United States Department of Agriculture

Soil Conservation Service

In cooperation with United States Department of the Interior, Bureau of Indian Affairs, and the South Dakota Agricultural Experiment Station

Soil Survey of Ziebach County, South Dakota

How To Use This Soil Survey

General Soil Map

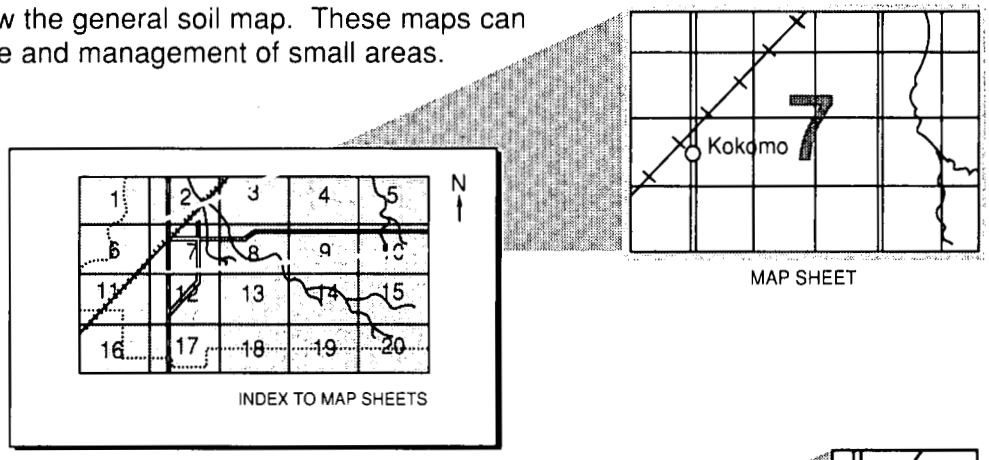
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

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

Detailed Soil Maps

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

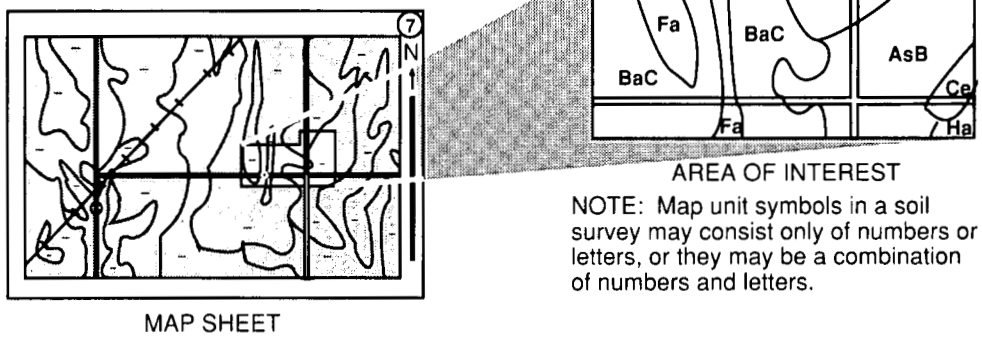
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



INDEX TO MAP SHEETