Broadwater	24	Very limited:		Very limited:		Very limited:	
		Filtering capacity	1.00	Filtering capacity	1.00	Filtering capacity	1.00
		Flooding	1.00	Flooding	1.00	Droughty	1.00
		Droughty	1.00	Droughty	1.00	Low adsorption	0.93
		Low adsorption	0.93			Flooding	0.60
		Leaching	0.45				
2630:							
Duroc	90	Not limited		Not limited		Not limited	
2638:							
Duroc	90	Not limited		Not limited		Not limited	
2639:							
Duroc	90	Not limited		Not limited		Not limited	
3050:							
Glenberg, rarely flooded	90	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Flooding	0.40	Flooding	0.40	Filtering capacity	0.01
		Filtering capacity	0.01	Filtering capacity	0.01		
3140:							
Gothenburg, occasionally flooded	85	Very limited:		Very limited:		Very limited:	
		Filtering capacity	1.00	Filtering capacity	1.00	Filtering capacity	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Flooding	1.00	Flooding	1.00	Low adsorption	1.00
		Low adsorption	1.00	Droughty	1.00	Droughty	1.00
		Droughty	1.00	Low adsorption	0.08	Flooding	0.60

Table 15a.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste: Rating class and limiting features	Value	Application of sewage sludge: Rating class and limiting features	Value	Disposal of wastewater by irrigation: Rating class and limiting features	Value
3952:							
Jankosh	85	Very limited:		Very limited:		Very limited:	
		Filtering capacity	1.00	Filtering capacity	1.00	Filtering capacity	1.00
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Depth to saturated zone	0.95	Salinity	1.00	Salinity	1.00
		Salinity	0.50	Depth to saturated zone	0.95	Depth to saturated zone	0.95
		Flooding	0.40	Flooding	0.40	Restricted permeability	0.22
4028:							
Jayem	90	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Filtering capacity	0.01	Filtering capacity	0.01	Filtering capacity	0.01
4070:							
Johnstown	35	Very limited:		Very limited:		Very limited:	
		Filtering capacity	1.00	Filtering capacity	1.00	Filtering capacity	1.00
		Restricted permeability	0.41	Restricted permeability	0.31	Restricted permeability	0.31
Satanta, sandy substratum	31	Very limited:		Very limited:		Very limited:	
		Filtering capacity	1.00	Filtering capacity	1.00	Filtering capacity	1.00
		Restricted permeability	0.41	Restricted permeability	0.31	Restricted permeability	0.31
Richfield	29	Very limited:		Very limited:		Very limited:	
		Restricted permeability	1.00	Restricted permeability	1.00	Restricted permeability	1.00
		Filtering capacity	0.01	Filtering capacity	0.01	Filtering capacity	0.01
4151:							
Keith	90	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Restricted permeability	0.41	Restricted permeability	0.31	Restricted permeability	0.31
4152:							
Keith	90	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Restricted permeability	0.41	Restricted permeability	0.31	Restricted permeability	0.31
						Too steep for surface application	0.17
4310:							
Kuma	95	Not limited		Not limited		Not limited	
4311:							
Kuma	90	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Restricted permeability	0.41	Restricted permeability	0.31	Restricted permeability	0.31

Table 15a.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste: Rating class and limiting features	Value	Application of sewage sludge: Rating class and limiting features	Value	Disposal of wastewater by irrigation: Rating class and limiting features	Value
4472:							
Las Animas, frequently flooded	95	Very limited:		Very limited:		Very limited:	
		Filtering capacity	1.00	Filtering capacity	1.00	Filtering capacity	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Runoff	0.40				
4475:							
Las Animas, occasionally flooded	92	Very limited:		Very limited:		Very limited:	
		Filtering capacity	1.00	Filtering capacity	1.00	Filtering capacity	1.00
		Flooding	1.00	Flooding	1.00	Depth to saturated zone	0.95
		Depth to saturated zone	0.95	Depth to saturated zone	0.95	Flooding	0.60
		Runoff	0.40				
4592:							
Lexsworth, very rarely flooded	85	Very limited:		Very limited:		Very limited:	
		Filtering capacity	1.00	Filtering capacity	1.00	Filtering capacity	1.00
		Restricted permeability	0.41	Restricted permeability	0.31	Restricted permeability	0.31
		Flooding	0.20	Flooding	0.20	Sodium content	0.02
		Sodium content	0.02	Sodium content	0.02	Droughty	0.01
		Salinity	0.01	Droughty	0.01		
4655:							
Lodgepole, ponded	95	Very limited:		Very limited:		Very limited:	
		Restricted permeability	1.00	Restricted permeability	1.00	Restricted permeability	1.00
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Runoff	0.40				
5212:							
Merrick, very rarely flooded	90	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Restricted permeability	0.41	Restricted permeability	0.31	Restricted permeability	0.31
		Flooding	0.20	Flooding	0.20		
6132:							
Platte, occasionally flooded	90	Very limited:		Very limited:		Very limited:	
		Filtering capacity	1.00	Filtering capacity	1.00	Filtering capacity	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	Droughty	0.61
		Droughty	0.61	Droughty	0.61	Flooding	0.60

Table 15a.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste: Rating class and limiting features	Value	Application of sewage sludge: Rating class and limiting features	Value	Disposal of wastewater by irrigation: Rating class and limiting features	Value
6248:							
Ralton, very rarely flooded	90	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Flooding	0.20	Flooding	0.20	Filtering capacity	0.01
		Filtering capacity	0.01	Filtering capacity	0.01		
6625:							
Sarben	90	Very limited:		Very limited:		Very limited:	
		Filtering capacity	1.00	Filtering capacity	1.00	Filtering capacity	1.00
		Droughty	0.01	Droughty	0.01	Droughty	0.01
6626:							
Sarben	90	Very limited:		Very limited:		Very limited:	
		Filtering capacity	1.00	Filtering capacity	1.00	Filtering capacity	1.00
		Droughty	0.01	Droughty	0.01	Too steep for surface application	0.17
						Droughty	0.01
6722:							
Satanta	65	Very limited:		Very limited:		Very limited:	
		Filtering capacity	1.00	Filtering capacity	1.00	Filtering capacity	1.00
		Restricted permeability	0.41	Restricted permeability	0.31	Restricted permeability	0.31
						Too steep for surface application	0.17
Altvan	25	Very limited:		Very limited:		Very limited:	
		Filtering capacity	1.00	Filtering capacity	1.00	Filtering capacity	1.00
		Restricted permeability	0.30	Restricted permeability	0.22	Restricted permeability	0.22
						Too steep for surface application	0.17
6725:							
Satanta, sandy substratum	45	Very limited:		Very limited:		Very limited:	
		Filtering capacity	1.00	Filtering capacity	1.00	Filtering capacity	1.00
		Restricted permeability	0.41	Restricted permeability	0.31	Restricted permeability	0.31
Ascalon	45	Very limited:		Very limited:		Very limited:	
		Filtering capacity	1.00	Filtering capacity	1.00	Filtering capacity	1.00
		Restricted permeability	0.41	Restricted permeability	0.31	Restricted permeability	0.31

Table 15a.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste: Rating class and limiting features	Value	Application of sewage sludge: Rating class and limiting features	Value	Disposal of wastewater by irrigation: Rating class and limiting features	Value
6727:							
Satanta, sandy substratum	60	Very limited:		Very limited:		Very limited:	
		Filtering capacity	1.00	Filtering capacity	1.00	Filtering capacity	1.00
		Restricted permeability	0.41	Restricted permeability	0.31	Restricted permeability	0.31
Johnstown	18	Very limited:		Very limited:		Very limited:	
		Filtering capacity	1.00	Filtering capacity	1.00	Filtering capacity	1.00
		Restricted permeability	0.41	Restricted permeability	0.31	Restricted permeability	0.31
Altvan	15	Very limited:		Very limited:		Very limited:	
		Filtering capacity	1.00	Filtering capacity	1.00	Filtering capacity	1.00
		Restricted permeability	0.30	Restricted permeability	0.22	Restricted permeability	0.22
6817:							
Scoville	95	Very limited:		Very limited:		Very limited:	
		Filtering capacity	1.00	Filtering capacity	1.00	Filtering capacity	1.00
		Depth to dense layer	1.00	Droughty	0.22	Droughty	0.22
		Leaching	0.45				
		Droughty	0.22				
6930:							
Sidney	85	Not limited		Not limited		Somewhat limited:	
						Too steep for surface application	0.17
6937:							
Sidney	65	Not limited		Not limited		Somewhat limited:	
						Too steep for surface application	0.97
						Too steep for sprinkler application	0.05
Canyon	25	Very limited:		Very limited:		Very limited:	
		Droughty	1.00	Droughty	1.00	Droughty	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Runoff	0.40			Too steep for surface application	0.97
		Low adsorption	0.14			Low adsorption	0.14
						Too steep for sprinkler application	0.05

Table 15a.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste: Rating class and limiting features	Value	Application of sewage sludge: Rating class and limiting features	Value	Disposal of wastewater by irrigation: Rating class and limiting features	Value
7120:							
Sulco, moderately eroded	55	Not limited		Not limited		Somewhat limited:	
						Too steep for surface application	0.31
McConaughy, moderately eroded	30	Not limited		Not limited		Somewhat limited:	
						Too steep for surface application	0.08
7121:							
Sulco, moderately eroded	65	Not limited		Not limited		Somewhat limited:	
						Too steep for surface application	0.97
						Too steep for sprinkler application	0.05
McConaughy, moderately eroded	25	Not limited		Not limited		Somewhat limited:	
						Too steep for surface application	0.08
						Too steep for sprinkler application	0.05
7122:							
Sulco, moderately eroded	70	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Too steep for surface application	1.00
						Too steep for sprinkler application	1.00
McConaughy, moderately eroded	20	Somewhat limited:		Somewhat limited:		Very limited:	
		Slope	0.63	Slope	0.63	Too steep for surface application	1.00
						Too steep for sprinkler application	0.77
7582:							
Valent	90	Very limited:		Very limited:		Very limited:	
		Filtering capacity	1.00	Filtering capacity	1.00	Filtering capacity	1.00
		Low adsorption	1.00	Droughty	0.88	Low adsorption	1.00
		Depth to dense layer	1.00	Low adsorption	0.50	Droughty	0.88
		Droughty	0.88			Too steep for surface application	0.66
		Leaching	0.45				

Table 15a.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste		Application of sewage sludge		Disposal of wastewater by irrigation	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
7586:							
Valent--------------	95	Very limited:		Very limited:		Very limited:	
		Filtering		Filtering	1.00	Filtering	
		capacity	1.00	capacity		capacity	1.00
		Low adsorption	1.00	Slope	1.00	Low adsorption	1.00
		Slope	1.00	Droughty	0.88	Too steep for	
		Depth to dense		Low adsorption	0.50	surface	
		layer	1.00			application	1.00
		Droughty	0.88			Too steep for	
						sprinkler	
						application	1.00
						Droughty	0.88
7588:							
Valent, rolling-----	50	Very limited:		Very limited:		Very limited:	
		Filtering		Filtering		Filtering	
		capacity	1.00	capacity	1.00	capacity	1.00
		Low adsorption	1.00	Slope	1.00	Low adsorption	1.00
		Slope	1.00	Droughty	0.88	Too steep for	
		Depth to dense		Low adsorption	0.50	surface	
		layer	1.00			application	1.00
		Droughty	0.88			Too steep for	
						sprinkler	
						application	1.00
						Droughty	0.88
Valent, hilly-------	45	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Filtering		Filtering	
		Filtering		capacity	1.00	capacity	1.00
		capacity	1.00	Slope	1.00	Low adsorption	1.00
		Low adsorption	1.00	Droughty	0.88	Too steep for	
		Depth to dense		Low adsorption	0.50	surface	
		layer	1.00			application	1.00
		Droughty	0.88			Too steep for	
			1.00			sprinkler	
						application	1.00
						Droughty	0.88

Table 15b.--Agricultural Waste 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	Overland flow of wastewater: Rating class and limiting features	Value	Rapid infiltration of wastewater: Rating class and limiting features	Value	Slow rate treatment of wastewater: Rating class and limiting features	Value
1130:							
Alliance	90	Very limited:		Very limited:		Very limited:	
		Seepage	1.00	Restricted permeability	1.00	Filtering capacity	1.00
		Too level	0.50	Depth to bedrock	1.00	Restricted permeability	0.15
		Depth to bedrock	0.13			Depth to bedrock	0.13
1146:							
Alliance	65	Very limited:		Very limited:		Somewhat limited:	
		Seepage	1.00	Restricted permeability	1.00	Depth to bedrock	0.42
		Depth to bedrock	0.42	Depth to bedrock	1.00	Restricted permeability	0.15
Rosebud	25	Very limited:		Very limited:		Very limited:	
		Seepage	1.00	Restricted permeability	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Restricted permeability	0.15
1198:							
Altvan	45	Very limited:		Very limited:		Very limited:	
		Seepage	1.00	Restricted permeability	1.00	Filtering capacity	1.00
				Slope	0.47	Too steep for surface application	0.66
						Restricted permeability	0.15
Eckley	30	Very limited:		Very limited:		Very limited:	
		Seepage	1.00	Restricted permeability	1.00	Filtering capacity	1.00
				Slope	0.47	Too steep for surface application	0.66
						Restricted permeability	0.21
Satanta, sandy substratum	20	Very limited:		Very limited:		Very limited:	
		Seepage	1.00	Restricted permeability	1.00	Filtering capacity	1.00
				Slope	0.47	Too steep for surface application	0.66
						Restricted permeability	0.21

Table 15b.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Overland flow of wastewater: Rating class and limiting features	Value	Rapid infiltration of wastewater: Rating class and limiting features	Value	Slow rate treatment of wastewater: Rating class and limiting features	Value
1295:							
Ashollow	65	Very limited:		Very limited:		Very limited:	
		Seepage	1.00	Slope	1.00	Too steep for surface application	1.00
		Too steep for surface application	1.00	Restricted permeability	1.00	Too steep for sprinkler application	1.00
Tassel	30	Very limited:		Very limited:		Very limited:	
		Seepage	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Too steep for surface application	1.00
		Too steep for surface application	1.00	Restricted permeability	0.32	Too steep for sprinkler application	1.00
						Filtering capacity	0.01
1588:							
Blueridge	50	Very limited:		Very limited:		Very limited:	
		Seepage	1.00	Slope	1.00	Filtering capacity	1.00
		Low adsorption	1.00			Low adsorption	1.00
		Too steep for surface application	1.00			Too steep for surface application	1.00
						Too steep for sprinkler application	1.00
Altvan	35	Very limited:		Very limited:		Very limited:	
		Seepage	1.00	Restricted permeability	1.00	Filtering capacity	1.00
		Too steep for surface application	0.21	Slope	1.00	Too steep for surface application	1.00
						Too steep for sprinkler application	0.21
						Restricted permeability	0.15
1782:							
Broadwater, frequently flooded	90	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00	Filtering capacity	1.00
		Seepage	1.00			Flooding	1.00
		Low adsorption	0.93			Low adsorption	0.93
1944:							
Calamus, very rarely flooded	95	Very limited:		Very limited:		Very limited:	
		Seepage	1.00	Depth to saturated zone	1.00	Filtering capacity	1.00
		Flooding	0.20				

Table 15b.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Overland flow of wastewater: Rating class and limiting features	Value	Rapid infiltration of wastewater: Rating class and limiting features	Value	Slow rate treatment of wastewater: Rating class and limiting features	Value
2072:							
Chappell	38	Very limited:		Somewhat limited:		Very limited:	
		Seepage	1.00	Restricted permeability	0.32	Filtering capacity	1.00
Alice	33	Very limited:		Somewhat limited:		Somewhat limited:	
		Seepage	1.00	Restricted permeability	0.32	Filtering capacity	0.01
Broadwater	24	Very limited:		Somewhat limited:		Very limited:	
		Flooding	1.00	Flooding	0.60	Filtering capacity	1.00
		Seepage	1.00			Low adsorption	0.93
		Low adsorption	0.93			Flooding	0.60
2630:							
Duroc	90	Very limited:		Very limited:		Not limited	
		Seepage	1.00	Restricted permeability	1.00		
		Too level	0.50				
2638:							
Duroc	90	Very limited:		Very limited:		Not limited	
		Seepage	1.00	Restricted permeability	1.00		
		Too level	0.50				
2639:							
Duroc	90	Very limited:		Very limited:		Not limited	
		Seepage	1.00	Restricted permeability	1.00		
3050:							
Glenberg, rarely flooded	90	Very limited:		Somewhat limited:		Somewhat limited:	
		Seepage	1.00	Restricted permeability	0.32	Filtering capacity	0.01
		Flooding	0.40				
3140:							
Gothenburg, occasionally flooded	85	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Depth to saturated zone	1.00	Filtering capacity	1.00
		Seepage	1.00	Flooding	0.60	Depth to saturated zone	1.00
		Depth to saturated zone	1.00			Low adsorption	1.00
		Low adsorption	1.00			Flooding	0.60
3952:							
Jankosh	85	Very limited:		Very limited:		Very limited:	
		Seepage	1.00	Restricted permeability	1.00	Filtering capacity	1.00
		Sodium content	1.00	Depth to saturated zone	1.00	Sodium content	1.00
		Depth to saturated zone	0.95			Salinity	1.00
		Too level	0.50			Depth to saturated zone	0.95
		Flooding	0.40			Restricted permeability	0.15

Table 15b.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Overland flow of wastewater: Rating class and limiting features	Value	Rapid infiltration of wastewater: Rating class and limiting features	Value	Slow rate treatment of wastewater: Rating class and limiting features	Value
4028:							
Jayem	90	Very limited:		Somewhat limited:		Somewhat limited:	
		Seepage	1.00	Restricted permeability	0.32	Filtering capacity	0.01
4070:							
Johnstown	35	Very limited:		Very limited:		Very limited:	
		Seepage	1.00	Restricted permeability	1.00	Filtering capacity	1.00
		Too level	0.50			Restricted permeability	0.21
Satanta, sandy substratum	31	Very limited:		Very limited:		Very limited:	
		Seepage	1.00	Restricted permeability	1.00	Filtering capacity	1.00
		Too level	0.50			Restricted permeability	0.21
Richfield	29	Very limited:		Very limited:		Very limited:	
		Seepage	1.00	Restricted permeability	1.00	Restricted permeability	1.00
		Too level	0.50			Filtering capacity	0.01
4151:							
Keith	90	Very limited:		Very limited:		Somewhat limited:	
		Seepage	1.00	Restricted permeability	1.00	Restricted permeability	0.21
4152:							
Keith	90	Very limited:		Very limited:		Somewhat limited:	
		Seepage	1.00	Restricted permeability	1.00	Restricted permeability	0.21
				Slope	0.03	Too steep for surface application	0.17
4310:							
Kuma	95	Very limited:		Very limited:		Not limited	
		Seepage	1.00	Restricted permeability	1.00		
		Too level	0.50				
4311:							
Kuma	90	Very limited:		Very limited:		Somewhat limited:	
		Seepage	1.00	Restricted permeability	1.00	Restricted permeability	0.21
4472:							
Las Animas, frequently flooded	95	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00	Filtering capacity	1.00
		Seepage	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Restricted permeability	1.00	Flooding	1.00
		Too level	0.50				

Table 15b.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Overland flow of wastewater		Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
4475:							
Las Animas, occasionally flooded-----------	92	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Depth to saturated zone	1.00	Filtering capacity	1.00
		Seepage	1.00	Restricted permeability	1.00	Depth to saturated zone	0.95
		Depth to saturated zone	0.95	Flooding	0.60	Flooding	0.60
4592:							
Lexsworth, very rarely flooded-----	85	Very limited:		Very limited:		Very limited:	
		Seepage	1.00	Restricted permeability	1.00	Filtering capacity	1.00
		Too level	0.50			Restricted permeability	0.21
		Flooding	0.20			Sodium content	0.02
		Sodium content	0.02				
4655:							
Lodgepole, ponded---	95	Very limited:		Very limited:		Very limited:	
		Seepage	1.00	Ponding	1.00	Ponding	1.00
		Ponding	1.00	Restricted permeability	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Restricted permeability	1.00
		Too level	0.50				
5212:							
Merrick, very rarely flooded-----------	90	Somewhat limited:		Very limited:		Somewhat limited:	
		Seepage	0.69	Restricted permeability	1.00	Restricted permeability	0.21
		Too level	0.50	Depth to saturated zone	1.00		
		Flooding	0.20				
6132:							
Platte, occasionally flooded-----------	90	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Depth to saturated zone	1.00	Filtering capacity	1.00
		Seepage	1.00	Restricted permeability	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Flooding	0.60	Flooding	0.60
		Too level	0.50				
6248:							
Ralton, very rarely flooded-----------	90	Very limited:		Very limited:		Somewhat limited:	
		Seepage	1.00	Restricted permeability	1.00	Filtering capacity	0.01
		Too level	0.50	Depth to saturated zone	1.00		
		Flooding	0.20				
6625:							
Sarben--------------	90	Very limited:		Somewhat limited:		Very limited:	
		Seepage	1.00	Restricted permeability	0.32	Filtering capacity	1.00

Table 15b.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Overland flow of wastewater: Rating class and limiting features	Value	Rapid infiltration of wastewater: Rating class and limiting features	Value	Slow rate treatment of wastewater: Rating class and limiting features	Value
6626:							
Sarben	90	Very limited:		Somewhat limited:		Very limited:	
		Seepage	1.00	Restricted permeability	0.32	Filtering capacity	1.00
				Slope	0.03	Too steep for surface application	0.17
6722:							
Satanta	65	Very limited:		Very limited:		Very limited:	
		Seepage	1.00	Restricted permeability	1.00	Filtering capacity	1.00
				Slope	0.03	Restricted permeability	0.21
						Too steep for surface application	0.17
Altvan	25	Very limited:		Very limited:		Very limited:	
		Seepage	1.00	Restricted permeability	1.00	Filtering capacity	1.00
				Slope	0.03	Too steep for surface application	0.17
						Restricted permeability	0.15
6725:							
Satanta, sandy substratum	45	Very limited:		Very limited:		Very limited:	
		Seepage	1.00	Restricted permeability	1.00	Filtering capacity	1.00
						Restricted permeability	0.21
Ascalon	45	Very limited:		Very limited:		Very limited:	
		Seepage	1.00	Restricted permeability	1.00	Filtering capacity	1.00
						Restricted permeability	0.21
6727:							
Satanta, sandy substratum	60	Very limited:		Very limited:		Very limited:	
		Seepage	1.00	Restricted permeability	1.00	Filtering capacity	1.00
						Restricted permeability	0.21
Johnstown	18	Very limited:		Very limited:		Very limited:	
		Seepage	1.00	Restricted permeability	1.00	Filtering capacity	1.00
						Restricted permeability	0.21
Altvan	15	Very limited:		Very limited:		Very limited:	
		Seepage	1.00	Restricted permeability	1.00	Filtering capacity	1.00
						Restricted permeability	0.15

Table 15b.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Overland flow of wastewater		Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
6817:							
Scoville------------	95	Very limited:		Very limited:		Very limited:	
		Seepage	1.00	Restricted permeability	1.00	Filtering capacity	1.00
6930:							
Sidney--------------	85	Very limited:		Very limited:		Somewhat limited:	
		Seepage	1.00	Depth to bedrock	1.00	Depth to bedrock	0.42
		Depth to bedrock	0.42	Restricted permeability	1.00	Too steep for surface application	0.17
				Slope	0.03		
6937:							
Sidney--------------	65	Very limited:		Very limited:		Somewhat limited:	
		Seepage	1.00	Depth to bedrock	1.00	Too steep for surface application	0.97
		Depth to bedrock	0.42	Restricted permeability	1.00	Depth to bedrock	0.42
		Too steep for surface application	0.12	Slope	0.96	Too steep for sprinkler application	0.12
Canyon--------------	25	Very limited:		Very limited:		Very limited:	
		Seepage	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Restricted permeability	1.00	Too steep for surface application	0.97
		Low adsorption	0.14	Slope	0.96	Low adsorption	0.14
		Too steep for surface application	0.12			Too steep for sprinkler application	0.12
7120:							
Sulco, moderately eroded-------------	55	Very limited:		Very limited:		Somewhat limited:	
		Seepage	1.00	Restricted permeability	1.00	Too steep for surface application	0.31
				Slope	0.12		
McConaughy, moderately eroded--	30	Very limited:		Very limited:		Somewhat limited:	
		Seepage	1.00	Restricted permeability	1.00	Too steep for surface application	0.08
7121:							
Sulco, moderately eroded-------------	65	Very limited:		Very limited:		Somewhat limited:	
		Seepage	1.00	Restricted permeability	1.00	Too steep for surface application	0.97
		Too steep for surface application	0.12	Slope	0.96	Too steep for sprinkler application	0.12

Table 15b.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Overland flow of wastewater: Rating class and limiting features	Value	Rapid infiltration of wastewater: Rating class and limiting features	Value	Slow rate treatment of wastewater: Rating class and limiting features	Value
7121:							
McConaughy, moderately eroded	25	Very limited:		Very limited:		Somewhat limited:	
		Seepage	1.00	Restricted permeability	1.00	Too steep for surface application	0.97
		Too steep for surface application	0.12	Slope	0.96	Too steep for sprinkler application	0.12
7122:							
Sulco, moderately eroded	70	Very limited:		Very limited:		Very limited:	
		Seepage	1.00	Slope	1.00	Too steep for surface application	1.00
		Too steep for surface application	1.00	Restricted permeability	1.00	Too steep for sprinkler application	1.00
McConaughy, moderately eroded	20	Very limited:		Very limited:		Very limited:	
		Seepage	1.00	Slope	1.00	Too steep for surface application	1.00
		Too steep for surface application	1.00	Restricted permeability	1.00	Too steep for sprinkler application	1.00
7582:							
Valent	90	Very limited:		Somewhat limited:		Very limited:	
		Seepage	1.00	Slope	0.47	Filtering capacity	1.00
		Low adsorption	1.00			Low adsorption	1.00
						Too steep for surface application	0.66
7586:							
Valent	95	Very limited:		Very limited:		Very limited:	
		Seepage	1.00	Slope	1.00	Filtering capacity	1.00
		Low adsorption	1.00			Low adsorption	1.00
		Too steep for surface application	1.00			Too steep for surface application	1.00
7588:							
Valent, rolling	50	Very limited:		Very limited:		Very limited:	
		Seepage	1.00	Slope	1.00	Filtering capacity	1.00
		Low adsorption	1.00			Low adsorption	1.00
		Too steep for surface application	1.00			Too steep for surface application	1.00

Table 15b.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Overland flow of wastewater		Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
7588:							
Valent, hilly-------	45	Very limited:		Very limited:		Very limited:	
		Seepage	1.00	Slope	1.00	Filtering capacity	1.00
		Too steep for surface application	1.00			Low adsorption	1.00
		Low adsorption	1.00			Too steep for surface application	1.00

Table 16a.--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. For gravel and sand, the larger the value, the greater the likelihood that the layer is a source. For topsoil, the smaller 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	Potential source of gravel: Rating class	Value	Potential source of sand: Rating class	Value	Potential source of topsoil: Rating class and limiting features	Value
1130:							
Alliance	90	Poor:		Poor:		Good	
		Bottom layer	0.00	Bottom layer	0.00		
		Thickest layer	0.00	Thickest layer	0.00		
1146:							
Alliance	65	Poor:		Poor:		Good	
		Bottom layer	0.00	Bottom layer	0.00		
		Thickest layer	0.00	Thickest layer	0.00		
Rosebud	25	Poor:		Poor:		Fair:	
		Bottom layer	0.00	Bottom layer	0.00	Depth to bedrock	0.58
		Thickest layer	0.00	Thickest layer	0.00		
1198:							
Altvan	45	Poor:		Fair:		Fair:	
		Bottom layer	0.00	Thickest layer	0.00	Hard to reclaim	0.65
		Thickest layer	0.00	Bottom layer	0.17		
Eckley	30	Poor:		Fair:		Poor:	
		Bottom layer	0.00	Thickest layer	0.08	Hard to reclaim	0.00
		Thickest layer	0.00	Bottom layer	0.17	Rock fragments	0.02
						Too sandy	0.44
Satanta, sandy substratum	20	Poor:		Fair:		Good	
		Bottom layer	0.00	Thickest layer	0.00		
		Thickest layer	0.00	Bottom layer	0.90		
1295:							
Ashollow	65	Poor:		Poor:		Fair:	
		Bottom layer	0.00	Bottom layer	0.00	Slope	0.16
		Thickest layer	0.00	Thickest layer	0.00		
Tassel	30	Poor:		Poor:		Poor:	
		Bottom layer	0.00	Bottom layer	0.00	Rock fragments	0.00
		Thickest layer	0.00	Thickest layer	0.00	Slope	0.00
						Depth to bedrock	0.00
1588:							
Blueridge	50	Poor:		Fair:		Poor:	
		Bottom layer	0.00	Bottom layer	0.17	Hard to reclaim	0.00
		Thickest layer	0.00	Thickest layer	0.17	Slope	0.00
						Rock fragments	0.03
						Too sandy	0.44
Altvan	35	Poor:		Fair:		Fair:	
		Bottom layer	0.00	Thickest layer	0.06	Hard to reclaim	0.92
		Thickest layer	0.00	Bottom layer	0.22		

Table 16a.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel: Rating class	Value	Potential source of sand: Rating class	Value	Potential source of topsoil: Rating class and limiting features	Value
1782:							
Broadwater, frequently flooded	90	Poor:		Fair:		Poor:	
		Bottom layer	0.00	Bottom layer	0.17	Hard to reclaim	0.00
		Thickest layer	0.00	Thickest layer	0.17	Rock fragments	0.03
						Too sandy	0.44
1944:							
Calamus, very rarely flooded	95	Poor:		Fair:		Poor:	
		Bottom layer	0.00	Bottom layer	0.17	Too sandy	0.00
		Thickest layer	0.00	Thickest layer	0.17	Hard to reclaim	0.92
2072:							
Chappell	38	Poor:		Fair:		Fair:	
		Bottom layer	0.00	Thickest layer	0.06	Hard to reclaim	0.54
		Thickest layer	0.00	Bottom layer	0.10		
Alice	33	Poor:		Fair:		Good	
		Bottom layer	0.00	Bottom layer	0.08		
		Thickest layer	0.00	Thickest layer	0.08		
Broadwater	24	Poor:		Fair:		Poor:	
		Bottom layer	0.00	Bottom layer	0.17	Hard to reclaim	0.00
		Thickest layer	0.00	Thickest layer	0.17	Rock fragments	0.03
						Too sandy	0.44
2630:							
Duroc	90	Poor:		Poor:		Good	
		Bottom layer	0.00	Bottom layer	0.00		
		Thickest layer	0.00	Thickest layer	0.00		
2638:							
Duroc	90	Poor:		Poor:		Good	
		Bottom layer	0.00	Bottom layer	0.00		
		Thickest layer	0.00	Thickest layer	0.00		
2639:							
Duroc	90	Poor:		Poor:		Good	
		Bottom layer	0.00	Bottom layer	0.00		
		Thickest layer	0.00	Thickest layer	0.00		
3050:							
Glenberg, rarely flooded	90	Poor:		Fair:		Good	
		Bottom layer	0.00	Thickest layer	0.02		
		Thickest layer	0.00	Bottom layer	0.04		
3140:							
Gothenburg, occasionally flooded	85	Poor:		Fair:		Poor:	
		Bottom layer	0.00	Bottom layer	0.16	Depth to saturated zone	0.00
		Thickest layer	0.00	Thickest layer	0.90	Hard to reclaim	0.00
						Rock fragments	0.03
						Too sandy	0.50

Table 16a.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel: Rating class	Value	Potential source of sand: Rating class	Value	Potential source of topsoil: Rating class and limiting features	Value
3952:							
Jankosh-------------	85	Poor:		Fair:		Poor:	
		Bottom layer	0.00	Thickest layer	0.00	Sodium content	0.00
		Thickest layer	0.00	Bottom layer	0.17	Salinity	0.00
						Depth to saturated zone	0.76
						Hard to reclaim	0.80
4028:							
Jayem---------------	90	Poor:		Fair:		Good	
		Bottom layer	0.00	Bottom layer	0.02		
		Thickest layer	0.00	Thickest layer	0.02		
4070:							
Johnstown-----------	35	Poor:		Fair:		Fair:	
		Bottom layer	0.00	Thickest layer	0.00	Too clayey	0.81
		Thickest layer	0.00	Bottom layer	0.16	Hard to reclaim	0.98
Satanta, sandy substratum---------	31	Poor:		Fair:		Good	
		Bottom layer	0.00	Thickest layer	0.00		
		Thickest layer	0.00	Bottom layer	0.90		
Richfield-----------	29	Poor:		Fair:		Good	
		Bottom layer	0.00	Thickest layer	0.08		
		Thickest layer	0.00	Bottom layer	0.16		
4151:							
Keith---------------	90	Poor:		Poor:		Fair:	
		Bottom layer	0.00	Bottom layer	0.00	Too clayey	0.66
		Thickest layer	0.00	Thickest layer	0.00		
4152:							
Keith---------------	90	Poor:		Poor:		Good	
		Bottom layer	0.00	Bottom layer	0.00		
		Thickest layer	0.00	Thickest layer	0.00		
4310:							
Kuma----------------	95	Poor:		Poor:		Good	
		Bottom layer	0.00	Bottom layer	0.00		
		Thickest layer	0.00	Thickest layer	0.00		
4311:							
Kuma----------------	90	Poor:		Poor:		Fair:	
		Bottom layer	0.00	Bottom layer	0.00	Too clayey	0.81
		Thickest layer	0.00	Thickest layer	0.00		
4472:							
Las Animas, frequently flooded-	95	Poor:		Fair:		Poor:	
		Bottom layer	0.00	Thickest layer	0.02	Depth to saturated zone	0.00
		Thickest layer	0.00	Bottom layer	0.04		
4475:							
Las Animas, occasionally flooded------------	92	Poor:		Fair:		Fair:	
		Bottom layer	0.00	Thickest layer	0.02	Depth to saturated zone	0.76
		Thickest layer	0.00	Bottom layer	0.04		

Table 16a.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel: Rating class	Value	Potential source of sand: Rating class	Value	Potential source of topsoil: Rating class and limiting features	Value
4592:							
Lexsworth, very rarely flooded	85	Poor:		Fair:		Fair:	
		Bottom layer	0.00	Thickest layer	0.26	Hard to reclaim	0.20
		Thickest layer	0.00	Bottom layer	0.39		
4655:							
Lodgepole, ponded	95	Poor:		Poor:		Poor:	
		Bottom layer	0.00	Bottom layer	0.00	Too clayey	0.00
		Thickest layer	0.00	Thickest layer	0.00	Depth to saturated zone	0.00
5212:							
Merrick, very rarely flooded	90	Poor:		Poor:		Good	
		Bottom layer	0.00	Bottom layer	0.00		
		Thickest layer	0.00	Thickest layer	0.00		
6132:							
Platte, occasionally flooded	90	Poor:		Fair:		Poor:	
		Bottom layer	0.00	Thickest layer	0.00	Hard to reclaim	0.00
		Thickest layer	0.00	Bottom layer	0.16	Rock fragments	0.03
						Too sandy	0.50
						Depth to saturated zone	0.53
6248:							
Ralton, very rarely flooded	90	Poor:		Fair:		Good	
		Bottom layer	0.00	Thickest layer	0.00		
		Thickest layer	0.00	Bottom layer	0.22		
6625:							
Sarben	90	Poor:		Poor:		Good	
		Bottom layer	0.00	Bottom layer	0.00		
		Thickest layer	0.00	Thickest layer	0.00		
6626:							
Sarben	90	Poor:		Poor:		Good	
		Bottom layer	0.00	Bottom layer	0.00		
		Thickest layer	0.00	Thickest layer	0.00		
6722:							
Satanta	65	Poor:		Fair:		Good	
		Bottom layer	0.00	Thickest layer	0.00		
		Thickest layer	0.00	Bottom layer	0.11		
Altvan	25	Poor:		Fair:		Fair:	
		Bottom layer	0.00	Thickest layer	0.00	Hard to reclaim	0.98
		Thickest layer	0.00	Bottom layer	0.16		
6725:							
Satanta, sandy substratum	45	Poor:		Fair:		Good	
		Bottom layer	0.00	Thickest layer	0.00		
		Thickest layer	0.00	Bottom layer	0.90		
Ascalon	45	Poor:		Fair:		Good	
		Bottom layer	0.00	Thickest layer	0.02		
		Thickest layer	0.00	Bottom layer	0.04		

Table 16a.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel: Rating class	Value	Potential source of sand: Rating class	Value	Potential source of topsoil: Rating class and limiting features	Value
6727:							
Satanta, sandy substratum---------	60	Poor:		Fair:		Good	
		Bottom layer	0.00	Thickest layer	0.00		
		Thickest layer	0.00	Bottom layer	0.90		
Johnstown-----------	18	Poor:		Fair:		Fair:	
		Bottom layer	0.00	Thickest layer	0.00	Too clayey	0.81
		Thickest layer	0.00	Bottom layer	0.90		
Altvan--------------	15	Poor:		Fair:		Fair:	
		Bottom layer	0.00	Thickest layer	0.00	Too sandy	0.02
		Thickest layer	0.00	Bottom layer	0.39	Rock fragments	0.50
						Hard to reclaim	0.54
6817:							
Scoville------------	95	Poor:		Fair:		Good	
		Bottom layer	0.00	Thickest layer	0.10		
		Thickest layer	0.00	Bottom layer	0.11		
6930:							
Sidney--------------	85	Poor:		Poor:		Good	
		Bottom layer	0.00	Bottom layer	0.00		
		Thickest layer	0.00	Thickest layer	0.00		
6937:							
Sidney--------------	65	Poor:		Poor:		Good	
		Bottom layer	0.00	Bottom layer	0.00		
		Thickest layer	0.00	Thickest layer	0.00		
Canyon--------------	25	Poor:		Poor:		Poor:	
		Bottom layer	0.00	Bottom layer	0.00	Depth to bedrock	0.00
		Thickest layer	0.00	Thickest layer	0.00		
7120:							
Sulco, moderately eroded-------------	55	Poor:		Poor:		Good	
		Bottom layer	0.00	Bottom layer	0.00		
		Thickest layer	0.00	Thickest layer	0.00		
McConaughy, moderately eroded--	30	Poor:		Poor:		Good	
		Bottom layer	0.00	Bottom layer	0.00		
		Thickest layer	0.00	Thickest layer	0.00		
7121:							
Sulco, moderately eroded-------------	65	Poor:		Poor:		Good	
		Bottom layer	0.00	Bottom layer	0.00		
		Thickest layer	0.00	Thickest layer	0.00		
McConaughy, moderately eroded--	25	Poor:		Poor:		Good	
		Bottom layer	0.00	Bottom layer	0.00		
		Thickest layer	0.00	Thickest layer	0.00		

Table 16a.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel: Rating class	Value	Potential source of sand: Rating class	Value	Potential source of topsoil: Rating class and limiting features	Value
7122:							
Sulco, moderately eroded	70	Poor:		Poor:		Poor:	
		Bottom layer	0.00	Bottom layer	0.00	Slope	0.00
		Thickest layer	0.00	Thickest layer	0.00		
McConaughy, moderately eroded	20	Poor:		Poor:		Fair:	
		Bottom layer	0.00	Bottom layer	0.00	Slope	0.37
		Thickest layer	0.00	Thickest layer	0.00		
7582:							
Valent	90	Poor:		Fair:		Good	
		Bottom layer	0.00	Bottom layer	0.10		
		Thickest layer	0.00	Thickest layer	0.10		
7586:							
Valent	95	Poor:		Fair:		Poor:	
		Bottom layer	0.00	Bottom layer	0.10	Slope	0.00
		Thickest layer	0.00	Thickest layer	0.10		
7588:							
Valent, rolling	50	Poor:		Fair:		Poor:	
		Bottom layer	0.00	Bottom layer	0.10	Slope	0.00
		Thickest layer	0.00	Thickest layer	0.10		
Valent, hilly	45	Poor:		Fair:		Poor:	
		Bottom layer	0.00	Bottom layer	0.10	Slope	0.00
		Thickest layer	0.00	Thickest layer	0.10		

Table 16b.--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 limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value
1130:					
Alliance	90	Fair:		Fair:	
		Low content of organic matter	0.88	Depth to bedrock	0.87
		No water erosion	0.99		
1146:					
Alliance	65	Fair:		Fair:	
		Low content of organic matter	0.88	Depth to bedrock	0.58
		No water erosion	0.99		
Rosebud	25	Fair:		Poor:	
		Depth to bedrock	0.58	Depth to bedrock	0.00
		Low content of organic matter	0.88		
		Water erosion	0.90		
		Droughty	0.92		
1198:					
Altvan	45	Fair:		Good	
		Low content of organic matter	0.88		
		No water erosion	0.99		
Eckley	30	Fair:		Good	
		Droughty	0.04		
		Too sandy	0.44		
		Low content of organic matter	0.88		
Satanta, sandy substratum	20	Fair:		Good	
		Low content of organic matter	0.12		
		Water erosion	0.90		
1295:					
Ashollow	65	Fair:		Good	
		Low content of organic matter	0.88		
		Water erosion	0.90		
Tassel	30	Poor:		Poor:	
		Droughty	0.00	Depth to bedrock	0.00
		Depth to bedrock	0.00	Slope	0.50
		Low content of organic matter	0.12		

Table 16b.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value
1588:					
Blueridge-----------	50	Poor:		Fair:	
		Wind erosion	0.00	Slope	0.82
		Droughty	0.00		
		Low content of organic matter	0.12		
		Too sandy	0.44		
Altvan--------------	35	Fair:		Good	
		Low content of organic matter	0.12		
1782:					
Broadwater, frequently flooded-	90	Poor:		Good	
		Droughty	0.00		
		Wind erosion	0.00		
		Low content of organic matter	0.12		
		Too sandy	0.44		
1944:					
Calamus, very rarely flooded------------	95	Poor:		Good	
		Too sandy	0.00		
		Wind erosion	0.00		
		Droughty	0.03		
		Low content of organic matter	0.12		
2072:					
Chappell------------	38	Fair:		Good	
		Low content of organic matter	0.12		
		Droughty	0.92		
Alice---------------	33	Fair:		Good	
		Low content of organic matter	0.88		
Broadwater----------	24	Poor:		Good	
		Droughty	0.00		
		Wind erosion	0.00		
		Low content of organic matter	0.12		
		Too sandy	0.44		
2630:					
Duroc---------------	90	Fair:		Good	
		Low content of organic matter	0.88		
		Water erosion	0.90		
2638:					
Duroc---------------	90	Fair:		Good	
		Low content of organic matter	0.88		
		Water erosion	0.90		

Table 16b.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value
2639:					
Duroc	90	Fair:		Good	
		Low content of organic matter	0.88		
		Water erosion	0.90		
3050:					
Glenberg, rarely flooded	90	Fair:		Good	
		Low content of organic matter	0.88		
3140:					
Gothenburg, occasionally flooded	85	Poor:		Poor:	
		Droughty	0.00	Depth to saturated zone	0.00
		Low content of organic matter	0.12		
		Too sandy	0.50		
3952:					
Jankosh	85	Poor:		Fair:	
		Sodium content	0.00	Depth to saturated zone	0.76
		Too alkaline	0.00		
		Low content of organic matter	0.12		
		Salinity	0.88		
		Water erosion	0.90		
4028:					
Jayem	90	Fair:		Good	
		Low content of organic matter	0.18		
4070:					
Johnstown	35	Fair:		Poor:	
		Too clayey	0.98	Low strength	0.00
		No water erosion	0.99		
Satanta, sandy substratum	31	Fair:		Good	
		Low content of organic matter	0.12		
		Water erosion	0.90		
Richfield	29	Fair:		Good	
		Low content of organic matter	0.88		
		Water erosion	0.90		
4151:					
Keith	90	Fair:		Fair:	
		Low content of organic matter	0.12	Low strength	0.78
		Water erosion	0.90		
		Too clayey	0.92		

Table 16b.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value
4152:					
Keith	90	Fair:		Good	
		Low content of organic matter	0.88		
		Water erosion	0.90		
4310:					
Kuma	95	Fair:		Good	
		Low content of organic matter	0.88		
		No water erosion	0.99		
4311:					
Kuma	90	Fair:		Good	
		Low content of organic matter	0.88		
		Water erosion	0.90		
		Too clayey	0.98		
4472:					
Las Animas, frequently flooded	95	Fair:		Poor:	
		Low content of organic matter	0.88	Depth to saturated zone	0.00
4475:					
Las Animas, occasionally flooded	92	Fair:		Fair:	
		Low content of organic matter	0.88	Depth to saturated zone	0.76
4592:					
Lexsworth, very rarely flooded	85	Fair:		Good	
		Low content of organic matter	0.12		
		Droughty	1.00		
4655:					
Lodgepole, ponded	95	Poor:		Poor:	
		Too clayey	0.00	Depth to saturated zone	0.00
		Low content of organic matter	0.88	Shrink-swell	0.92
		Water erosion	0.90		
5212:					
Merrick, very rarely flooded	90	Fair:		Poor:	
		No water erosion	0.99	Low strength	0.00
6132:					
Platte, occasionally flooded	90	Fair:		Fair:	
		Low content of organic matter	0.12	Depth to saturated zone	0.53
		Droughty	0.39		
		Too sandy	0.50		

Table 16b.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value
6248:					
Ralton, very rarely flooded	90	Fair:		Good	
		Low content of organic matter	0.50		
		Water erosion	0.90		
6625:					
Sarben	90	Poor:		Good	
		Wind erosion	0.00		
		Low content of organic matter	0.12		
		Droughty	0.99		
6626:					
Sarben	90	Poor:		Good	
		Wind erosion	0.00		
		Low content of organic matter	0.12		
		Droughty	0.99		
6722:					
Satanta	65	Fair:		Good	
		Low content of organic matter	0.12		
		Water erosion	0.90		
Altvan	25	Fair:		Good	
		Low content of organic matter	0.12		
		Water erosion	0.90		
6725:					
Satanta, sandy substratum	45	Fair:		Good	
		Low content of organic matter	0.12		
		Water erosion	0.90		
Ascalon	45	Fair:		Good	
		Low content of organic matter	0.12		
6727:					
Satanta, sandy substratum	60	Fair:		Good	
		Low content of organic matter	0.12		
		Water erosion	0.90		
Johnstown	18	Fair:		Good	
		Water erosion	0.90		
		Too clayey	0.98		
Altvan	15	Fair:		Good	
		Too sandy	0.02		
		Low content of organic matter	0.12		
		No water erosion	0.99		

Table 16b.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value
6817:					
Scoville------------	95	Poor:		Good	
		Wind erosion	0.00		
		Low content of organic matter	0.12		
		Droughty	0.78		
6930:					
Sidney--------------	85	Fair:		Fair:	
		Low content of organic matter	0.88	Depth to bedrock	0.58
		No water erosion	0.99		
6937:					
Sidney--------------	65	Fair:		Fair:	
		Low content of organic matter	0.88	Depth to bedrock	0.58
		No water erosion	0.99		
Canyon--------------	25	Poor:		Poor:	
		Depth to bedrock	0.00	Depth to bedrock	0.00
		Droughty	0.00		
7120:					
Sulco, moderately eroded-------------	55	Fair:		Good	
		Low content of organic matter	0.88		
		Water erosion	0.90		
McConaughy, moderately eroded--	30	Fair:		Good	
		Low content of organic matter	0.12		
		Water erosion	0.90		
7121:					
Sulco, moderately eroded-------------	65	Fair:		Good	
		Low content of organic matter	0.88		
		Water erosion	0.90		
McConaughy, moderately eroded--	25	Fair:		Good	
		Low content of organic matter	0.12		
		Water erosion	0.90		
7122:					
Sulco, moderately eroded-------------	70	Fair:		Good	
		Low content of organic matter	0.88		
		Water erosion	0.90		
McConaughy, moderately eroded--	20	Fair:		Good	
		Low content of organic matter	0.12		
		Water erosion	0.90		

Table 16b.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value
7582:					
Valent	90	Poor:		Good	
		Wind erosion	0.00		
		Droughty	0.12		
		Low content of organic matter	0.12		
7586:					
Valent	95	Poor:		Fair:	
		Wind erosion	0.00	Slope	0.92
		Droughty	0.12		
		Low content of organic matter	0.12		
7588:					
Valent, rolling	50	Poor:		Fair:	
		Wind erosion	0.00	Slope	0.92
		Droughty	0.12		
		Low content of organic matter	0.12		
Valent, hilly	45	Poor:		Poor:	
		Wind erosion	0.00	Slope	0.00
		Droughty	0.12		
		Low content of organic matter	0.12		

Table 17.--Water Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table.)

Map symbol and soil name	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Limitations for-- Aquifer-fed excavated ponds	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
1130:							
Alliance	Moderate: seepage depth to rock	Severe: piping	Severe: no water	Limitation: deep to water	Favorable	Limitation: erodes easily	Limitation: erodes easily too arid
1146:							
Alliance	Moderate: seepage depth to rock	Severe: piping	Severe: no water	Limitation: deep to water	Favorable	Limitation: erodes easily	Limitation: erodes easily too arid
Rosebud	Moderate: seepage depth to rock	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: depth to rock	Limitation: erodes easily depth to rock	Limitation: erodes easily too arid
1198:							
Altvan	Severe: seepage	Severe: seepage	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily too sandy	Limitation: erodes easily too arid
Eckley	Severe: seepage	Severe: seepage	Severe: no water	Limitation: deep to water	Limitation: slope droughty	Limitation: too sandy	Limitation: too arid droughty
Satanta	Severe: seepage	Severe: thin layer	Severe: no water	Limitation: deep to water	Favorable	Favorable	Limitation: too arid
1295:							
Ashollow	Severe: seepage slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope soil blowing	Limitation: erodes easily slope soil blowing	Limitation: erodes easily slope too arid
Tassel	Severe: slope depth to rock	Severe: seepage	Severe: no water	Limitation: deep to water	Limitation: slope soil blowing	Limitation: slope soil blowing depth to rock	Limitation: slope too arid
1588:							
Blueridge	Severe: seepage slope	Severe: seepage piping	Severe: no water	Limitation: deep to water	Limitation: fast intake slope droughty	Limitation: slope too sandy soil blowing	Limitation: slope too arid droughty

Table 17.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
1588: Altvan	Severe: seepage	Severe: seepage	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily too sandy	Limitation: erodes easily too arid
1782: Broadwater	Severe: seepage	Severe: seepage piping	Severe: no water	Limitation: deep to water	Limitation: fast intake soil blowing droughty	Limitation: too sandy soil blowing	Limitation: rooting depth too arid droughty
1944: Calamus	Severe: seepage	Severe: seepage piping	Severe: cutbanks cave	Limitation: deep to water	Limitation: fast intake soil blowing droughty	Limitation: too sandy soil blowing	Limitation: droughty
2072: Chappell	Severe: seepage	Severe: seepage	Severe: no water	Limitation: deep to water	Limitation: droughty	Limitation: too sandy soil blowing	Limitation: too arid droughty
Alice	Severe: seepage	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: soil blowing droughty	Limitation: soil blowing	Limitation: too arid droughty
Broadwater	Severe: seepage	Severe: seepage piping	Severe: no water	Limitation: deep to water	Limitation: fast intake soil blowing droughty	Limitation: too sandy soil blowing	Limitation: rooting depth too arid droughty
2630: Duroc	Moderate: seepage	Severe: piping	Severe: no water	Limitation: deep to water	Favorable	Limitation: erodes easily	Limitation: erodes easily
2638: Duroc	Moderate: seepage	Severe: piping	Severe: no water	Limitation: deep to water	Favorable	Limitation: erodes easily	Limitation: erodes easily
2639: Duroc	Moderate: seepage	Severe: piping	Severe: no water	Limitation: deep to water	Favorable	Limitation: erodes easily	Limitation: erodes easily
3050: Glenberg	Severe: seepage	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: soil blowing droughty	Limitation: too sandy	Limitation: too arid droughty

Table 17.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
3140:							
Gothenburg	Severe: seepage	Severe: seepage piping wetness	Severe: cutbanks cave	Limitation: flooding cutbanks cave	Limitation: fast intake wetness droughty	Limitation: too sandy wetness	Limitation: wetness droughty
3952:							
Jankosh	Severe: seepage	Severe: seepage wetness	Severe: cutbanks cave	Limitation: excess salt cutbanks cave	Limitation: rooting depth wetness	Limitation: erodes easily too sandy wetness	Limitation: erodes easily excess salt rooting depth
4028:							
Jayem	Severe: seepage	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: soil blowing	Limitation: soil blowing	Limitation: too arid
4070:							
Johnstown	Severe: seepage	Severe: thin layer	Severe: no water	Limitation: deep to water	Favorable	Limitation: erodes easily	Limitation: erodes easily
Satanta	Severe: seepage	Severe: thin layer	Severe: no water	Limitation: deep to water	Favorable	Favorable	Limitation: too arid
Richfield	Slight	Severe: piping	Severe: no water	Limitation: deep to water	Favorable	Limitation: erodes easily	Limitation: erodes easily too arid
4151:							
Keith	Moderate: seepage	Severe: piping	Severe: no water	Limitation: deep to water	Favorable	Limitation: erodes easily	Limitation: erodes easily too arid
4152:							
Keith	Moderate: seepage	Severe: piping	Severe: no water	Limitation: deep to water	Favorable	Limitation: erodes easily	Limitation: erodes easily too arid
4310:							
Kuma	Moderate: seepage	Severe: piping	Severe: no water	Limitation: deep to water	Favorable	Limitation: erodes easily	Limitation: erodes easily
4311:							
Kuma	Moderate: seepage	Severe: piping	Severe: no water	Limitation: deep to water	Favorable	Limitation: erodes easily	Limitation: erodes easily

Table 17.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
4472: Las Animas	Severe: seepage	Severe: piping wetness	Severe: cutbanks cave	Limitation: flooding frost action cutbanks cave	Limitation: rooting depth wetness droughty	Limitation: wetness	Limitation: rooting depth wetness droughty
4475: Las Animas	Severe: seepage	Severe: piping wetness	Severe: cutbanks cave	Limitation: flooding frost action cutbanks cave	Limitation: rooting depth wetness droughty	Limitation: wetness	Limitation: rooting depth wetness droughty
4592: Lexsworth	Severe: seepage	Severe: seepage piping	Severe: cutbanks cave	Limitation: deep to water	Favorable	Limitation: too sandy	Favorable
4655: Lodgepole	Severe: seepage	Severe: ponding	Severe: no water	Limitation: frost action percs slowly ponding	Limitation: erodes easily percs slowly ponding	Limitation: erodes easily percs slowly ponding	Limitation: erodes easily percs slowly wetness
5212: Merrick	Moderate: seepage	Severe: piping	Moderate: slow refill deep to water	Limitation: deep to water	Favorable	Limitation: erodes easily	Limitation: erodes easily
6132: Platte	Severe: seepage	Severe: seepage piping wetness	Severe: cutbanks cave	Limitation: flooding cutbanks cave	Limitation: wetness droughty	Limitation: too sandy wetness	Limitation: rooting depth wetness droughty
6248: Ralton	Severe: seepage	Severe: piping	Severe: no water	Limitation: deep to water	Favorable	Limitation: erodes easily	Limitation: erodes easily
6625: Sarben	Severe: seepage	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: fast intake droughty	Limitation: soil blowing	Limitation: rooting depth droughty
6626: Sarben	Severe: seepage	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: fast intake droughty	Limitation: soil blowing	Limitation: rooting depth droughty

Table 17.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Limitations for-- Aquifer-fed excavated ponds	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
6722:							
Satanta---------	Severe: seepage	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope	Favorable	Limitation: too arid
Altvan----------	Severe: seepage	Severe: seepage	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily too sandy	Limitation: erodes easily too arid
6725:							
Satanta---------	Severe: seepage	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: soil blowing	Limitation: soil blowing	Limitation: too arid
Ascalon---------	Severe: seepage	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: droughty	Limitation: soil blowing	Limitation: too arid droughty
6727:							
Satanta---------	Severe: seepage	Severe: thin layer	Severe: no water	Limitation: deep to water	Favorable	Favorable	Limitation: too arid
Johnstown-------	Severe: seepage	Severe: thin layer	Severe: no water	Limitation: deep to water	Favorable	Limitation: erodes easily	Limitation: erodes easily
Altvan----------	Severe: seepage	Severe: seepage	Severe: no water	Limitation: deep to water	Favorable	Limitation: erodes easily too sandy	Limitation: erodes easily too arid
6817:							
Scoville--------	Severe: seepage	Severe: seepage piping	Severe: no water	Limitation: deep to water	Limitation: fast intake soil blowing droughty	Limitation: too sandy soil blowing	Limitation: rooting depth too arid droughty
6930:							
Sidney----------	Moderate: seepage slope depth to rock	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily too arid

Table 17.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Limitations for-- Aquifer-fed excavated ponds	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
6937: Sidney----------	Moderate: seepage slope depth to rock	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily too arid
Canyon----------	Severe: depth to rock	Slight	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock	Limitation: depth to rock	Limitation: too arid
7120: Sulco-----------	Moderate: seepage slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: erodes easily slope	Limitation: erodes easily	Limitation: erodes easily too arid
McConaughy------	Moderate: seepage slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily too arid
7121: Sulco-----------	Moderate: seepage slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: erodes easily slope	Limitation: erodes easily	Limitation: erodes easily too arid
McConaughy------	Moderate: seepage slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily too arid
7122: Sulco-----------	Moderate: seepage slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: erodes easily slope	Limitation: erodes easily	Limitation: erodes easily too arid
McConaughy------	Moderate: seepage slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily too arid
7582: Valent----------	Severe: seepage	Severe: seepage piping	Severe: no water	Limitation: deep to water	Limitation: fast intake slope droughty	Limitation: too sandy soil blowing	Limitation: too arid droughty

Table 17.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Limitations for-- Aquifer-fed excavated ponds	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
7586:							
Valent----------	Severe: seepage slope	Severe: seepage piping	Severe: no water	Limitation: deep to water	Limitation: fast intake slope droughty	Limitation: slope too sandy soil blowing	Limitation: slope too arid droughty
7588:							
Valent, rolling-	Severe: seepage slope	Severe: seepage piping	Severe: no water	Limitation: deep to water	Limitation: fast intake slope droughty	Limitation: slope too sandy soil blowing	Limitation: slope too arid droughty
Valent, hilly---	Severe: seepage slope	Severe: seepage piping	Severe: no water	Limitation: deep to water	Limitation: fast intake slope droughty	Limitation: slope too sandy soil blowing	Limitation: slope too arid droughty

Soil Properties

Data relating to soil properties are collected during the course of the soil survey.

Soil properties are ascertained by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. 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 particle-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties are shown in tables. They include engineering index properties, physical and chemical properties, and pertinent soil and water features.

Engineering Index Properties

Table 18 gives the engineering classifications and the range of index properties for the layers of each soil in the survey area.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. “Loam,” for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, “gravelly.” Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2001) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2000).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-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, CL-ML.

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 particle-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. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

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.

The estimates of particle-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 generally omitted in the table.

Physical Properties

Table 19 shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In table 19, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, 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 $^1/_3$- or $^1/_{10}$-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability (K_{sat}) refers to the ability of a soil to transmit water or air. The term permeability, as used in soil surveys, indicates saturated hydraulic conductivity (K_{sat}). The estimates in the table indicate the rate of water movement, in inches per hour, 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 capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at $^1/_3$- or $^1/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. Volume change is influenced by the amount and type of clay minerals in the soil.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 19, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained by returning crop residue to the soil. Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in table 19 as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of several factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and permeability. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are as follows:

1. Coarse sands, sands, fine sands, and very fine sands.

2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, ash material, and sapric soil material.

3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay.

5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material.

6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay.

7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material.

8. Soils that are not subject to wind erosion because of coarse fragments on the surface or because of surface wetness.

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Chemical Properties

Table 20 shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Cation-exchange capacity is the total amount of extractable bases 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 reduces the hazard of ground-water pollution.

Soil reaction is a measure of acidity or alkalinity. The pH of each soil 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 fraction of the soil less than 2 millimeters in size. 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.

Gypsum is expressed as a percent, by weight, of hydrated calcium sulfates in the fraction of the soil less than 20 millimeters in size. Gypsum is partially soluble in water. Soils that have a high content of gypsum 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 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 (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration. Soils that have SAR values 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.

Soil Features

Table 21 gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A ***restrictive layer*** is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. The table indicates the hardness of the restrictive layer, which significantly affects the ease of excavation. ***Depth to top*** is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

Potential for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as ***low, moderate,*** or ***high,*** is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as ***low, moderate,*** or ***high***. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Water Features

Table 22 gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of 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 chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture 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 chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture 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 chiefly of clays that have a high shrink-swell potential, soils that have a 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.

The ***months*** in the table indicate the portion of the year in which the feature is most likely to be a concern.

Soil saturation refers to a water table, or a saturated zone in the soil. Table 22 indicates, by month, depth to the top (***upper limit***) and base (***lower limit***) of the saturated zone in most years. Estimates of the upper and lower limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. Table 22 indicates ***surface water depth***, or the depth of the water above the surface of the soil, and the ***duration*** and ***frequency*** of ponding. Duration is expressed as ***very brief*** if less than 2 days, ***brief*** if 2 to 7 days, ***long*** if 7 to 30 days, and ***very long*** if more than 30 days. Frequency is expressed as none, rare, occasional, and frequent. ***None*** means that ponding is not probable; ***rare*** that it is unlikely but possible under unusual weather conditions (the chance of ponding is nearly 0 percent to 5 percent in any year); ***occasional*** that it occurs, on the average, once or less in 2 years (the chance of ponding is 5 to 50 percent in any year); and ***frequent*** that it occurs, on the average, more than once in 2 years (the chance of ponding is more than 50 percent in any year).

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Duration and ***frequency*** are estimated. Duration is expressed as ***extremely brief*** if 0.1 hour to 4 hours, ***very brief*** if 4 hours to 2 days, ***brief*** if 2 to 7 days, ***long*** if 7 to 30 days, and ***very long*** if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. ***None*** means that flooding is not probable; ***very rare*** that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); ***rare*** that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); ***occasional*** that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); ***frequent*** that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and ***very frequent*** that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

The information 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 are local information about the extent and levels 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.

Table 18.--Engineering Index Properties

(Absence of an entry indicates that the data were not estimated.)

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	
1130:												
Alliance-------	0-6	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	30-40	5-15
	6-17	Clay loam	CL	A-6, A-7	0	0	100	100	90-100	70-80	35-45	15-25
	17-24	Loam	ML	A-4	0	0	100	100	85-95	60-75	30-40	NP-15
	24-34	Loam	ML	A-4	0	0	100	100	85-95	60-75	30-40	NP-15
	34-47	Very fine sandy loam	ML	A-4	0	0	100	100	70-100	50-65	20-30	NP-10
	47-54	Loamy fine sand	SP-SM	A-2	0	0	100	100	50-70	5-15	0-0	NP
	54-80	Weathered bedrock	---	---	---	---	---	---	---	---	0-0	---
1146:												
Alliance-------	0-6	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	30-40	5-15
	6-14	Clay loam	CL	A-6, A-7	0	0	100	100	90-100	70-80	35-45	15-25
	14-19	Clay loam	CL	A-6, A-7	0	0	100	100	90-100	70-80	35-45	15-25
	19-25	Loam	ML	A-4	0	0	100	100	85-95	60-75	30-40	NP-15
	25-45	Very fine sandy loam	ML	A-4	0	0	100	100	70-100	50-65	20-30	NP-10
	45-60	Weathered bedrock	---	---	---	---	---	---	---	---	0-0	---
Rosebud--------	0-6	Loam	CL	A-4, A-6	0	0	100	100	85-95	65-75	30-40	5-15
	6-11	Clay loam	CL	A-6, A-7	0	0	100	100	90-100	70-80	35-45	15-25
	11-17	Clay loam	CL	A-6, A-7	0	0	100	100	90-100	70-80	35-45	15-25
	17-23	Loam	ML	A-4	0	0	100	100	85-95	60-75	30-40	NP-15
	23-30	Very fine sandy loam	ML	A-4	0	0	100	100	70-100	50-65	20-30	NP-10
	30-80	Weathered bedrock	---	---	---	---	---	---	---	---	0-0	---
1198:												
Altvan---------	0-7	Fine sandy loam	SC	A-2, A-4	0	0	100	100	70-85	40-55	15-30	NP-10
	7-12	Loam	CL	A-4	0	0	100	100	85-95	60-75	30-40	5-15
	12-17	Clay loam	CL	A-4, A-6	0	0	100	100	90-100	60-80	35-45	15-25
	17-25	Very fine sandy loam	ML	A-4	0	0	100	100	70-100	50-65	20-30	NP-10
	25-31	Loamy fine sand	SC	A-2, A-4	0	0	100	100	65-80	20-45	15-25	NP-10
	31-80	Gravelly coarse sand	SP-SC	A-1	0	0	70-100	50-95	25-65	0-15	0-0	NP

Table 18.--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	
1198:												
Eckley---------	0-5	Sandy loam	SC-SM, SC, SM	A-1, A-2, A-4	0	0	100	100	60-70	30-40	15-30	NP-10
	5-8	Sandy clay loam	SC	A-6	0	0	100	100	80-90	35-45	30-40	10-20
	8-11	Gravelly sandy loam	SC	A-2, A-6	0	0	70-100	50-95	60-70	30-40	15-30	NP-10
	11-15	Gravelly coarse sand	SP-SC	A-1	0	0	70-100	50-95	25-65	0-15	0-0	NP
	15-80	Gravelly coarse sand	SP-SC	A-1	0	0	70-100	50-95	25-65	0-15	0-0	NP
Satanta, sandy substratum----	0-10	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	30-40	5-15
	10-21	Loam	ML	A-4	0	0	100	100	85-95	60-75	30-40	NP-15
	21-30	Clay loam	CL	A-6, A-7	0	0	100	100	90-100	70-80	35-45	15-25
	30-37	Very fine sandy loam	ML	A-4, A-6	0	0	100	100	85-95	50-65	20-30	NP-10
	37-42	Very fine sandy loam	ML	A-4	0	0	100	100	70-100	50-65	20-30	NP-10
	42-50	Loamy fine sand	SP-SM	A-2	0	0	100	100	50-70	5-15	0-0	NP
	50-80	Fine sand	SP-SM	A-2	0	0	100	100	50-70	5-15	0-0	NP
1295:												
Ashollow-------	0-3	Very fine sandy loam	ML	A-2, A-4, A-1-b, A-6	0	0	100	100	85-95	50-65	20-30	NP-10
	3-10	Very fine sandy loam	ML	A-1-b, A-2, A-6, A-4	0	0	100	100	85-95	50-65	20-30	NP-10
	10-32	Very fine sandy loam	ML	A-2, A-4, A-1-b, A-6	0	0	100	100	85-95	50-65	20-30	NP-10
	32-60	Very fine sandy loam	ML	A-1-b, A-2, A-6, A-4	0	0	100	100	85-95	50-65	20-30	NP-10
Tassel---------	0-4	Fine sandy loam	SC	A-4	0	0	100	100	70-85	40-55	0-0	NP-10
	4-7	Fine sandy loam	SC	A-4	0	0	100	100	70-85	40-55	0-0	NP-10
	7-18	Gravelly fine sandy loam	SC	A-1, A-2	0	0-5	100	50-95	60-70	30-40	0-0	NP-10
	18-60	Weathered bedrock	---	---	---	---	---	---	---	---	0-0	---

Table 18.--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	
1588:												
Blueridge------	0-4	Coarse sand	SP-SC	A-1, A-3, A-2	0	0	100	50-95	25-65	0-15	0-0	NP
	4-40	Gravelly coarse sand	SP	A-1, A-2, A-3	0	0-5	70-100	50-95	25-60	0-15	0-0	NP
	40-80	Gravelly coarse sand	SP	A-1, A-2, A-3	0	0-5	70-100	50-95	25-60	0-15	0-0	NP
Altvan---------	0-7	Loam	CL	A-4	0	0	100	100	85-95	60-75	30-40	5-15
	7-10	Sandy clay loam	SC	A-6	0	0	100	100	80-90	35-45	30-40	10-20
	10-20	Sandy clay loam	SC	A-6	0	0	100	100	80-90	35-45	30-40	10-20
	20-24	Very fine sandy loam	ML	A-4	0	0	100	100	70-100	50-65	20-30	NP-10
	24-30	Loamy fine sand	SC	A-2, A-4	0	0	100	100	65-80	20-45	15-25	NP-10
	30-80	Gravelly sand	SP-SC	A-1, A-3, A-2-4	0	0	75-90	50-90	25-35	0-10	0-0	NP
1782:												
Broadwater, frequently flooded-------	0-3	Loamy sand	SC	A-2, A-1-b, A-4	0	0	100	100	50-75	15-30	15-25	NP-10
	3-9	Loamy sand	SC	A-2, A-4, A-1-b	0	0	100	100	50-75	15-30	15-25	NP-10
	9-32	Gravelly coarse sand	SP	A-1, A-3, A-2	0	0	70-100	50-95	25-60	0-15	0-0	NP
	32-60	Gravelly coarse sand	SP	A-1, A-3, A-2	0	0	70-100	50-95	25-60	0-15	0-0	NP
1944:												
Calamus, very rarely flooded	0-7	Loamy sand	SM	A-2, A-3	0	0	100	90-100	50-75	15-30	15-25	NP-5
	7-14	Sand	SP-SM	A-3	0	0	100	90-100	50-70	5-15	0-0	NP
	14-22	Sand	SP-SM	A-3	0	0	100	90-100	50-70	5-15	0-0	NP
	22-38	Sand	SP-SM	A-3	0	0	100	90-100	65-80	5-15	0-0	NP
	38-58	Stratified gravelly coarse sand to coarse sand	SP-SC	A-2, A-1, A-3	0	0	70-100	50-90	25-65	0-15	0-0	NP
	58-60	Stratified gravelly coarse sand to coarse sand	SP-SC	A-2, A-1, A-3	0	0	70-100	50-90	25-65	0-15	0-0	NP

Table 18.--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	
2072:												
Chappell-------	0-7	Fine sandy loam	SC	A-2, A-4	0	0	100	100	70-85	40-55	15-30	NP-10
	7-17	Fine sandy loam	SC	A-2, A-4	0	0	100	100	70-85	40-55	15-30	NP-10
	17-25	Fine sandy loam	SC	A-2, A-4	0	0	100	100	70-85	40-55	15-30	NP-10
	25-30	Fine sandy loam	SC	A-2, A-4	0	0	100	100	70-85	40-55	15-30	NP-10
	30-60	Gravelly coarse sand	SP-SC	A-1	0	0-5	70-85	50-90	25-65	0-15	0-0	NP
Alice----------	0-8	Sandy loam	SC, SC-SM, SM	A-4	0	0	100	100	60-70	30-40	15-30	NP-10
	8-14	Sandy loam	SC-SM, SC, SM	A-4	0	0	100	100	60-70	30-40	15-30	NP-10
	14-19	Sandy loam	SC, SC-SM, SM	A-4	0	0	100	100	60-70	30-40	15-30	NP-10
	19-33	Sandy loam	SC-SM, SC, SM	A-4	0	0	100	100	60-70	30-40	15-30	NP-10
	33-80	Sandy loam	SC-SM, SC, SM	A-4	0	0	100	100	60-70	30-40	15-30	NP-10
Broadwater-----	0-3	Loamy sand	SC	A-1-b, A-2, A-4	0	0	100	100	50-75	15-30	15-25	NP-10
	3-9	Loamy sand	SC	A-2, A-4, A-1-b	0	0	100	100	50-75	15-30	15-25	NP-10
	9-32	Gravelly coarse sand	SP	A-1, A-3, A-2	0	0	70-100	50-95	25-60	0-15	0-0	NP
	32-60	Gravelly coarse sand	SP	A-1, A-2, A-3	0	0	70-100	50-95	25-60	0-15	0-0	NP
2630:												
Duroc----------	0-6	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	30-40	5-15
	6-14	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	30-40	5-15
	14-27	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	30-40	5-15
	27-32	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	30-40	5-15
	32-42	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	30-40	5-15
	42-60	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	30-40	5-15
2638:												
Duroc----------	0-12	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	30-40	5-15
	12-24	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	30-40	5-15
	24-31	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	30-40	5-15
	31-37	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	30-40	5-15
	37-46	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	30-40	5-15
	46-60	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	30-40	5-15
2639:												
Duroc----------	0-12	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	30-40	5-15
	12-24	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	30-40	5-15
	24-31	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	30-40	5-15
	31-37	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	30-40	5-15
	37-46	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	30-40	5-15
	46-60	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	30-40	5-15

Table 18.--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	
3050:												
Glenberg,												
rarely flooded	0-8	Fine sandy loam	SC	A-2, A-4	0	0	100	100	70-85	40-55	15-30	NP-10
	8-60	Stratified loamy fine sand to fine sandy loam to very fine sandy loam	SC	A-2, A-4	0	0	100	100	65-95	20-65	15-30	NP-10
3140:												
Gothenburg,												
occasionally												
flooded-------	0-5	Loamy sand	SM	A-2	0	0	100	90-100	50-70	15-30	15-25	NP
	5-14	Sand	SP-SM	A-3	0	0	100	90-100	50-70	5-15	0-0	NP
	14-60	Coarse sand	SP-SC	A-1, A-3, A-2	0	0	70-100	50-95	25-65	0-15	0-0	NP
3952:												
Jankosh--------	0-2	Loam	CL	A-4	0	0	100	100	85-95	60-75	30-40	5-15
	2-4	Loam	CL	A-4	0	0	100	100	85-95	60-75	30-40	5-15
	4-14	Sandy clay loam	SC	A-6	0	0	100	100	80-90	35-45	30-40	10-20
	14-18	Loam	CL	A-4	0	0	100	100	85-95	60-75	30-40	5-15
	18-33	Very fine sandy loam	ML	A-4	0	0	100	100	85-95	50-65	20-30	NP-10
	33-60	Gravelly coarse sand	SP	A-1, A-2, A-3	0	0	70-100	50-95	25-65	0-15	0-0	NP
4028:												
Jayem----------	0-6	Fine sandy loam	SC	A-2, A-4	0	0	100	100	70-85	40-55	15-30	NP-10
	6-9	Fine sandy loam	SC	A-2, A-4	0	0	100	100	70-85	40-55	15-30	NP-10
	9-22	Fine sandy loam	SC	A-2, A-4	0	0	100	100	70-85	40-55	15-30	NP-10
	22-50	Fine sandy loam	SC	A-2, A-4	0	0	100	100	70-85	40-55	15-30	NP-10
	50-60	Fine sandy loam	SC	A-2, A-4	0	0	100	100	70-85	40-55	15-30	NP-10

Table 18.--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	
4070:												
Johnstown------	0-9	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	30-40	5-15
	9-25	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	85-95	35-50	15-35
	25-29	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	85-95	35-50	15-35
	29-35	Loam	CL	A-6, A-7	0	0	100	100	85-100	60-75	30-40	10-20
	35-46	Very fine sandy loam	ML	A-4	0	0	100	100	70-100	50-65	20-30	NP-10
	46-60	Coarse sand	SP-SC	A-1, A-3, A-2	0	0	70-100	50-95	25-65	0-15	0-0	NP
Satanta, sandy substratum----	0-8	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	30-40	5-15
	8-25	Clay loam	CL	A-6, A-7	0	0	100	100	90-100	70-80	35-45	15-25
	25-32	Loam	CL	A-6, A-7	0	0	100	100	85-100	60-75	30-40	10-20
	32-52	Very fine sandy loam	ML	A-4, A-6	0	0	100	100	85-95	50-65	20-30	NP-10
	52-60	Sand	SP-SM	A-3	0	0	100	100	50-70	5-15	0-0	NP
Richfield------	0-7	Loam	CL	A-4	0	0	100	100	85-95	60-75	30-40	5-15
	7-12	Silty clay	CH	A-7	0	0	100	100	95-100	90-95	50-70	25-40
	12-17	Silty clay loam	CL	A-7	0	0	100	100	95-100	85-95	35-50	15-35
	17-21	Silt loam	CL-ML, CL, ML	A-4	0	0	100	100	90-100	70-90	25-35	5-15
	21-32	Silt loam	CL-ML, CL, ML	A-4	0	0	100	100	90-100	70-90	25-35	5-15
	32-42	Silt loam	CL, ML, CL-ML	A-4	0	0	100	100	90-100	70-90	25-35	5-15
	42-48	Fine sandy loam	SC	A-2, A-4	0	0	100	100	70-85	40-55	15-30	NP-10
	48-78	Sandy loam	SC, SC-SM, SM	A-2, A-4	0	0	100	100	60-70	30-40	15-30	NP-10
	78-80	Gravelly coarse sand	SP-SC	A-2-4, A-1, A-3	0	0	70-100	50-90	25-65	0-15	0-0	NP
4151:												
Keith----------	0-6	Loam	CL	A-4	0	0	100	100	85-95	60-75	30-40	5-15
	6-13	Loam	CL	A-4	0	0	100	100	85-95	60-75	30-40	5-15
	13-22	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	85-95	35-50	5-15
	22-31	Silt loam	CL, CL-ML, ML	A-6, A-7	0	0	100	100	90-100	70-90	25-35	5-15
	31-48	Silt loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	90-100	70-90	25-35	5-15
	48-60	Very fine sandy loam	ML	A-4, A-6	0	0	100	100	85-95	50-65	20-30	NP-10
4152:												
Keith----------	0-7	Loam	CL	A-4	0	0	100	100	85-95	60-75	30-40	5-15
	7-14	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	85-95	35-50	5-15
	14-19	Silt loam	CL-ML, CL, ML	A-6, A-7	0	0	100	100	90-100	70-90	25-35	5-15
	19-25	Loam	ML	A-4	0	0	100	100	85-95	60-75	30-40	NP-15
	25-60	Loam	ML	A-4	0	0	100	100	85-95	60-75	30-40	NP-15

Table 18.--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	
4310:												
Kuma-----------	0-7	Loam	CL	A-4	0	0	100	100	85-95	60-75	30-40	5-15
	7-17	Loam	CL	A-4	0	0	100	100	85-95	60-75	30-40	5-15
	17-24	Loam	CL	A-6, A-7	0	0	100	100	85-95	60-75	30-40	5-15
	24-37	Loam	CL	A-6, A-7	0	0	100	100	85-95	60-75	30-40	5-15
	37-44	Loam	CL	A-6, A-7	0	0	100	100	85-95	60-75	30-40	5-15
	44-60	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	30-40	5-15
4311:												
Kuma-----------	0-6	Loam	CL	A-4	0	0	100	100	85-95	60-75	30-40	5-15
	6-10	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	85-95	35-50	15-35
	10-23	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	85-95	35-50	15-35
	23-33	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	85-95	35-50	15-35
	33-41	Silt loam	CL, ML, CL-ML	A-4	0	0	100	100	90-100	70-90	25-35	5-15
	41-60	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	30-40	5-15
4472:												
Las Animas, frequently flooded-------	0-5	Loam	CL	A-4	0	0	100	100	85-95	60-75	30-40	5-15
	5-11	Fine sandy loam	SC-SM	A-2, A-4	0	0	100	100	70-85	40-55	20-30	NP-10
	11-33	Stratified sandy loam to fine sandy loam	SC	A-2, A-4	0	0	100	100	70-85	40-55	15-30	NP-10
	33-60	Stratified loamy fine sand to very fine sandy loam	SC	A-2, A-4	0	0	100	100	65-95	20-65	15-30	NP-10
4475:												
Las Animas, occasionally flooded-------	0-5	Loam	CL	A-4	0	0	100	100	85-95	60-75	30-40	5-15
	5-11	Fine sandy loam	SC-SM	A-2, A-4	0	0	100	100	70-85	40-55	20-30	NP-10
	11-33	Stratified sandy loam to fine sandy loam	SC	A-2, A-4	0	0	100	100	70-85	40-55	15-30	NP-10
	33-60	Stratified loamy fine sand to very fine sandy loam	SC	A-2, A-4	0	0	100	100	65-95	20-65	15-30	NP-10

Table 18.--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	
4592: Lexsworth, very rarely flooded	0-12	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	30-40	5-15
	12-19	Sandy clay loam	SC	A-6	0	0	100	100	80-90	35-45	30-40	10-20
	19-26	Coarse sandy loam	SC	A-2, A-4	0	0	100	90-100	60-70	40-55	15-30	NP-10
	26-33	Coarse sand	SP-SC	A-1, A-2, A-3	0	0	95-100	75-95	25-65	3-15	0-0	NP
	33-52	Coarse sand	SP-SC	A-2, A-1, A-3	0	0	95-100	75-95	25-65	3-15	0-0	NP
	52-60	Fine sand	SP-SC	A-1, A-2, A-3	0	0	95-100	90-100	65-80	3-15	0-0	NP
	60-80	Coarse sand	SP-SC	A-1, A-2, A-3	0	0	85-100	75-95	25-65	3-15	0-0	NP
4655: Lodgepole, ponded--------	0-5	Silt loam	CL, ML, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	25-35	5-15
	5-14	Silty clay	CH	A-7	0	0	100	100	95-100	90-95	50-70	25-40
	14-26	Silty clay	CH	A-7	0	0	100	100	95-100	90-95	50-70	25-40
	26-32	Silty clay loam	CL	A-7	0	0	100	100	95-100	85-95	35-50	15-25
	32-48	Loam	CL	A-4	0	0	100	100	85-95	60-75	30-40	5-15
	48-60	Loam	CL	A-4	0	0	100	100	85-95	60-75	30-40	5-15
5212: Merrick, very rarely flooded	0-12	Sandy clay loam	SC	A-6	0	0	100	100	85-100	60-75	30-40	10-20
	12-27	Clay loam	CL	A-4, A-6	0	0	100	100	90-100	70-80	20-40	10-20
	27-38	Clay loam	CL	A-6	0	0	100	100	90-100	70-80	30-40	10-20
	38-42	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	30-40	5-15
	42-53	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	30-40	5-15
	53-64	Very fine sandy loam	ML	A-4, A-6	0	0	100	100	85-95	50-65	20-30	NP-10
	64-80	Very fine sandy loam	ML	A-4, A-6	0	0	100	100	85-95	50-65	20-30	NP-10
6132: Platte, occasionally flooded-------	0-5	Loam	CL	A-4, A-6	0	0	100	95-100	85-95	60-70	30-40	5-15
	5-11	Fine sandy loam	ML	A-4	0	0	100	95-100	70-95	60-75	15-20	NP-10
	11-18	Fine sandy loam	ML, CL-ML, SC-SM, SM	A-4	0	0	100	95-100	70-95	60-75	15-20	NP-10
	18-60	Gravelly coarse sand	SP	A-1, A-3, A-2	0	0	70-100	50-95	25-65	0-15	0-0	NP

Table 18.--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	
6248:												
Ralton, very rarely flooded	0-6	Loam	CL	A-4	0	0	100	100	85-95	60-75	30-40	5-15
	6-14	Loam	CL	A-4	0	0	100	100	85-95	60-75	30-40	5-15
	14-24	Stratified very fine sandy loam to loam	ML	A-4	0	0	100	100	85-95	50-75	15-35	NP-10
	24-34	Very fine sandy loam	ML	A-4	0	0	100	100	85-95	60-75	20-30	NP-10
	34-51	Loam	CL	A-4	0	0	100	100	85-95	60-75	30-40	5-15
	51-71	Very fine sandy loam	ML	A-4	0	0	100	100	85-95	50-65	20-30	NP-10
	71-80	Gravelly loamy coarse sand	SP-SC	A-1	0	0	70-100	50-90	25-65	0-15	0-0	NP
6625:												
Sarben---------	0-7	Loamy fine sand	SC	A-2	0	0	100	100	65-80	20-35	15-25	NP-10
	7-15	Fine sandy loam	SC-SM	A-4	0	0	100	100	70-85	40-55	20-30	NP-10
	15-32	Fine sandy loam	SC-SM	A-4	0	0	100	100	70-85	40-55	20-30	NP-10
	32-60	Fine sandy loam	SC-SM	A-4	0	0	100	100	70-85	40-55	20-30	NP-10
6626:												
Sarben---------	0-7	Loamy fine sand	SC	A-2	0	0	100	100	65-80	20-35	15-25	NP-10
	7-15	Fine sandy loam	SC-SM	A-4	0	0	100	100	70-85	40-55	20-30	NP-10
	15-32	Fine sandy loam	SC-SM	A-4	0	0	100	100	70-85	40-55	20-30	NP-10
	32-60	Fine sandy loam	SC-SM	A-4	0	0	100	100	70-85	40-55	20-30	NP-10
6722:												
Satanta--------	0-6	Very fine sandy loam	ML	A-4, A-6	0	0	100	100	85-95	50-65	20-30	NP-10
	6-13	Clay loam	CL	A-6, A-7	0	0	100	100	90-100	70-80	35-45	15-25
	13-19	Clay loam	CL	A-6, A-7	0	0	100	100	90-100	70-80	35-45	15-25
	19-26	Very fine sandy loam	ML	A-4, A-6	0	0	100	100	85-95	50-65	20-30	NP-10
	26-52	Very fine sandy loam	ML	A-4, A-6	0	0	100	100	85-95	50-65	20-30	NP-10
	52-76	Loamy fine sand	SC	A-2, A-3	0	0	100	100	65-80	20-35	15-25	NP-10
Altvan---------	0-5	Fine sandy loam	SC	A-2, A-4	0	0	100	100	70-85	40-55	15-30	NP-10
	5-10	Clay loam	CL	A-4, A-6	0	0	100	100	90-100	60-80	35-45	15-25
	10-14	Clay loam	CL	A-4, A-6	0	0	100	100	90-100	60-80	35-45	15-25
	14-24	Loam	CL	A-4	0	0	100	100	85-95	60-75	30-40	5-15
	24-38	Very fine sandy loam	ML	A-4, A-6	0	0	100	100	85-95	50-65	20-30	NP-10
	38-80	Coarse sand	SP-SC	A-1, A-2, A-3	0	0	70-100	50-95	25-65	0-15	0-0	NP

Table 18.--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	
6725:												
Satanta, sandy substratum----	0-9	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	30-40	5-15
	9-14	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	30-40	5-15
	14-26	Clay loam	CL	A-6, A-7	0	0	100	100	90-100	70-80	35-45	15-25
	26-31	Loam	CL	A-6, A-7	0	0	100	100	85-100	60-75	30-40	10-20
	31-55	Very fine sandy loam	ML	A-4, A-6	0	0	100	100	85-95	50-65	20-30	NP-10
	55-80	Sand	SP-SM	A-3	0	0	100	100	50-70	5-15	0-0	NP
Ascalon--------	0-6	Fine sandy loam	SC	A-2, A-4	0	0	100	100	70-85	40-55	15-30	NP-10
	6-19	Sandy clay loam	SC	A-6	0	0	100	100	80-90	35-45	30-40	10-20
	19-35	Fine sandy loam	SC	A-4, A-6	0	0	100	100	70-85	40-55	15-30	NP-10
	35-40	Fine sandy loam	SC	A-2, A-4	0	0	100	100	70-85	40-55	15-30	NP-10
	40-46	Loamy fine sand	SC	A-2, A-4	0	0	100	100	65-80	20-45	15-25	NP-10
	46-80	Stratified coarse sand to sand to loamy fine sand	SC	A-2, A-4	0	0	70-100	50-100	25-80	20-35	0-25	NP-10
6727:												
Satanta, sandy substratum----	0-9	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	30-40	5-15
	9-14	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	30-40	5-15
	14-26	Clay loam	CL	A-6, A-7	0	0	100	100	90-100	70-80	35-45	15-25
	26-31	Loam	CL	A-6, A-7	0	0	100	100	85-100	60-75	30-40	10-20
	31-55	Very fine sandy loam	ML	A-4, A-6	0	0	100	100	85-95	50-65	20-30	NP-10
	55-80	Sand	SP-SM	A-3	0	0	100	100	50-70	5-15	0-0	NP
Johnstown------	0-6	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	30-40	5-15
	6-23	Clay loam	CL	A-6, A-7	0	0	100	100	90-100	70-80	35-50	15-25
	23-36	Clay loam	CL	A-6, A-7	0	0	100	100	90-100	70-80	35-50	15-25
	36-42	Very fine sandy loam	ML	A-4, A-6	0	0	100	100	85-95	50-65	20-30	NP-10
	42-58	Very fine sandy loam	ML	A-4, A-6	0	0	100	100	85-95	50-65	20-30	NP-10
	58-80	Sand	SP-SM	A-3	0	0	100	100	50-70	5-15	0-0	NP
Altvan---------	0-5	Loam	CL	A-4	0	0	100	100	85-95	60-75	30-40	5-15
	5-10	Clay loam	CL	A-4, A-6	0	0	100	100	90-100	60-80	35-45	15-25
	10-17	Clay loam	CL	A-4, A-6	0	0	100	100	90-100	60-80	35-45	15-25
	17-24	Loam	CL	A-4	0	0	100	100	85-95	60-75	30-40	5-15
	24-30	Loam	CL	A-4	0	0	100	100	85-95	60-75	30-40	5-15
	30-80	Coarse sand	SP-SC	A-1, A-3, A-2	0	0	85-100	75-95	25-65	3-15	0-0	NP

Table 18.--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	
6817:												
Scoville-------	0-6	Loamy fine sand	SC	A-2	0	0	100	100	65-80	20-35	15-25	NP-10
	6-10	Loamy fine sand	SC	A-2, A-3	0	0	100	100	65-80	20-35	15-25	NP-10
	10-42	Fine sand	SP-SM	A-3	0	0	100	100	65-80	20-35	0-0	NP
	42-46	Very fine sandy loam	ML	A-4	0	0	100	100	85-95	40-65	20-30	NP-10
	46-60	Loamy fine sand	SC	A-2, A-3	0	0	100	100	65-80	20-35	15-25	NP-10
6930:												
Sidney---------	0-11	Loam	CL	A-4, A-6	0	0	95-100	90-100	85-95	60-75	30-40	5-15
	11-17	Loam	CL	A-4, A-6	0	0	95-100	85-100	85-95	60-75	30-40	5-15
	17-29	Very fine sandy loam	ML	A-4, A-6	0	0	95-100	80-100	85-95	50-65	20-30	NP-10
	29-48	Very fine sandy loam	ML	A-4, A-6	0	0	95-100	80-100	85-95	50-60	20-30	NP-10
	48-60	Weathered bedrock	---	---	---	---	---	---	---	---	0-0	---
6937:												
Sidney---------	0-11	Loam	CL	A-6, A-4	0	0	95-100	90-100	85-95	60-75	30-40	5-15
	11-17	Loam	CL	A-4, A-6	0	0	95-100	85-100	85-95	60-75	30-40	5-15
	17-29	Very fine sandy loam	ML	A-4, A-6	0	0	95-100	80-100	85-95	50-65	20-30	NP-10
	29-48	Very fine sandy loam	ML	A-4, A-6	0	0	95-100	80-100	85-95	50-60	20-30	NP-10
	48-60	Weathered bedrock	---	---	---	---	---	---	---	---	0-0	---
Canyon---------	0-5	Loam	CL	A-4	0	0-5	95-100	95-100	50-67	60-75	30-40	5-15
	5-10	Very fine sandy loam	ML	A-4, A-2, A-6	0	0-5	95-100	95-100	40-57	65-75	20-30	NP-10
	10-60	Weathered bedrock	---	---	---	---	---	---	---	---	0-0	---

Table 18.--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	
7120:												
Sulco, moderately eroded--------	0-5	Loam	CL	A-4, A-6	0	0	100	100	80-95	60-75	30-40	5-15
	5-16	Loam	CL	A-4	0	0	100	100	80-95	60-75	30-40	5-15
	16-26	Loam	CL	A-4	0	0	100	100	80-95	60-75	30-40	5-15
	26-60	Loam	CL	A-4	0	0	100	100	80-95	60-75	30-40	5-15
McConaughy, moderately eroded--------	0-7	Loam	CL	A-4, A-6	0	0	100	100	80-95	60-75	30-40	5-15
	7-18	Loam	CL	A-4, A-6	0	0	100	100	80-95	60-75	30-40	5-15
	18-28	Loam	CL	A-4, A-6	0	0	100	100	80-95	60-75	30-40	5-15
	28-60	Loam	CL	A-4, A-6	0	0	100	100	80-95	60-75	30-40	5-15
7121:												
Sulco, moderately eroded--------	0-5	Loam	CL	A-4, A-6	0	0	100	100	80-95	60-75	30-40	5-15
	5-16	Loam	CL	A-4	0	0	100	100	80-95	60-75	30-40	5-15
	16-26	Loam	CL	A-4	0	0	100	100	80-95	60-75	30-40	5-15
	26-60	Loam	CL	A-4	0	0	100	100	80-95	60-75	30-40	5-15
McConaughy, moderately eroded--------	0-7	Loam	CL	A-4, A-6	0	0	100	100	80-95	60-75	30-40	5-15
	7-18	Loam	CL	A-4, A-6	0	0	100	100	80-95	60-75	30-40	5-15
	18-28	Loam	CL	A-4, A-6	0	0	100	100	80-95	60-75	30-40	5-15
	28-60	Loam	CL	A-4, A-6	0	0	100	100	80-95	60-75	30-40	5-15
7122:												
Sulco, moderately eroded--------	0-5	Loam	CL	A-4, A-6	0	0	100	100	80-95	60-75	30-40	5-15
	5-16	Loam	CL	A-4	0	0	100	100	80-95	60-75	30-40	5-15
	16-26	Loam	CL	A-4	0	0	100	100	80-95	60-75	30-40	5-15
	26-60	Loam	CL	A-4	0	0	100	100	80-95	60-75	30-40	5-15
McConaughy, moderately eroded--------	0-7	Loam	CL	A-4, A-6	0	0	100	100	80-95	60-75	30-40	5-15
	7-18	Loam	CL	A-4, A-6	0	0	100	100	80-95	60-75	30-40	5-15
	18-28	Loam	CL	A-4, A-6	0	0	100	100	80-95	60-75	30-40	5-15
	28-60	Loam	CL	A-4, A-6	0	0	100	100	80-95	60-75	30-40	5-15

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
7582:												
Valent---------	0-4	Fine sand	SP-SM	A-3	0	0	100	100	65-80	20-35	0-0	NP
	4-60	Fine sand	SP-SM	A-3	0	0	100	100	65-80	20-35	0-0	NP
7586:												
Valent---------	0-4	Fine sand	SP-SM	A-3	0	0	100	100	65-80	20-35	0-0	NP
	4-60	Fine sand	SP-SM	A-3	0	0	100	100	65-80	20-35	0-0	NP
7588:												
Valent, rolling	0-4	Fine sand	SP-SM	A-3	0	0	100	100	65-80	20-35	0-0	NP
	4-60	Fine sand	SP-SM	A-3	0	0	100	100	65-80	20-35	0-0	NP
Valent, hilly--	0-4	Fine sand	SP-SM	A-3	0	0	100	100	65-80	20-35	0-0	NP
	4-60	Fine sand	SP-SM	A-3	0	0	100	100	65-80	20-35	0-0	NP

Table 19.--Physical Properties of the Soils

(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.)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors K	Erosion factors Kf	Erosion factors T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	g/cc	in/hr	In/in	Pct	Pct					
1130:												
Alliance--------	0-6	18-27	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-3.0	.28	.28	4	5	56
	6-17	25-35	1.30-1.50	0.20-0.60	0.17-0.19	3.0-5.9	0.5-1.0	.37	.37			
	17-24	10-27	1.45-1.65	0.60-2.00	0.17-0.18	0.0-2.9	0.5-1.0	.24	.24			
	24-34	10-27	1.45-1.65	0.60-2.00	0.17-0.18	0.0-2.9	0.5-1.0	.24	.24			
	34-47	10-20	1.30-1.40	0.60-2.00	0.16-0.17	0.0-1.0	0.5-1.0	.24	.24			
	47-54	2-5	1.60-1.80	20.00-20.00	0.05-0.07	0.0-2.9	0.0-0.5	.15	.15			
	54-80	---	---	0.20-0.60	---	---	---	---	---			
1146:												
Alliance--------	0-6	18-27	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-3.0	.28	.28	4	5	56
	6-14	25-35	1.30-1.50	0.20-0.60	0.17-0.19	3.0-5.9	0.5-1.0	.37	.37			
	14-19	25-35	1.30-1.50	0.20-0.60	0.17-0.19	3.0-5.9	0.5-1.0	.37	.37			
	19-25	10-27	1.45-1.65	0.60-2.00	0.17-0.18	0.0-2.9	0.5-1.0	.24	.24			
	25-45	10-20	1.30-1.40	0.60-2.00	0.16-0.17	0.0-1.0	0.5-1.0	.24	.24			
	45-60	---	---	0.20-0.60	---	---	---	---	---			
Rosebud---------	0-6	18-27	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-3.0	.28	.28	3	5	56
	6-11	25-35	1.30-1.50	0.20-0.60	0.17-0.19	3.0-5.9	0.5-1.0	.37	.37			
	11-17	25-35	1.30-1.50	0.20-0.60	0.17-0.18	3.0-5.9	0.5-1.0	.43	.43			
	17-23	10-27	1.45-1.65	0.60-2.00	0.17-0.18	0.0-2.9	0.5-1.0	.24	.24			
	23-30	10-20	1.30-1.40	0.60-2.00	0.16-0.17	0.0-1.0	0.5-1.0	.24	.24			
	30-80	---	---	0.20-0.60	---	---	---	---	---			
1198:												
Altvan----------	0-7	8-20	1.30-1.50	2.00-6.00	0.16-0.18	0.0-2.9	1.0-3.0	.20	.20	4	5	56
	7-12	18-27	1.45-1.65	0.60-2.00	0.20-0.22	0.0-2.9	1.0-2.0	.28	.28			
	12-17	25-35	1.30-1.50	0.20-0.60	0.17-0.19	3.0-5.9	0.5-1.0	.37	.37			
	17-25	10-20	1.30-1.40	0.60-2.00	0.16-0.17	0.0-1.0	0.5-1.0	.24	.24			
	25-31	5-15	1.55-1.75	6.00-20.00	0.08-0.10	0.0-1.0	0.0-0.5	.17	.17			
	31-80	0-5	1.65-1.85	20.00-20.00	0.02-0.04	0.0-2.9	0.5-1.0	.10	.28			
Eckley----------	0-5	10-20	1.30-1.50	2.00-6.00	0.13-0.15	0.0-1.0	1.0-3.0	.20	.28	3	3	86
	5-8	20-30	1.35-1.55	0.20-0.60	0.16-0.18	0.0-2.9	0.5-2.0	.15	.28			
	8-11	10-20	1.50-1.70	2.00-6.00	0.12-0.14	0.0-2.9	0.5-1.0	.15	.28			
	11-15	0-5	1.65-1.85	20.00-20.00	0.02-0.04	0.0-2.9	0.5-1.0	.10	.28			
	15-80	0-5	1.65-1.85	20.00-20.00	0.02-0.04	0.0-2.9	0.5-1.0	.10	.28			
Satanta, sandy substratum-----	0-10	18-27	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-3.0	.28	.28	5	6	48
	10-21	10-27	1.45-1.65	0.60-2.00	0.17-0.18	0.0-2.9	0.5-1.0	.24	.24			
	21-30	25-35	1.30-1.50	0.20-0.60	0.17-0.18	3.0-5.9	0.5-1.0	.43	.43			
	30-37	8-20	1.40-1.60	0.60-2.00	0.16-0.18	0.0-1.0	0.0-0.5	.43	.43			
	37-42	10-20	1.30-1.40	0.60-2.00	0.16-0.17	0.0-1.0	0.5-1.0	.24	.24			
	42-50	2-5	1.60-1.80	20.00-20.00	0.05-0.07	0.0-2.9	0.0-0.5	.15	.15			
	50-80	2-5	1.60-1.80	6.00-20.00	0.05-0.07	0.0-2.9	0.0-0.5	.15	.15			
1295:												
Ashollow--------	0-3	5-18	1.20-1.40	0.60-2.00	0.17-0.19	0.0-1.0	1.0-2.0	.37	.37	5	3	86
	3-10	5-18	1.40-1.65	0.60-2.00	0.16-0.18	0.0-1.0	1.0-2.0	.37	.37			
	10-32	5-18	1.40-1.65	0.60-2.00	0.16-0.18	0.0-1.0	0.5-1.0	.43	.43			
	32-60	5-18	1.40-1.65	0.60-2.00	0.16-0.18	0.0-1.0	0.5-1.0	.43	.43			
Tassel----------	0-4	5-12	1.30-1.70	2.00-6.00	0.16-0.18	0.0-2.9	0.5-1.0	.24	.24	2	3	86
	4-7	5-12	1.50-1.70	2.00-6.00	0.12-0.16	0.0-2.9	0.5-1.0	.24	.24			
	7-18	5-12	1.50-1.70	2.00-6.00	0.12-0.16	0.0-2.9	0.0-0.5	.10	.20			
	18-60	---	---	0.20-0.60	---	---	---	---	---			

Table 19.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors K	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	g/cc	in/hr	In/in	Pct	Pct					
1588:												
Blueridge-------	0-4	0-5	1.45-1.65	20.00-20.00	0.04-0.06	0.0-2.9	0.5-1.0	.10	.10	2	1	160
	4-40	0-3	1.65-1.85	20.00-20.00	0.02-0.04	0.0-0.0	0.0-0.5	.05	.10			
	40-80	0-3	1.65-1.85	20.00-20.00	0.02-0.04	0.0-0.0	0.0-0.5	.05	.10			
Altvan----------	0-7	18-27	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-3.0	.28	.28	4	5	56
	7-10	20-30	1.35-1.55	0.20-0.60	0.15-0.17	0.0-2.9	0.5-1.0	.24	.24			
	10-20	20-30	1.35-1.55	0.20-0.60	0.15-0.17	0.0-2.9	0.5-1.0	.24	.24			
	20-24	10-20	1.30-1.40	0.60-2.00	0.16-0.17	0.0-1.0	0.5-1.0	.24	.24			
	24-30	5-15	1.55-1.75	6.00-20.00	0.08-0.10	0.0-1.0	0.0-0.5	.17	.17			
	30-80	0-5	1.60-1.80	20.00-20.00	0.05-0.07	0.0-2.9	0.0-0.5	.10	.15			
1782:												
Broadwater, frequently flooded--------	0-3	7-15	1.35-1.55	6.00-20.00	0.10-0.12	0.0-1.0	0.5-1.0	.17	.17	3	2	134
	3-9	3-10	1.55-1.75	6.00-20.00	0.08-0.10	0.0-2.9	0.5-1.0	.17	.17			
	9-32	0-3	1.65-1.85	20.00-20.00	0.02-0.04	0.0-0.0	0.0-0.5	.05	.10			
	32-60	0-3	1.65-1.85	20.00-20.00	0.02-0.04	0.0-0.0	0.0-0.5	.05	.10			
1944:												
Calamus, very rarely flooded-	0-7	7-20	1.25-1.55	6.00-20.00	0.10-0.12	0.0-1.0	0.5-1.0	.17	.17	5	2	134
	7-14	0-5	1.60-1.80	20.00-20.00	0.05-0.07	0.0-0.0	0.5-1.0	.17	.17			
	14-22	0-5	1.60-1.80	20.00-20.00	0.05-0.07	0.0-0.0	0.5-1.0	.17	.17			
	22-38	0-5	1.60-1.80	20.00-20.00	0.05-0.07	0.0-0.0	0.5-1.0	.17	.17			
	38-58	0-5	1.65-1.85	20.00-20.00	0.02-0.04	0.0-1.0	0.0-0.5	.15	.17			
	58-60	0-5	1.65-1.85	20.00-20.00	0.02-0.04	0.0-1.0	0.0-0.5	.15	.17			
2072:												
Chappell--------	0-7	8-20	1.30-1.50	2.00-6.00	0.16-0.18	0.0-2.9	1.0-2.0	.20	.20	4	3	86
	7-17	8-20	1.30-1.50	2.00-6.00	0.12-0.16	0.0-2.9	1.0-2.0	.20	.20			
	17-25	8-20	1.50-1.70	2.00-6.00	0.12-0.16	0.0-2.9	0.5-1.0	.28	.28			
	25-30	8-20	1.50-1.70	2.00-6.00	0.12-0.16	0.0-2.9	0.5-1.0	.28	.28			
	30-60	8-20	1.65-1.85	20.00-20.00	0.02-0.04	0.0-2.9	0.0-0.5	.10	.10			
Alice-----------	0-8	7-10	1.30-1.50	2.00-6.00	0.13-0.15	0.0-1.0	1.0-2.0	.20	.20	5	3	86
	8-14	7-10	1.30-1.50	2.00-6.00	0.13-0.15	0.0-1.0	1.0-2.0	.20	.20			
	14-19	5-18	1.50-1.70	2.00-6.00	0.12-0.14	0.0-1.0	0.5-1.0	.28	.28			
	19-33	5-18	1.50-1.70	2.00-6.00	0.11-0.13	0.0-1.0	0.5-1.0	.28	.28			
	33-80	5-18	1.50-1.70	2.00-6.00	0.11-0.13	0.0-1.0	0.5-1.0	.28	.28			
Broadwater------	0-3	7-15	1.35-1.55	6.00-20.00	0.10-0.12	0.0-1.0	0.5-1.0	.17	.17	3	2	134
	3-9	3-10	1.55-1.75	6.00-20.00	0.08-0.10	0.0-2.9	0.5-1.0	.17	.17			
	9-32	0-3	1.65-1.85	20.00-20.00	0.02-0.04	0.0-0.0	0.0-0.5	.05	.10			
	32-60	0-3	1.65-1.85	20.00-20.00	0.02-0.04	0.0-0.0	0.0-0.5	.05	.10			
2630:												
Duroc-----------	0-6	15-20	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-3.0	.28	.28	5	5	56
	6-14	15-20	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-3.0	.28	.28			
	14-27	18-27	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	1.0-3.0	.43	.43			
	27-32	18-27	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	1.0-3.0	.43	.43			
	32-42	18-27	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-1.0	.43	.43			
	42-60	18-27	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-1.0	.43	.43			
2638:												
Duroc-----------	0-12	15-20	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-3.0	.28	.28	5	5	56
	12-24	15-20	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-3.0	.28	.28			
	24-31	18-27	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	1.0-3.0	.43	.43			
	31-37	18-27	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-1.0	.43	.43			
	37-46	18-27	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-1.0	.43	.43			
	46-60	18-27	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-1.0	.43	.43			

Table 19.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility (Ksat)	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors K	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	Pct	g/cc	in/hr	In/in	Pct	Pct					
2639:												
Duroc-----------	0-12	15-20	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-3.0	.28	.28	5	5	56
	12-24	15-20	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-3.0	.28	.28			
	24-31	18-27	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	1.0-3.0	.43	.43			
	31-37	18-27	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-1.0	.43	.43			
	37-46	18-27	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-1.0	.43	.43			
	46-60	18-27	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-1.0	.43	.43			
3050:												
Glenberg, rarely flooded--------	0-8	8-20	1.30-1.50	2.00-6.00	0.16-0.18	0.0-2.9	0.5-2.0	.24	.24	5	3	86
	8-60	5-18	1.40-1.75	2.00-6.00	0.08-0.16	0.0-1.0	0.5-1.0	.28	.28			
3140:												
Gothenburg, occasionally flooded--------	0-5	7-15	1.35-1.55	6.00-20.00	0.10-0.12	0.0-1.0	0.5-1.0	.17	.17	2	8	134
	5-14	1-5	1.60-1.70	20.00-20.00	0.05-0.07	0.0-0.0	0.0-0.5	.15	.15			
	14-60	0-3	1.65-1.85	20.00-20.00	0.02-0.04	0.0-0.0	0.0-0.5	.05	.10			
3952:												
Jankosh---------	0-2	15-25	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-3.0	.32	.32	2	4L	86
	2-4	15-25	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	0.5-1.0	.32	.32			
	4-14	20-30	1.35-1.65	0.20-0.60	0.16-0.18	0.0-2.9	0.5-1.0	.37	.37			
	14-18	18-27	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.0-0.5	.43	.43			
	18-33	10-18	1.50-1.70	0.60-2.00	0.17-0.19	0.0-1.0	0.0-0.5	.43	.43			
	33-60	0-3	1.65-1.85	20.00-20.00	0.02-0.04	0.0-0.0	0.0-0.5	.05	.10			
4028:												
Jayem-----------	0-6	5-18	1.30-1.50	2.00-6.00	0.16-0.18	0.0-2.9	1.0-3.0	.20	.20	5	3	86
	6-9	5-18	1.50-1.70	2.00-6.00	0.16-0.18	0.0-2.9	1.0-3.0	.20	.20			
	9-22	5-18	1.50-1.70	2.00-6.00	0.15-0.17	0.0-2.9	0.5-1.0	.32	.32			
	22-50	5-18	1.50-1.70	2.00-6.00	0.12-0.16	0.0-2.9	0.1-0.5	.32	.32			
	50-60	5-18	1.50-1.70	2.00-6.00	0.12-0.16	0.0-2.9	0.1-0.5	.32	.32			
4070:												
Johnstown-------	0-9	18-27	1.25-1.45	0.60-2.00	0.20-0.24	0.0-2.9	1.0-3.0	.28	.28	4	5	56
	9-25	27-35	1.25-1.45	0.20-0.60	0.18-0.20	3.0-5.9	0.5-2.0	.37	.37			
	25-29	27-35	1.25-1.45	0.20-0.60	0.18-0.20	3.0-5.9	0.5-2.0	.37	.37			
	29-35	10-20	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-2.0	.28	.28			
	35-46	10-20	1.30-1.40	0.60-2.00	0.16-0.17	0.0-1.0	0.5-1.0	.24	.24			
	46-60	0-3	1.65-1.85	20.00-20.00	0.02-0.04	0.0-0.0	0.0-0.5	.05	.10			
Satanta, sandy substratum-----	0-8	18-27	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-3.0	.28	.28	5	6	48
	8-25	25-35	1.30-1.50	0.20-0.60	0.17-0.19	3.0-5.9	0.5-2.0	.28	.28			
	25-32	10-20	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-2.0	.28	.28			
	32-52	8-20	1.40-1.60	0.60-2.00	0.16-0.18	0.0-1.0	0.0-0.5	.43	.43			
	52-60	2-5	1.60-1.80	20.00-20.00	0.05-0.07	0.0-0.0	0.0-0.5	.15	.15			
Richfield-------	0-7	18-27	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-3.0	.32	.32	5	6	48
	7-12	40-50	1.20-1.40	0.01-0.06	0.11-0.16	6.0-8.9	1.0-3.0	.28	.28			
	12-17	27-35	1.25-1.45	0.20-0.60	0.18-0.20	3.0-5.9	0.5-2.0	.37	.37			
	17-21	18-27	1.45-1.65	0.60-2.00	0.18-0.20	0.0-2.9	0.5-1.0	.43	.43			
	21-32	18-27	1.45-1.65	0.60-2.00	0.18-0.20	0.0-2.9	0.5-1.0	.43	.43			
	32-42	18-27	1.45-1.65	0.60-2.00	0.18-0.20	0.0-2.9	0.5-1.0	.43	.43			
	42-48	5-18	1.50-1.70	2.00-6.00	0.12-0.16	0.0-2.9	0.5-1.0	.28	.28			
	48-78	5-18	1.50-1.70	2.00-6.00	0.11-0.13	0.0-1.0	0.5-1.0	.28	.28			
	78-80	0-5	1.65-1.85	20.00-20.00	0.02-0.04	0.0-2.9	0.0-0.5	.10	.15			

Table 19.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors K	Erosion factors Kf	Erosion factors T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	g/cc	in/hr	In/in	Pct	Pct					
4151:												
Keith-----------	0-6	18-27	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-3.0	.28	.28	5	5	56
	6-13	18-27	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-3.0	.28	.28			
	13-22	27-35	1.25-1.45	0.20-0.60	0.18-0.20	3.0-5.9	0.5-1.0	.43	.43			
	22-31	20-35	1.40-1.65	0.60-2.00	0.18-0.20	0.0-2.9	0.5-1.0	.43	.43			
	31-48	18-27	1.40-1.65	0.60-2.00	0.18-0.20	0.0-2.9	0.0-0.5	.43	.43			
	48-60	10-18	1.40-1.65	0.60-2.00	0.16-0.18	0.0-1.0	0.0-0.5	.43	.43			
4152:												
Keith-----------	0-7	18-27	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-3.0	.28	.28	5	5	56
	7-14	27-35	1.25-1.45	0.20-0.60	0.18-0.20	3.0-5.9	0.5-1.0	.43	.43			
	14-19	20-35	1.40-1.65	0.60-2.00	0.18-0.20	0.0-2.9	0.5-1.0	.43	.43			
	19-25	10-27	1.45-1.65	0.60-2.00	0.17-0.18	0.0-2.9	0.5-1.0	.24	.24			
	25-60	10-27	1.45-1.65	0.60-2.00	0.17-0.18	0.0-2.9	0.5-1.0	.24	.24			
4310:												
Kuma------------	0-7	18-27	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-3.0	.28	.28	5	5	56
	7-17	18-27	1.25-1.45	0.60-2.00	0.17-0.19	0.0-2.9	1.0-3.0	.28	.28			
	17-24	18-27	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	1.0-2.0	.37	.37			
	24-37	18-27	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	1.0-2.0	.37	.37			
	37-44	18-27	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	1.0-2.0	.37	.37			
	44-60	18-27	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-1.0	.32	.32			
4311:												
Kuma------------	0-6	18-27	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-3.0	.28	.28	5	5	56
	6-10	27-35	1.25-1.45	0.20-0.60	0.18-0.20	3.0-5.9	0.5-2.0	.37	.37			
	10-23	27-35	1.25-1.45	0.20-0.60	0.18-0.20	3.0-5.9	0.5-2.0	.37	.37			
	23-33	27-35	1.25-1.45	0.20-0.60	0.18-0.20	3.0-5.9	0.5-2.0	.37	.37			
	33-41	18-27	1.45-1.65	0.60-2.00	0.18-0.20	0.0-2.9	0.5-1.0	.43	.43			
	41-60	18-27	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-1.0	.32	.32			
4472:												
Las Animas, frequently flooded--------	0-5	15-25	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-2.0	.32	.32	4	4L	86
	5-11	8-18	1.50-1.75	2.00-6.00	0.16-0.18	0.0-1.0	0.5-1.0	.24	.24			
	11-33	8-18	1.50-1.75	2.00-6.00	0.11-0.16	0.0-1.0	0.5-1.0	.24	.24			
	33-60	8-18	1.40-1.75	6.00-20.00	0.08-0.18	0.0-1.0	0.5-1.0	.24	.24			
4475:												
Las Animas, occasionally flooded--------	0-5	15-25	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-2.0	.32	.32	4	4L	86
	5-11	8-18	1.50-1.75	2.00-6.00	0.16-0.18	0.0-1.0	0.5-1.0	.24	.24			
	11-33	8-18	1.50-1.75	2.00-6.00	0.11-0.16	0.0-1.0	0.5-1.0	.24	.24			
	33-60	8-18	1.40-1.75	6.00-20.00	0.08-0.18	0.0-1.0	0.5-1.0	.24	.24			
4592:												
Lexsworth, very rarely flooded-	0-12	18-27	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-3.0	.28	.28	4	5	56
	12-19	20-35	1.30-1.50	0.20-0.60	0.15-0.17	0.0-2.9	0.5-1.0	.28	.28			
	19-26	8-20	1.50-1.70	2.00-6.00	0.06-0.12	0.0-1.0	0.0-0.5	.24	.24			
	26-33	0-3	1.65-1.85	20.00-20.00	0.02-0.04	0.0-0.0	0.0-0.5	.10	.15			
	33-52	0-3	1.65-1.85	20.00-20.00	0.02-0.04	0.0-2.9	0.0-0.5	.10	.15			
	52-60	0-5	1.60-1.80	6.00-20.00	0.05-0.07	0.0-2.9	0.0-0.5	.10	.15			
	60-80	0-3	1.65-1.85	20.00-20.00	0.02-0.04	0.0-0.0	0.0-0.5	.10	.15			

Table 19.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors K	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	g/cc	in/hr	In/in	Pct	Pct					
4655:												
Lodgepole, ponded---------	0-5	18-27	1.20-1.45	0.60-2.00	0.20-0.23	0.0-2.9	2.0-4.0	.37	.37	3	6	48
	5-14	40-50	1.20-1.45	0.01-0.06	0.11-0.16	6.0-8.9	1.0-3.0	.28	.28			
	14-26	40-50	1.25-1.45	0.01-0.06	0.11-0.16	6.0-8.9	1.0-3.0	.28	.28			
	26-32	27-40	1.25-1.45	0.20-0.60	0.18-0.20	6.0-8.9	1.0-3.0	.28	.28			
	32-48	18-27	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-1.0	.43	.43			
	48-60	18-27	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-1.0	.43	.43			
5212:												
Merrick, very rarely flooded-	0-12	18-27	1.15-1.35	0.20-0.60	0.18-0.20	0.0-2.9	2.0-4.0	.28	.28	5	6	48
	12-27	18-27	1.30-1.50	0.20-0.60	0.19-0.22	3.0-5.9	2.0-4.0	.28	.28			
	27-38	27-35	1.30-1.50	0.20-0.60	0.17-0.19	3.0-5.9	0.5-2.0	.37	.37			
	38-42	18-27	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-1.0	.37	.37			
	42-53	18-27	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-1.0	.37	.37			
	53-64	10-18	1.45-1.65	0.60-2.00	0.16-0.18	0.0-1.0	0.5-1.0	.37	.37			
	64-80	10-18	1.45-1.65	0.60-2.00	0.16-0.18	0.0-1.0	0.5-1.0	.37	.37			
6132:												
Platte, occasionally flooded--------	0-5	10-27	1.45-1.65	0.60-2.00	0.20-0.22	0.0-2.9	1.0-3.0	.28	.28	3	4L	86
	5-11	7-18	1.50-1.70	2.00-5.97	0.15-0.17	0.0-2.9	0.0-0.5	.28	.28			
	11-18	7-18	1.50-1.70	2.00-5.97	0.12-0.16	0.0-2.9	0.0-0.5	.28	.28			
	18-60	0-3	1.65-1.85	20.00-20.00	0.02-0.04	0.0-0.0	0.0-0.5	.05	.10			
6248:												
Ralton, very rarely flooded-	0-6	15-25	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-3.0	.28	.28	5	4L	86
	6-14	15-25	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-3.0	.28	.28			
	14-24	10-25	1.40-1.65	0.60-6.00	0.16-0.18	0.0-1.0	0.0-1.0	.43	.43			
	24-34	10-18	1.40-1.65	0.60-2.00	0.16-0.18	0.0-1.0	0.0-1.0	.43	.43			
	34-51	15-25	1.40-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.0-1.0	.43	.43			
	51-71	10-18	1.40-1.65	2.00-6.00	0.16-0.18	0.0-1.0	0.0-1.0	.43	.43			
	71-80	0-5	1.40-1.65	20.00-20.00	0.02-0.04	0.0-2.9	0.0-0.5	.10	.10			
6625:												
Sarben----------	0-7	7-12	1.35-1.55	6.00-20.00	0.10-0.12	0.0-1.0	0.5-1.0	.17	.17	5	2	134
	7-15	10-18	1.50-1.65	2.00-6.00	0.10-0.12	0.0-1.0	0.5-1.0	.24	.24			
	15-32	10-18	1.50-1.65	2.00-6.00	0.08-0.10	0.0-1.0	0.0-0.5	.24	.24			
	32-60	10-18	1.50-1.65	2.00-6.00	0.08-0.10	0.0-1.0	0.0-0.5	.24	.24			
6626:												
Sarben----------	0-7	7-12	1.35-1.55	6.00-20.00	0.10-0.12	0.0-1.0	0.5-1.0	.17	.17	5	2	134
	7-15	10-18	1.50-1.65	2.00-6.00	0.10-0.12	0.0-1.0	0.5-1.0	.24	.24			
	15-32	10-18	1.50-1.65	2.00-6.00	0.08-0.10	0.0-1.0	0.0-0.5	.24	.24			
	32-60	10-18	1.50-1.65	2.00-6.00	0.08-0.10	0.0-1.0	0.0-0.5	.24	.24			
6722:												
Satanta---------	0-6	8-20	1.40-1.60	0.60-2.00	0.16-0.18	0.0-1.0	1.0-3.0	.43	.43	5	6	48
	6-13	25-35	1.30-1.50	0.20-0.60	0.17-0.19	3.0-5.9	0.5-2.0	.28	.28			
	13-19	25-35	1.30-1.50	0.20-0.60	0.17-0.19	3.0-5.9	0.5-2.0	.28	.28			
	19-26	8-20	1.40-1.60	0.60-2.00	0.16-0.18	0.0-1.0	0.0-0.5	.43	.43			
	26-52	8-20	1.40-1.60	0.60-2.00	0.16-0.18	0.0-1.0	0.0-0.5	.43	.43			
	52-76	3-15	1.55-1.75	6.00-20.00	0.08-0.10	0.0-1.0	0.0-0.5	.15	.15			

Table 19.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility (Ksat)	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors K	Erosion factors Kf	Erosion factors T	Wind erodi-bility group	Wind erodi-bility index
	In	Pct	g/cc	in/hr	In/in	Pct	Pct					
6722:												
Altvan----------	0-5	8-20	1.30-1.50	2.00-6.00	0.16-0.18	0.0-2.9	1.0-3.0	.20	.20	4	5	56
	5-10	25-35	1.30-1.50	0.20-0.60	0.17-0.19	3.0-5.9	0.5-1.0	.37	.37			
	10-14	25-35	1.30-1.50	0.20-0.60	0.17-0.19	3.0-5.9	0.5-1.0	.37	.37			
	14-24	18-27	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-1.0	.37	.37			
	24-38	8-20	1.40-1.60	0.60-2.00	0.16-0.18	0.0-1.0	0.0-0.5	.43	.43			
	38-80	0-3	1.65-1.85	20.00-20.00	0.02-0.04	0.0-0.0	0.0-0.5	.05	.10			
6725:												
Satanta, sandy substratum-----	0-9	18-27	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-3.0	.28	.28	5	3	86
	9-14	18-27	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-2.0	.28	.28			
	14-26	25-35	1.30-1.50	0.20-0.60	0.17-0.19	3.0-5.9	0.5-2.0	.28	.28			
	26-31	10-20	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-2.0	.28	.28			
	31-55	8-20	1.40-1.60	0.60-2.00	0.16-0.18	0.0-1.0	0.0-0.5	.43	.43			
	55-80	2-5	1.60-1.80	20.00-20.00	0.05-0.07	0.0-0.0	0.0-0.5	.15	.15			
Ascalon---------	0-6	8-20	1.30-1.50	2.00-6.00	0.16-0.18	0.0-2.9	1.0-3.0	.20	.20	5	3	86
	6-19	20-30	1.35-1.55	0.20-0.60	0.15-0.17	0.0-2.9	0.5-1.0	.24	.24			
	19-35	8-20	1.50-1.70	2.00-6.00	0.15-0.17	0.0-2.9	0.5-1.0	.24	.24			
	35-40	8-20	1.50-1.70	2.00-6.00	0.12-0.16	0.0-2.9	0.5-1.0	.17	.17			
	40-46	5-15	1.55-1.75	6.00-20.00	0.08-0.10	0.0-1.0	0.0-0.5	.17	.17			
	46-80	2-10	1.55-1.75	6.00-20.00	0.05-0.10	0.0-1.0	0.0-0.5	.17	.17			
6727:												
Satanta, sandy substratum-----	0-9	18-27	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-3.0	.28	.28	5	6	48
	9-14	18-27	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-2.0	.28	.28			
	14-26	25-35	1.30-1.50	0.20-0.60	0.17-0.19	3.0-5.9	0.5-2.0	.28	.28			
	26-31	10-20	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-2.0	.28	.28			
	31-55	8-20	1.40-1.60	0.60-2.00	0.16-0.18	0.0-1.0	0.0-0.5	.43	.43			
	55-80	2-5	1.60-1.80	20.00-20.00	0.05-0.07	0.0-0.0	0.0-0.5	.15	.15			
Johnstown-------	0-6	18-27	1.25-1.45	0.60-2.00	0.20-0.24	0.0-2.9	1.0-3.0	.28	.28	4	5	56
	6-23	27-35	1.30-1.50	0.20-0.60	0.17-0.19	3.0-5.9	0.5-2.0	.37	.37			
	23-36	27-35	1.30-1.50	0.20-0.60	0.17-0.19	3.0-5.9	0.5-2.0	.37	.37			
	36-42	8-20	1.40-1.60	0.60-2.00	0.16-0.18	0.0-1.0	0.5-2.0	.43	.43			
	42-58	8-20	1.40-1.60	0.60-2.00	0.16-0.18	0.0-1.0	0.0-0.5	.43	.43			
	58-80	2-5	1.60-1.80	20.00-20.00	0.05-0.07	0.0-0.0	0.0-0.5	.15	.15			
Altvan----------	0-5	18-27	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-3.0	.28	.28	4	5	56
	5-10	25-35	1.30-1.50	0.20-0.60	0.17-0.19	3.0-5.9	0.5-1.0	.37	.37			
	10-17	25-35	1.30-1.50	0.20-0.60	0.17-0.19	3.0-5.9	0.5-1.0	.37	.37			
	17-24	18-27	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-1.0	.37	.37			
	24-30	18-27	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-1.0	.37	.37			
	30-80	0-3	1.65-1.85	20.00-20.00	0.02-0.04	0.0-0.0	0.0-0.5	.10	.15			
6817:												
Scoville--------	0-6	3-15	1.35-1.55	6.00-20.00	0.10-0.12	0.0-1.0	0.5-1.0	.17	.17	5	2	134
	6-10	3-15	1.55-1.75	6.00-20.00	0.10-0.12	0.0-1.0	0.0-0.5	.15	.15			
	10-42	2-7	1.60-1.80	6.00-20.00	0.05-0.07	0.0-0.0	0.0-0.5	.15	.15			
	42-46	8-18	1.40-1.65	0.60-2.00	0.16-0.18	0.0-1.0	0.0-0.5	.24	.24			
	46-60	3-15	1.55-1.75	6.00-20.00	0.08-0.10	0.0-1.0	0.0-0.5	.15	.15			

Table 19.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors K	Erosion factors Kf	Erosion factors T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	g/cc	in/hr	In/in	Pct	Pct					
6930:												
Sidney----------	0-11	15-27	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-3.0	.28	.28	4	5	56
	11-17	15-27	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-1.0	.37	.37			
	17-29	10-18	1.40-1.60	0.60-2.00	0.16-0.18	0.0-1.0	0.5-1.0	.37	.37			
	29-48	10-18	1.40-1.60	0.60-2.00	0.16-0.18	0.0-1.0	0.5-1.0	.37	.37			
	48-60	---	---	0.20-0.60	---	---	---	---	---			
6937:												
Sidney----------	0-11	15-27	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-3.0	.28	.28	4	5	56
	11-17	15-27	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-1.0	.37	.37			
	17-29	10-18	1.40-1.60	0.60-2.00	0.16-0.18	0.0-1.0	0.5-1.0	.37	.37			
	29-48	10-18	1.40-1.60	0.60-2.00	0.16-0.18	0.0-1.0	0.5-1.0	.37	.37			
	48-60	---	---	0.20-0.60	---	---	---	---	---			
Canyon----------	0-5	10-25	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-3.0	.32	.32	2	4L	86
	5-10	10-18	1.40-1.60	0.60-2.00	0.16-0.18	0.0-1.0	0.5-2.0	.20	.37			
	10-60	---	---	0.20-0.60	---	---	---	---	---			
7120:												
Sulco, moderately eroded---------	0-5	10-20	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	0.5-2.0	.37	.37	5	4L	86
	5-16	10-20	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-1.0	.43	.43			
	16-26	10-20	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-1.0	.43	.43			
	26-60	10-20	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-1.0	.43	.43			
McConaughy, moderately eroded---------	0-7	7-18	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-3.0	.28	.28	5	5	56
	7-18	10-18	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-1.0	.43	.43			
	18-28	5-18	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.0-0.5	.43	---			
	28-60	5-18	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.0-0.5	.43	---			
7121:												
Sulco, moderately eroded---------	0-5	10-20	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	0.5-2.0	.37	.37	5	4L	86
	5-16	10-20	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-1.0	.43	.43			
	16-26	10-20	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-1.0	.43	.43			
	26-60	10-20	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-1.0	.43	.43			
McConaughy, moderately eroded---------	0-7	7-18	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-3.0	.28	.28	5	5	56
	7-18	10-18	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-1.0	.43	.43			
	18-28	5-18	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.0-0.5	.43	---			
	28-60	5-18	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.0-0.5	.43	---			
7122:												
Sulco, moderately eroded---------	0-5	10-20	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	0.5-2.0	.37	.37	5	4L	86
	5-16	10-20	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-1.0	.43	.43			
	16-26	10-20	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-1.0	.43	.43			
	26-60	10-20	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-1.0	.43	.43			
McConaughy, moderately eroded---------	0-7	7-18	1.25-1.45	0.60-2.00	0.20-0.22	0.0-2.9	1.0-3.0	.28	.28	5	5	56
	7-18	10-18	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.5-1.0	.43	.43			
	18-28	5-18	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.0-0.5	.43	---			
	28-60	5-18	1.45-1.65	0.60-2.00	0.17-0.19	0.0-2.9	0.0-0.5	.43	---			

Table 19.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors K	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	g/cc	in/hr	In/in	Pct	Pct					
7582:												
Valent----------	0-4	2-8	1.40-1.60	6.00-20.00	0.07-0.09	0.0-0.0	0.5-1.0	.15	.15	5	1	250
	4-60	2-8	1.60-1.80	6.00-20.00	0.05-0.07	0.0-0.0	0.0-0.5	.15	.15			
7586:												
Valent----------	0-4	2-8	1.40-1.60	6.00-20.00	0.07-0.09	0.0-0.0	0.5-1.0	.15	.15	5	1	250
	4-60	2-8	1.60-1.80	6.00-20.00	0.05-0.07	0.0-0.0	0.0-0.5	.15	.15			
7588:												
Valent, rolling-	0-4	2-8	1.40-1.60	6.00-20.00	0.07-0.09	0.0-0.0	0.5-1.0	.15	.15	5	1	250
	4-60	2-8	1.60-1.80	6.00-20.00	0.05-0.07	0.0-0.0	0.0-0.5	.15	.15			
Valent, hilly---	0-4	2-8	1.40-1.60	6.00-20.00	0.07-0.09	0.0-0.0	0.5-1.0	.15	.15	5	1	250
	4-60	2-8	1.60-1.80	6.00-20.00	0.05-0.07	0.0-0.0	0.0-0.5	.15	.15			

Table 20.--Chemical Properties of the Soils

(Absence of an entry indicates that the data were not estimated.)

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	meq/100g	pH	Pct	Pct	mmhos/cm	
1130:							
Alliance--------	0-6	10-40	6.6-7.8	0	0	0	0
	6-17	20-30	6.6-7.8	0	0	0	0
	17-24	5.0-20	7.4-8.4	1-10	0	0	0
	24-34	5.0-20	7.4-8.4	1-10	0	0	0
	34-47	5.0-15	7.4-8.4	1-10	0	0	0
	47-54	0.0-5.0	6.6-7.8	0	0	0	0
	54-80	---	---	---	---	---	---
1146:							
Alliance--------	0-6	10-40	6.6-7.8	0	0	0	0
	6-14	20-30	6.6-7.8	0	0	0	0
	14-19	20-30	6.6-7.8	0	0	0	0
	19-25	5.0-20	7.4-8.4	1-10	0	0	0
	25-45	5.0-15	7.4-8.4	1-10	0	0	0
	45-60	---	---	---	---	---	---
Rosebud---------	0-6	10-40	6.6-7.8	0	0	0	0
	6-11	20-30	6.6-7.8	0	0	0	0
	11-17	20-30	6.6-7.8	0	0	0	0
	17-23	5.0-20	7.4-8.4	1-10	0	0	0
	23-30	5.0-15	7.4-8.4	1-10	0	0	0
	30-80	---	---	---	---	---	---
1198:							
Altvan----------	0-7	5.0-20	6.6-7.8	0	0	0	0
	7-12	10-30	6.1-7.8	0	0	0	0
	12-17	10-20	6.6-8.4	0	0	0	0
	17-25	5.0-15	7.4-8.4	1-10	0	0	0
	25-31	0.0-10	7.4-8.4	1-10	0	0	0
	31-80	0.0-5.0	6.6-7.8	0-5	0	0	0
Eckley----------	0-5	10-30	6.6-7.3	0	0	0	0
	5-8	5.0-25	6.6-7.8	0	0	0	0
	8-11	0.0-15	6.6-7.8	0	0	0	0
	11-15	0.0-5.0	6.6-7.8	0-5	0	0	0
	15-80	0.0-5.0	6.6-7.8	0-5	0	0	0
Satanta, sandy substratum-----	0-10	10-40	6.6-7.8	0	0	0	0
	10-21	5.0-20	7.4-8.4	0	0	0	0
	21-30	20-30	6.6-7.8	0	0	0	0
	30-37	5.0-15	7.4-8.4	1-10	0	0	0
	37-42	5.0-15	7.4-8.4	1-10	0	0	0
	42-50	0.0-5.0	6.6-7.8	0-5	0	0	0
	50-80	0.0-5.0	6.6-7.8	0-5	0	0	0
1295:							
Ashollow--------	0-3	5.0-20	7.4-8.4	1-5	0	0	0
	3-10	0.0-10	7.4-8.4	1-5	0	0	0
	10-32	0.0-10	7.4-8.4	1-10	0	0	0
	32-60	0.0-10	7.4-8.4	1-10	0	0	0
Tassel----------	0-4	5.0-15	7.4-8.4	2-10	0	0	0
	4-7	0.0-5.0	7.4-8.4	2-10	0	0	0
	7-18	0.0-5.0	7.4-8.4	2-15	0	0	0
	18-60	---	---	---	---	---	---

Table 20.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	meq/100g	pH	Pct	Pct	mmhos/cm	
1588:							
Blueridge-------	0-4	0.0-5.0	5.6-7.3	0	0	0	0
	4-40	0.0-0.0	5.6-7.3	0	0	0	0
	40-80	0.0-0.0	5.6-7.3	0	0	0	0
Altvan----------	0-7	10-40	6.1-7.8	0	0	0	0
	7-10	10-25	6.6-7.8	0	0	0	0
	10-20	10-25	6.6-7.8	0	0	0	0
	20-24	5.0-15	7.4-8.4	1-10	0	0	0
	24-30	0.0-10	7.4-8.4	1-10	0	0	0
	30-80	0.0-5.0	7.4-8.4	0-5	0	0	0
1782:							
Broadwater, frequently flooded--------	0-3	0.0-10	6.6-7.8	0-5	0	0	0
	3-9	0.0-5.0	6.6-7.8	0-5	0	0	0
	9-32	0.0-0.0	6.6-7.8	0-5	0	0	0
	32-60	0.0-0.0	6.6-7.8	0-5	0	0	0
1944:							
Calamus, very rarely flooded-	0-7	0.0-10	5.6-7.8	0	0	0	0
	7-14	0.0-5.0	6.1-7.8	0	0	0	0
	14-22	0.0-0.0	6.1-7.8	0	0	0	0
	22-38	0.0-0.0	6.1-7.8	0	0	0	0
	38-58	0.0-0.0	6.1-7.8	0	0	0	0
	58-60	0.0-0.0	6.1-7.8	0	0	0	0
2072:							
Chappell--------	0-7	5.0-25	6.1-7.3	0	0	0	0
	7-17	5.0-25	6.1-7.3	0	0	0	0
	17-25	5.0-15	6.6-7.3	0	0	0	0
	25-30	0.0-15	6.6-7.8	0-5	0	0	0
	30-60	0.0-0.0	6.6-7.8	0-5	0	0	0
Alice-----------	0-8	5.0-25	6.6-7.8	0	0	0	0
	8-14	5.0-25	6.6-7.8	0	0	0	0
	14-19	5.0-15	6.6-7.8	0	0	0	0
	19-33	5.0-15	6.6-7.8	0-5	0	0	0
	33-80	5.0-15	6.6-7.8	0-5	0	0	0
Broadwater------	0-3	0.0-10	6.6-7.8	0-5	0	0	0
	3-9	0.0-5.0	6.6-7.8	0-5	0	0	0
	9-32	0.0-0.0	6.6-7.8	0-5	0	0	0
	32-60	0.0-0.0	6.6-7.8	0-5	0	0	0
2630:							
Duroc-----------	0-6	10-40	6.6-7.8	0	0	0	0
	6-14	10-40	6.6-7.8	0	0	0	0
	14-27	10-30	6.6-7.8	0	0	0	0
	27-32	10-30	6.6-7.8	0	0	0	0
	32-42	5.0-25	7.4-8.4	2-10	0	0	0
	42-60	5.0-25	7.4-8.4	2-10	0	0	0
2638:							
Duroc-----------	0-12	10-40	6.6-7.8	0	0	0	0
	12-24	10-40	6.6-7.8	0	0	0	0
	24-31	10-30	6.6-7.8	0	0	0	0
	31-37	10-30	6.6-7.8	2-10	0	0	0
	37-46	5.0-25	7.4-8.4	2-10	0	0	0
	46-60	5.0-25	7.4-8.4	2-10	0	0	0

Table 20.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	meq/100g	pH	Pct	Pct	mmhos/cm	
2639:							
Duroc-----------	0-12	10-40	6.6-7.8	0	0	0	0
	12-24	10-40	6.6-7.8	0	0	0	0
	24-31	10-30	6.6-7.8	0	0	0	0
	31-37	10-30	6.6-7.8	2-10	0	0	0
	37-46	5.0-25	7.4-8.4	2-10	0	0	0
	46-60	5.0-25	7.4-8.4	2-10	0	0	0
3050:							
Glenberg, rarely flooded--------	0-8	5.0-25	7.4-8.4	0-5	0	0	0
	8-60	0.0-15	7.4-8.4	1-10	0	0	0
3140:							
Gothenburg, occasionally flooded--------	0-5	0.0-10	6.6-8.4	0-5	0	0	0
	5-14	0.0-0.0	6.6-8.4	0-5	0	0	0
	14-60	0.0-0.0	6.6-7.8	0	0	0	0
3952:							
Jankosh---------	0-2	10-40	7.4-8.4	1-15	0	2.0-16.0	0-9
	2-4	10-30	7.4-8.4	1-15	0	2.0-16.0	0-9
	4-14	10-30	8.5-9.6	5-15	0	4.0-16.0	13-30
	14-18	10-30	8.5-9.6	5-15	0	4.0-16.0	13-30
	18-33	5.0-15	8.5-9.6	5-15	0	4.0-16.0	13-30
	33-60	0.0-2.0	6.6-7.3	0-5	0	0.0-2.0	0-6
4028:							
Jayem-----------	0-6	5.0-25	6.6-7.8	0	0	0	0
	6-9	5.0-15	6.6-7.8	0	0	0	0
	9-22	5.0-15	6.6-7.8	0	0	0	0
	22-50	5.0-15	6.6-7.8	0-2	0	0	0
	50-60	5.0-15	6.6-7.8	0-2	0	0	0
4070:							
Johnstown-------	0-9	10-40	6.6-7.3	0	0	0	0
	9-25	20-50	6.1-7.8	0	0	0	0
	25-29	20-50	6.1-7.8	0	0	0	0
	29-35	10-30	6.6-8.4	1-10	0	0	0
	35-46	5.0-15	7.4-8.4	1-10	0	0	0
	46-60	0.0-0.0	6.6-7.8	0-5	0	0	0
Satanta, sandy substratum-----	0-8	10-40	6.6-7.8	0	0	0	0
	8-25	20-30	6.6-7.8	0	0	0	0
	25-32	10-30	6.6-8.4	0-10	0	0	0
	32-52	5.0-15	7.4-8.4	1-10	0	0	0
	52-60	0.0-5.0	6.6-7.8	0	0	0	0
Richfield-------	0-7	10-40	6.6-7.8	0	0	0	0
	7-12	55-100	6.1-7.8	0	0	0	0
	12-17	20-50	6.1-7.8	0	0	0	0
	17-21	5.0-20	7.4-8.4	0	0	0	0
	21-32	5.0-20	7.4-8.4	1-10	0	0	0
	32-42	5.0-20	7.4-8.4	1-10	0	0	0
	42-48	0.0-15	6.1-8.4	1-10	0	0	0
	48-78	0.0-15	6.1-8.4	1-10	0	0	0
	78-80	0.0-5.0	7.4-8.4	0-5	0	0	0

Table 20.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	meq/100g	pH	Pct	Pct	mmhos/cm	
4151:							
Keith-----------	0-6	10-40	6.6-7.3	0	0	0	0
	6-13	10-40	6.6-7.3	0	0	0	0
	13-22	20-30	6.6-7.8	0	0	0	0
	22-31	10-20	6.6-7.8	0	0	0	0
	31-48	10-20	7.4-8.4	1-10	0	0	0
	48-60	0.0-15	7.4-8.4	1-10	0	0	0
4152:							
Keith-----------	0-7	10-40	6.6-7.3	0	0	0	0
	7-14	20-30	6.6-7.8	0	0	0	0
	14-19	10-20	6.6-7.8	0	0	0	0
	19-25	5.0-20	7.4-8.4	1-10	0	0	0
	25-60	5.0-20	7.4-8.4	1-10	0	0	0
4310:							
Kuma------------	0-7	10-40	6.6-7.8	0	0	0	0
	7-17	10-40	6.6-7.8	0	0	0	0
	17-24	10-30	6.6-7.8	0	0	0	0
	24-37	10-30	6.6-7.8	0	0	0	0
	37-44	5.0-15	6.6-8.4	1-10	0	0	0
	44-60	5.0-15	7.2-8.4	1-10	0	0	0
4311:							
Kuma------------	0-6	10-40	6.6-7.8	0	0	0	0
	6-10	20-50	6.1-7.8	0	0	0	0
	10-23	20-50	6.1-7.8	0	0	0	0
	23-33	20-50	6.1-7.8	0	0	0	0
	33-41	5.0-20	7.4-8.4	1-10	0	0	0
	41-60	5.0-15	7.2-8.4	1-10	0	0	0
4472:							
Las Animas, frequently flooded--------	0-5	10-40	7.4-8.4	1-10	0	0.0-4.0	0
	5-11	5.0-15	7.4-8.4	1-10	0	0.0-4.0	0
	11-33	5.0-15	7.4-8.4	1-10	0	0.0-4.0	0
	33-60	5.0-15	7.4-8.4	1-10	0	0.0-4.0	0
4475:							
Las Animas, occasionally flooded--------	0-5	10-40	7.4-8.4	1-10	0	0.0-4.0	0
	5-11	5.0-15	7.4-8.4	1-10	0	0.0-4.0	0
	11-33	5.0-15	7.4-8.4	1-10	0	0.0-4.0	0
	33-60	5.0-15	7.4-8.4	1-10	0	0.0-4.0	0
4592:							
Lexsworth, very rarely flooded-	0-12	10-40	7.4-8.4	0-5	0	2.0-4.0	1-4
	12-19	5.0-20	7.4-8.4	2-9	0	4.0-8.0	2-6
	19-26	0.0-15	7.4-8.4	1-8	0	4.0-8.0	2-6
	26-33	0.0-0.0	7.4-8.4	0	0	4.0-8.0	2-6
	33-52	0.0-0.0	7.4-8.4	0	0	0	0
	52-60	0.0-0.0	7.4-8.4	0	0	0	0
	60-80	0.0-0.0	7.4-8.4	0	0	0	0

Table 20.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	meq/100g	pH	Pct	Pct	mmhos/cm	
4655:							
Lodgepole, ponded---------	0-5	25-55	6.1-7.8	0	0	0	0
	5-14	55-100	6.1-7.8	0	0	0	0
	14-26	55-100	6.1-7.8	0	0	0	0
	26-32	20-55	6.1-7.8	0	0	0	0
	32-48	5.0-20	6.6-8.4	0-10	0	0	0
	48-60	5.0-20	6.6-8.4	0-10	0	0	0
5212:							
Merrick, very rarely flooded-	0-12	25-50	6.6-7.8	0-5	0	0.0-2.0	0
	12-27	20-40	6.6-7.8	0-5	0	0.0-2.0	0
	27-38	20-40	7.4-7.8	1-5	0	0.0-2.0	0
	38-42	5.0-20	7.4-8.4	5-10	0	0.0-2.0	0
	42-53	5.0-20	7.4-8.4	5-10	0	0.0-2.0	0
	53-64	0.0-15	7.4-8.4	5-10	0	0.0-2.0	0
	64-80	0.0-15	7.4-8.4	5-10	0	0.0-2.0	0
6132:							
Platte, occasionally flooded--------	0-5	10-40	6.6-8.4	0-10	0	0.0-2.0	0
	5-11	5.0-15	6.6-8.4	0-5	0	0.0-2.0	0
	11-18	5.0-15	6.6-8.4	0-5	0	0.0-2.0	0
	18-60	0.0-0.0	6.6-8.4	0-5	0	0.0-2.0	0
6248:							
Ralton, very rarely flooded-	0-6	10-40	7.4-8.4	1-10	0	0	0
	6-14	10-40	7.4-8.4	1-10	0	0	0
	14-24	5.0-15	7.4-8.4	1-10	0	0	0
	24-34	5.0-15	7.4-8.4	1-10	0	0	0
	34-51	5.0-20	7.4-8.4	1-10	0	0	0
	51-71	5.0-15	7.4-8.4	1-10	0	0	0
	71-80	0.0-0.0	7.4-8.4	1-10	0	0	0
6625:							
Sarben----------	0-7	0.0-10	6.1-7.3	0	0	0	0
	7-15	5.0-15	6.1-7.3	0	0	0	0
	15-32	5.0-15	6.6-7.8	0-5	0	0	0
	32-60	5.0-15	6.6-7.8	0-5	0	0	0
6626:							
Sarben----------	0-7	0.0-10	6.1-7.3	0	0	0	0
	7-15	5.0-15	6.1-7.3	0	0	0	0
	15-32	5.0-15	6.6-7.8	0-5	0	0	0
	32-60	5.0-15	6.6-7.8	0-5	0	0	0
6722:							
Satanta---------	0-6	5.0-15	7.4-8.4	0	0	0	0
	6-13	20-30	6.6-7.8	0	0	0	0
	13-19	20-30	6.6-7.8	0	0	0	0
	19-26	5.0-15	7.4-8.4	1-10	0	0	0
	26-52	5.0-15	7.4-8.4	1-10	0	0	0
	52-76	0.0-10	6.6-7.8	0-1	0	0	0
Altvan----------	0-5	5.0-20	6.6-7.8	0	0	0	0
	5-10	10-20	6.6-8.4	0	0	0	0
	10-14	10-20	6.6-8.4	0	0	0	0
	14-24	10-20	7.4-8.4	1-10	0	0	0
	24-38	5.0-15	7.4-8.4	1-10	0	0	0
	38-80	0.0-0.0	7.4-8.4	0-5	0	0	0

Table 20.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	meq/100g	pH	Pct	Pct	mmhos/cm	
6725:							
Satanta, sandy substratum-----	0-9	10-40	6.6-7.8	0	0	0	0
	9-14	10-40	6.6-7.8	0	0	0	0
	14-26	20-30	6.6-7.8	0	0	0	0
	26-31	10-30	6.6-8.4	0-10	0	0	0
	31-55	5.0-15	7.4-8.4	1-10	0	0	0
	55-80	0.0-5.0	6.6-7.8	0	0	0	0
Ascalon---------	0-6	5.0-20	6.6-7.8	0	0	0	0
	6-19	10-25	6.6-7.8	0	0	0	0
	19-35	5.0-15	7.4-8.4	0-5	0	0	0
	35-40	5.0-15	7.4-8.4	1-10	0	0	0
	40-46	0.0-10	7.4-8.4	1-10	0	0	0
	46-80	0.0-5.0	7.4-8.4	1-5	0	0	0
6727:							
Satanta, sandy substratum-----	0-9	10-40	6.6-7.8	0	0	0	0
	9-14	10-40	6.6-7.8	0	0	0	0
	14-26	20-30	6.6-7.8	0	0	0	0
	26-31	10-30	6.6-8.4	0-10	0	0	0
	31-55	5.0-15	7.4-8.4	1-10	0	0	0
	55-80	0.0-5.0	6.6-7.8	0	0	0	0
Johnstown-------	0-6	10-40	6.6-7.3	0	0	0	0
	6-23	20-30	6.6-7.8	0	0	0	0
	23-36	20-30	6.6-7.8	0	0	0	0
	36-42	5.0-15	7.4-8.4	1-10	0	0	0
	42-58	5.0-15	7.4-8.4	1-10	0	0	0
	58-80	0.0-5.0	6.6-7.8	0	0	0	0
Altvan----------	0-5	10-40	6.1-7.8	0	0	0	0
	5-10	10-20	6.6-8.4	0	0	0	0
	10-17	10-20	6.6-8.4	0	0	0	0
	17-24	10-20	7.4-8.4	1-10	0	0	0
	24-30	10-20	7.4-8.4	1-10	0	0	0
	30-80	0.0-0.0	7.4-8.4	1-5	0	0	0
6817:							
Scoville--------	0-6	0.0-10	6.1-7.8	0-1	0	0	0
	6-10	0.0-10	6.6-7.8	0-1	0	0	0
	10-42	0.0-5.0	6.6-7.8	0-1	0	0	0
	42-46	0.0-20	7.4-8.4	1-5	0	0	0
	46-60	0.0-10	6.6-7.8	0-1	0	0	0
6930:							
Sidney----------	0-11	10-40	6.6-7.8	0-5	0	0	0
	11-17	5.0-20	6.6-7.8	1-10	0	0	0
	17-29	5.0-15	7.4-8.4	1-10	0	0	0
	29-48	5.0-15	7.4-8.4	1-10	0	0	0
	48-60	---	---	---	---	---	---
6937:							
Sidney----------	0-11	10-40	6.6-7.8	0-5	0	0	0
	11-17	5.0-20	6.6-7.8	1-10	0	0	0
	17-29	5.0-15	7.4-8.4	1-10	0	0	0
	29-48	5.0-15	7.4-8.4	1-10	0	0	0
	48-60	---	---	---	---	---	---
Canyon----------	0-5	10-20	7.4-8.4	1-10	0	0	0
	5-10	5.0-20	7.4-8.4	1-10	0	0	0
	10-60	---	---	---	---	---	---

Table 20.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	meq/100g	pH	Pct	Pct	mmhos/cm	
7120:							
Sulco, moderately eroded---------	0-5	10-30	7.4-8.4	1-5	0	0	0
	5-16	10-30	7.4-8.4	5-10	0	0	0
	16-26	5.0-20	7.4-8.4	5-10	0	0	0
	26-60	5.0-20	7.4-8.4	5-10	0	0	0
McConaughy, moderately eroded---------	0-7	10-30	6.6-7.8	0	0	0	0
	7-18	10-30	6.6-7.8	0	0	0	0
	18-28	5.0-20	7.4-8.4	1-10	0	0	0
	28-60	5.0-20	7.4-8.4	1-10	0	0	0
7121:							
Sulco, moderately eroded---------	0-5	10-30	7.4-8.4	1-5	0	0	0
	5-16	10-30	7.4-8.4	5-10	0	0	0
	16-26	5.0-20	7.4-8.4	5-10	0	0	0
	26-60	5.0-20	7.4-8.4	5-10	0	0	0
McConaughy, moderately eroded---------	0-7	10-30	6.6-7.8	0	0	0	0
	7-18	10-30	6.6-7.8	0	0	0	0
	18-28	5.0-20	7.4-8.4	1-10	0	0	0
	28-60	5.0-20	7.4-8.4	1-10	0	0	0
7122:							
Sulco, moderately eroded---------	0-5	10-30	7.4-8.4	1-5	0	0	0
	5-16	10-30	7.4-8.4	5-10	0	0	0
	16-26	5.0-20	7.4-8.4	5-10	0	0	0
	26-60	5.0-20	7.4-8.4	5-10	0	0	0
McConaughy, moderately eroded---------	0-7	10-30	6.6-7.8	0	0	0	0
	7-18	10-30	6.6-7.8	0	0	0	0
	18-28	5.0-20	7.4-8.4	1-10	0	0	0
	28-60	5.0-20	7.4-8.4	1-10	0	0	0
7582:							
Valent----------	0-4	0.0-5.0	6.6-7.8	0	0	0	0
	4-60	0.0-0.0	6.6-7.8	0	0	0	0
7586:							
Valent----------	0-4	0.0-5.0	6.6-7.8	0	0	0	0
	4-60	0.0-0.0	6.6-7.8	0	0	0	0
7588:							
Valent, rolling-	0-4	0.0-5.0	6.6-7.8	0	0	0	0
	4-60	0.0-0.0	6.6-7.8	0	0	0	0
Valent, hilly---	0-4	0.0-5.0	6.6-7.8	0	0	0	0
	4-60	0.0-0.0	6.6-7.8	0	0	0	0

Table 21.--Soil Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated.)

Map symbol and soil name	Restrictive layer: Depth to top	Restrictive layer: Kind	Restrictive layer: Hardness	Potential for frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
	In					
1130:						
Alliance	40-60	Bedrock (paralithic)	Weakly cemented	Moderate	Moderate	Low
1146:						
Alliance	40-60	Bedrock (paralithic)	Weakly cemented	Moderate	Moderate	Low
Rosebud	20-40	Bedrock (paralithic)	Weakly cemented	Moderate	High	Low
1198:						
Altvan	---	---	---	Moderate	Low	Low
Eckley	---	---	---	Low	Moderate	Low
Satanta, sandy substratum	---	---	---	Moderate	Low	Low
1295:						
Ashollow	---	---	---	Low	Low	Low
Tassel	6-20	Bedrock (paralithic)	Moderately cemented	Low	High	Low
1588:						
Blueridge	---	---	---	Low	Low	Low
Altvan	---	---	---	Moderate	Low	Low
1782:						
Broadwater, frequently flooded	---	---	---	Low	Low	Low
1944:						
Calamus, very rarely flooded	---	---	---	Low	Low	Low
2072:						
Chappell	---	---	---	Low	Low	Low
Alice	---	---	---	Moderate	Low	Low
Broadwater	---	---	---	Low	Low	Low
2630:						
Duroc	---	---	---	Low	Low	Low
2638:						
Duroc	---	---	---	Low	Low	Low
2639:						
Duroc	---	---	---	Low	Low	Low
3050:						
Glenberg, rarely flooded	---	---	---	Moderate	Low	Low
3140:						
Gothenburg, occasionally flooded	---	---	---	Moderate	Moderate	Low

Table 21.--Soil Features--Continued

Map symbol and soil name	Restrictive layer			Potential for frost action	Risk of corrosion	
	Depth to top	Kind	Hardness		Uncoated steel	Concrete
	In					
3952:						
Jankosh	---	---	---	Moderate	High	High
4028:						
Jayem	---	---	---	Low	Moderate	Low
4070:						
Johnstown	---	---	---	Moderate	Moderate	Low
Satanta, sandy substratum	---	---	---	Moderate	Low	Low
Richfield	---	---	---	Low	High	Low
4151:						
Keith	---	---	---	Moderate	Moderate	Low
4152:						
Keith	---	---	---	Moderate	Moderate	Low
4310:						
Kuma	---	---	---	Moderate	High	Moderate
4311:						
Kuma	---	---	---	Moderate	High	Moderate
4472:						
Las Animas, frequently flooded	---	---	---	High	High	Moderate
4475:						
Las Animas, occasionally flooded	---	---	---	High	High	Moderate
4592:						
Lexsworth, very rarely flooded	---	---	---	High	Moderate	Low
4655:						
Lodgepole, ponded	---	---	---	High	High	Low
5212:						
Merrick, very rarely flooded	---	---	---	Moderate	Low	Low
6132:						
Platte, occasionally flooded	---	---	---	Moderate	High	Moderate
6248:						
Ralton, very rarely flooded	---	---	---	Moderate	High	Low
6625:						
Sarben	---	---	---	Low	High	Low
6626:						
Sarben	---	---	---	Low	High	Low
6722:						
Satanta	---	---	---	Moderate	Low	Low
Altvan	---	---	---	Moderate	Low	Low

Table 21.--Soil Features--Continued

Map symbol and soil name	Restrictive layer: Depth to top	Restrictive layer: Kind	Restrictive layer: Hardness	Potential for frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
	In					
6725:						
Satanta, sandy substratum-	---	---	---	Moderate	Low	Low
Ascalon-------------------	---	---	---	Moderate	Moderate	Low
6727:						
Satanta, sandy substratum-	---	---	---	Moderate	Low	Low
Johnstown-----------------	---	---	---	Moderate	Moderate	Low
Altvan--------------------	---	---	---	Moderate	Low	Low
6817:						
Scoville------------------	---	---	---	Low	High	Low
6930:						
Sidney--------------------	40-60	Bedrock (paralithic)	Weakly cemented	Moderate	High	Low
6937:						
Sidney--------------------	40-60	Bedrock (paralithic)	Weakly cemented	Moderate	High	Low
Canyon--------------------	6-20	Bedrock (paralithic)	Weakly cemented	Low	Low	Low
7120:						
Sulco, moderately eroded--	---	---	---	Low	High	Low
McConaughy, moderately eroded-------------------	---	---	---	Moderate	High	Moderate
7121:						
Sulco, moderately eroded--	---	---	---	Low	High	Low
McConaughy, moderately eroded-------------------	---	---	---	Moderate	High	Moderate
7122:						
Sulco, moderately eroded--	---	---	---	Low	High	Low
McConaughy, moderately eroded-------------------	---	---	---	Moderate	High	Moderate
7582:						
Valent--------------------	---	---	---	Low	Moderate	Low
7586:						
Valent--------------------	---	---	---	Low	Moderate	Low
7588:						
Valent, rolling-----------	---	---	---	Low	Moderate	Low
Valent, hilly-------------	---	---	---	Low	Moderate	Low

Table 22.--Water Features

(See text for definitions of terms used in this table. Estimates of the frequency of ponding and flooding apply to the whole year rather than to individual months. Absence of an entry indicates that the feature is not a concern or that data were not estimated.)

Map symbol and soil name	Hydro-logic group	Months	Soil saturation		Ponding			Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			Ft	Ft	Ft				
1130:									
Alliance	B	---	---	---	---	---	---	---	---
1146:									
Alliance	B	---	---	---	---	---	---	---	---
Rosebud	B	---	---	---	---	---	---	---	---
1198:									
Altvan	B	---	---	---	---	---	---	---	---
Eckley	B	---	---	---	---	---	---	---	---
Satanta, sandy substratum	B	---	---	---	---	---	---	---	---
1295:									
Ashollow	B	---	---	---	---	---	---	---	---
Tassel	D	---	---	---	---	---	---	---	---
1588:									
Blueridge	A	---	---	---	---	---	---	---	---
Altvan	B	---	---	---	---	---	---	---	---
1782:									
Broadwater, frequently flooded	A								
		March	---	---	---	---	None	Very brief	Frequent
		April	---	---	---	---	None	Very brief	Frequent
		May	---	---	---	---	None	Very brief	Frequent
		June	---	---	---	---	None	Very brief	Frequent
		July	---	---	---	---	None	Very brief	Frequent
		August	---	---	---	---	None	Very brief	Frequent
1944:									
Calamus, very rarely flooded	A								
		February	3.0-6.0	>6.0	---	---	None	Very brief	Very rare
		March	3.0-6.0	>6.0	---	---	None	Very brief	Very rare
		April	3.0-6.0	>6.0	---	---	None	Very brief	Very rare
		May	3.0-6.0	>6.0	---	---	None	Very brief	Very rare
		June	3.0-6.0	>6.0	---	---	None	---	None
		July	3.0-6.0	>6.0	---	---	None	---	None
		August	3.0-6.0	>6.0	---	---	None	---	None
		September	3.0-6.0	>6.0	---	---	None	---	None
		October	3.0-6.0	>6.0	---	---	None	---	None
		November	3.0-6.0	>6.0	---	---	None	---	None
		December	3.0-6.0	>6.0	---	---	None	---	None

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Soil saturation Upper limit	Soil saturation Lower limit	Surface water depth	Ponding Duration	Ponding Frequency	Flooding Duration	Flooding Frequency
			Ft	Ft	Ft				
2072:									
Chappell	A	---	---	---	---	---	---	---	---
Alice	B	---	---	---	---	---	---	---	---
Broadwater	A								
		March	---	---	---	---	None	Very brief	Occasional
		April	---	---	---	---	None	Very brief	Occasional
		May	---	---	---	---	None	Very brief	Occasional
		June	---	---	---	---	None	Very brief	Occasional
		July	---	---	---	---	None	Very brief	Occasional
		August	---	---	---	---	None	Very brief	Occasional
2630:									
Duroc	B	---	---	---	---	---	---	---	---
2638:									
Duroc	B	---	---	---	---	---	---	---	---
2639:									
Duroc	B	---	---	---	---	---	---	---	---
3050:									
Glenberg, rarely flooded	B								
		March	---	---	---	---	None	Very brief	Rare
		April	---	---	---	---	None	Very brief	Rare
		May	---	---	---	---	None	Very brief	Rare
		June	---	---	---	---	None	Very brief	Rare
		July	---	---	---	---	None	Very brief	Rare
		August	---	---	---	---	None	Very brief	Rare
3140:									
Gothenburg, occasionally flooded	D								
		January	0.0-1.5	>6.0	---	---	None	Brief	Occasional
		February	0.0-1.5	>6.0	---	---	None	Brief	Occasional
		March	0.0-1.5	>6.0	---	---	None	Brief	Occasional
		April	0.0-1.5	>6.0	---	---	None	Brief	Occasional
		May	0.0-1.5	>6.0	---	---	None	Brief	Occasional
		June	0.0-1.5	>6.0	---	---	None	Brief	Occasional
		July	0.0-1.5	>6.0	---	---	None	Brief	Occasional
		August	0.0-1.5	>6.0	---	---	None	Brief	Occasional
		September	0.0-1.5	>6.0	---	---	None	Brief	Occasional
		October	0.0-1.5	>6.0	---	---	None	Brief	Occasional
		November	0.0-1.5	>6.0	---	---	None	Brief	Occasional
		December	0.0-1.5	>6.0	---	---	None	Brief	Occasional
3952:									
Jankosh	C								
		January	1.5-3.0	>6.0	---	---	None	Brief	Rare
		February	1.5-3.0	>6.0	---	---	None	Brief	Rare
		March	1.5-3.0	>6.0	---	---	None	Brief	Rare
		April	1.5-3.0	>6.0	---	---	None	Brief	Rare
		May	1.5-3.0	>6.0	---	---	None	Brief	Rare
		June	1.5-3.0	>6.0	---	---	None	Brief	Rare
		July	1.5-3.0	>6.0	---	---	None	Brief	Rare
		August	1.5-3.0	>6.0	---	---	None	Brief	Rare
		September	1.5-3.0	>6.0	---	---	None	Brief	Rare
		October	1.5-3.0	>6.0	---	---	None	Brief	Rare
		November	1.5-3.0	>6.0	---	---	None	Brief	Rare
		December	1.5-3.0	>6.0	---	---	None	Brief	Rare

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Soil saturation: Upper limit	Soil saturation: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
4028:									
Jayem	B	---	---	---	---	---	---	---	---
4070:									
Johnstown	B	---	---	---	---	---	---	---	---
Satanta, sandy substratum	B	---	---	---	---	---	---	---	---
Richfield	B	---	---	---	---	---	---	---	---
4151:									
Keith	B	---	---	---	---	---	---	---	---
4152:									
Keith	B	---	---	---	---	---	---	---	---
4310:									
Kuma	B	---	---	---	---	---	---	---	---
4311:									
Kuma	B	---	---	---	---	---	---	---	---
4472:									
Las Animas, frequently flooded	D								
		January	0.0-1.5	>6.0	---	---	None	---	None
		February	0.0-1.5	>6.0	---	---	None	Brief	Frequent
		March	0.0-1.5	>6.0	---	---	None	Brief	Frequent
		April	0.0-1.5	>6.0	---	---	None	Brief	Frequent
		May	0.0-1.5	>6.0	---	---	None	Brief	Frequent
		June	0.0-1.5	>6.0	---	---	None	Brief	Frequent
		July	0.0-1.5	>6.0	---	---	None	Brief	Frequent
		August	0.0-1.5	>6.0	---	---	None	---	None
		September	0.0-1.5	>6.0	---	---	None	---	None
		October	0.0-1.5	>6.0	---	---	None	---	None
		November	0.0-1.5	>6.0	---	---	None	---	None
		December	0.0-1.5	>6.0	---	---	None	---	None
4475:									
Las Animas, occasionally flooded	D								
		January	1.5-3.0	>6.0	---	---	None	---	None
		February	1.5-3.0	>6.0	---	---	None	Brief	Occasional
		March	1.5-3.0	>6.0	---	---	None	Brief	Occasional
		April	1.5-3.0	>6.0	---	---	None	Brief	Occasional
		May	1.5-3.0	>6.0	---	---	None	Brief	Occasional
		June	1.5-3.0	>6.0	---	---	None	Brief	Occasional
		July	1.5-3.0	>6.0	---	---	None	Brief	Occasional
		August	1.5-3.0	>6.0	---	---	None	---	None
		September	1.5-3.0	>6.0	---	---	None	---	None
		October	1.5-3.0	>6.0	---	---	None	---	None
		November	1.5-3.0	>6.0	---	---	None	---	None
		December	1.5-3.0	>6.0	---	---	None	---	None

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Soil saturation: Upper limit	Soil saturation: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
4592: Lexsworth, very rarely flooded	B								
		January	5.0-8.0	>6.0	---	---	None	Very brief	Very rare
		February	5.0-8.0	>6.0	---	---	None	Very brief	Very rare
		March	5.0-8.0	>6.0	---	---	None	Very brief	Very rare
		April	5.0-8.0	>6.0	---	---	None	Very brief	Very rare
		May	5.0-8.0	>6.0	---	---	None	Very brief	Very rare
		June	5.0-8.0	>6.0	---	---	None	Very brief	Very rare
		July	5.0-8.0	>6.0	---	---	None	Very brief	Very rare
		August	5.0-8.0	>6.0	---	---	None	Very brief	Very rare
		September	5.0-8.0	>6.0	---	---	None	Very brief	Very rare
		October	5.0-8.0	>6.0	---	---	None	Very brief	Very rare
		November	5.0-8.0	>6.0	---	---	None	Very brief	Very rare
		December	5.0-8.0	>6.0	---	---	None	Very brief	Very rare
4655: Lodgepole, ponded	D								
		March	0.0	>6.0	0.5-1.0	Brief	Occasional	---	None
		April	0.0	>6.0	0.5-1.0	Brief	Occasional	---	None
		May	0.0	>6.0	0.5-1.0	Brief	Occasional	---	None
		June	0.0	>6.0	0.5-1.0	Brief	Occasional	---	None
		July	0.0	>6.0	0.5-1.0	Brief	Occasional	---	None
		August	---	---	0.5-1.0	Brief	Occasional	---	None
		September	---	---	0.5-1.0	Brief	Occasional	---	None
5212: Merrick, very rarely flooded	B								
		January	4.0-6.0	>6.0	---	---	None	Very brief	Very rare
		February	4.0-6.0	>6.0	---	---	None	Very brief	Very rare
		March	4.0-6.0	>6.0	---	---	None	Very brief	Very rare
		April	4.0-6.0	>6.0	---	---	None	Very brief	Very rare
		May	4.0-6.0	>6.0	---	---	None	Very brief	Very rare
		June	4.0-6.0	>6.0	---	---	None	---	None
		July	4.0-6.0	>6.0	---	---	None	---	None
		August	4.0-6.0	>6.0	---	---	None	---	None
		September	4.0-6.0	>6.0	---	---	None	---	None
		October	4.0-6.0	>6.0	---	---	None	---	None
		November	4.0-6.0	>6.0	---	---	None	---	None
		December	4.0-6.0	>6.0	---	---	None	---	None
6132: Platte, occasionally flooded	B								
		January	1.0-3.0	>6.0	---	---	None	---	None
		February	1.0-3.0	>6.0	---	---	None	Brief	Occasional
		March	1.0-3.0	>6.0	---	---	None	Brief	Occasional
		April	1.0-3.0	>6.0	---	---	None	Brief	Occasional
		May	1.0-3.0	>6.0	---	---	None	Brief	Occasional
		June	1.0-3.0	>6.0	---	---	None	Brief	Occasional
		July	1.0-3.0	>6.0	---	---	None	Brief	Occasional
		August	1.0-3.0	>6.0	---	---	None	---	None
		September	1.0-3.0	>6.0	---	---	None	---	None
		October	1.0-3.0	>6.0	---	---	None	---	None
		November	1.0-3.0	>6.0	---	---	None	---	None
		December	1.0-3.0	>6.0	---	---	None	---	None

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Months	Soil saturation		Ponding			Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			Ft	Ft	Ft				
6248:									
Ralton, very rarely flooded------------------	B								
		January	3.0-6.0	>6.0	---	---	None	---	None
		February	3.0-6.0	>6.0	---	---	None	Very brief	Very rare
		March	3.0-6.0	>6.0	---	---	None	Very brief	Very rare
		April	3.0-6.0	>6.0	---	---	None	Very brief	Very rare
		May	3.0-6.0	>6.0	---	---	None	Very brief	Very rare
		June	3.0-6.0	>6.0	---	---	None	Very brief	Very rare
		July	3.0-6.0	>6.0	---	---	None	Very brief	Very rare
		August	3.0-6.0	>6.0	---	---	None	---	None
		September	3.0-6.0	>6.0	---	---	None	---	None
		October	3.0-6.0	>6.0	---	---	None	---	None
		November	3.0-6.0	>6.0	---	---	None	---	None
		December	3.0-6.0	>6.0	---	---	None	---	None
6625:									
Sarben--------------------	B	---	---	---	---	---	---	---	---
6626:									
Sarben--------------------	B	---	---	---	---	---	---	---	---
6722:									
Satanta-------------------	B	---	---	---	---	---	---	---	---
Altvan--------------------	B	---	---	---	---	---	---	---	---
6725:									
Satanta, sandy substratum-	B	---	---	---	---	---	---	---	---
Ascalon-------------------	B	---	---	---	---	---	---	---	---
6727:									
Satanta, sandy substratum-	B	---	---	---	---	---	---	---	---
Johnstown-----------------	B	---	---	---	---	---	---	---	---
Altvan--------------------	B	---	---	---	---	---	---	---	---
6817:									
Scoville------------------	A	---	---	---	---	---	---	---	---
6930:									
Sidney--------------------	B	---	---	---	---	---	---	---	---
6937:									
Sidney--------------------	B	---	---	---	---	---	---	---	---
Canyon--------------------	D	---	---	---	---	---	---	---	---
7120:									
Sulco, moderately eroded--	B	---	---	---	---	---	---	---	---
McConaughy, moderately eroded-------------------	B	---	---	---	---	---	---	---	---
7121:									
Sulco, moderately eroded--	B	---	---	---	---	---	---	---	---
McConaughy, moderately eroded-------------------	B	---	---	---	---	---	---	---	---

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Soil saturation: Upper limit	Soil saturation: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
7122:									
Sulco, moderately eroded	B	---	---	---	---	---	---	---	---
McConaughy, moderately eroded	B	---	---	---	---	---	---	---	---
7582:									
Valent	A	---	---	---	---	---	---	---	---
7586:									
Valent	A	---	---	---	---	---	---	---	---
7588:									
Valent, rolling	A	---	---	---	---	---	---	---	---
Valent, hilly	A	---	---	---	---	---	---	---	---

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

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 cone. The material washed down the sides of mountains and hills by ephemeral streams and deposited at the mouth of gorges in the form of a moderately steep, conical mass descending equally in all directions from the point of issue.

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.

Alpha,alpha-dipyridyl. A dye that when dissolved in 1N ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction indicates a type of redoximorphic feature.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Arroyo. The flat-floored channel of an ephemeral stream, commonly with very steep to vertical banks cut in alluvium.

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.

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

Backslope. The position that forms the steepest and generally linear, middle portion of a hillslope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

Badland. Steep or 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.

Basal area. The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Basal till. Compact glacial till deposited beneath the ice.

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.

Base slope. A geomorphic component of hills consisting of the concave to linear (perpendicular to the contour) slope that, regardless of the lateral shape, forms an apron or wedge at the bottom of a hillside dominated by colluvium and slope-wash sediments (for example, slope alluvium).

Bedding planes. Fine strata, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediment.

Bedding system. A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography. A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

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.

Breast height. An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

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 or an exposed volcanic neck.

Cable yarding. A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems involve use of a drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, felled trees generally are reeled in while one end is lifted or the entire log is suspended.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Caliche. A more or less cemented deposit of calcium carbonate in soils of warm-temperate, subhumid to arid areas. Caliche occurs as soft, thin layers in the soil or as hard, thick beds directly beneath the solum, or it is exposed at the surface by erosion.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

Canyon. A long, deep, narrow, very steep sided valley with high, precipitous walls in an area of high local relief.

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.

Catsteps. Very small, irregular terraces on steep hillsides, especially in pasture, formed by the trampling of cattle or the slippage of saturated soil.

Cement rock. Shaly limestone used in the manufacture of cement.

Channery soil material. Soil material that has, 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 has 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.

COLE (coefficient of linear extensibility). See Linear extensibility.

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.

Congeliturbate. Soil material disturbed by frost action.

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. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the “Soil Survey Manual.”

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.

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.

Coppice dune. A small dune of fine grained soil material stabilized around shrubs or small trees.

Coprogenous earth (sedimentary peat). Fecal material deposited in water by aquatic organisms.

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.

Cross-slope farming. Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Cuesta. A hill or ridge that has a gentle slope on one side and a steep slope on the other; specifically, an asymmetric, homoclinal ridge capped by resistant rock layers of slight or moderate dip.

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.

Dip slope. A slope of the land surface, roughly determined by and approximately conforming to the dip of the underlying bedrock.

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, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,*** and ***very poorly drained***. These classes are defined in the “Soil Survey Manual.”

Drainage, surface. Runoff, or surface flow of water, from an area.

Draw. A small stream valley that generally is more open and has broader bottom land than a ravine or gulch.

Drumlin. A low, smooth, elongated oval hill, mound, or ridge of compact glacial till. The longer axis is parallel to the path of the glacier and commonly has a blunt nose pointing in the direction from which the ice approached.

Duff. A generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Ecological site. An area where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. An ecological site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other ecological sites in kind and/or proportion of species or in total production.

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.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

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.

Esker. A narrow, winding ridge of stratified gravelly and sandy drift deposited by a stream flowing in a tunnel beneath a glacier.

Extrusive rock. Igneous rock derived from deep-seated molten matter (magma) emplaced on the earth's surface.

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.

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.

Firebreak. Area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flaggy soil material. Material that has, 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.

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.

Foothill. A steeply sloping upland that has relief of as much as 1,000 feet (300 meters) and fringes a mountain range or high-plateau escarpment.

Footslope. The position that forms the inner, gently inclined surface at the base of a hillslope. In profile, footslopes are commonly concave. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

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.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

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.

Gilgai. Commonly, a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope. Typically, the microrelief of clayey soils that shrink and swell considerably with changes in moisture content.

Glacial drift. Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash. Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till. Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciofluvial deposits. Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

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 has 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.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

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.

Hard to reclaim (in tables). Reclamation is difficult after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Head out. To form a flower head.

Head slope. A geomorphic component of hills consisting of a laterally concave area of a hillside, especially at the head of a drainageway. The overland waterflow is converging.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

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 humified 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.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

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.

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

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.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Interfluve. An elevated area between two drainageways that sheds water to those drainageways.

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.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Kame. An irregular, short ridge or hill of stratified glacial drift.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

Knoll. A small, low, rounded hill rising above adjacent landforms.

K_{sat}. Saturated hydraulic conductivity. (See Permeability.)

Lacustrine deposit. Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

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.

Linear extensibility. Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at $^{1}/_{3}$- or $^{1}/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.

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.

Marl. An earthy, unconsolidated deposit consisting chiefly of calcium carbonate mixed with clay in approximately equal amounts.

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.

Mesa. A broad, nearly flat topped and commonly isolated upland mass characterized by summit widths that are more than the heights of bounding erosional scarps.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

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.

Moraine. An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

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).

Mountain. A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides. A mountain can occur as a single, isolated mass or in a group forming a chain or range.

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Mudstone. Sedimentary rock formed by induration of silt and clay in approximately equal amounts.

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.

Nose slope. A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent.

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

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it generally is low in relief.

Paleoterrace. An erosional remnant of a terrace that retains the surface form and alluvial deposits of its origin but was not emplaced by, and commonly 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.

Pedisediment. A thin layer of alluvial material that mantles an erosion surface and has been transported to its present position from higher lying areas of the erosion surface.

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 movement of water through the soil.

Permafrost. Layers of soil, or even bedrock, occurring in arctic or subarctic regions, in which a temperature below freezing has existed continuously for a long time.

Permeability. 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. In soil physics, the rate is referred to as “saturated hydraulic conductivity,” which is defined in the “Soil Survey Manual.” In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as “permeability.” Terms describing permeability, measured in inches per hour, are as follows:

Impermeable	less than 0.0015 inch
Very slow	0.0015 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

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.

Pitting (in tables). Pits caused by melting around ice. They form on the soil after plant cover is removed.

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.

Playa. The generally dry and nearly level lake plain that occupies the lowest parts of closed depressional areas, such as those on intermontane basin floors. Temporary flooding occurs primarily in response to precipitation and runoff.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

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.

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.

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.

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

Red beds. Sedimentary strata that are mainly red and are made up largely of sandstone and shale.

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 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.

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

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.

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.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

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 soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

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.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saprolite. Unconsolidated residual material underlying the soil and grading to hard bedrock below.

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.

Scarification. The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

Second bottom. The first terrace above the normal flood plain (or first bottom) of a river.

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.

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. The position that forms the uppermost inclined surface near the top of a hillslope. It is a transition from backslope to summit. 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.

Side slope. A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

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.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

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.

Slick spot. 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.

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
Nearly level	0 to 2 percent
Very gently sloping	0 to 3 percent
Gently sloping	3 to 6 percent
Strongly sloping	6 to 9 percent
Moderately steep	9 to 17 percent
Steep	17 to 30 percent
Very steep	30 to 60 percent

Classes for complex slopes are as follows:

Undulating	3 to 9 percent
Rolling	9 to 24 percent
Hilly	24 to 60 percent

Sloughed till. Water-saturated till that has flowed slowly downhill from its original place of deposit by glacial ice. It may rest on other till, on glacial outwash, or on a glaciolacustrine deposit.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in 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 Na^{+} to Ca^{++} + Mg^{++}. The degrees of sodicity and their respective ratios are:

Slight	less than 13:1
Moderate	13-30:1
Strong	more than 30:1

Sodium adsorption ratio (SAR). A measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration.

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 and by the passage of time.

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 grain*** (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. Any surface soil horizon (A, E, AB, or EB) below the 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.

Summit. The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.

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.

Talus. Fragments of rock and other soil material accumulated by gravity at the foot of cliffs or steep slopes.

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.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

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.

Till plain. An extensive area of nearly level to undulating soils underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope. The position that forms the gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

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.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Tuff. A compacted deposit that is 50 percent or more volcanic ash and dust.

Upland. Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Water bars. Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

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.

Windthrow. The uprooting and tipping over of trees by the wind.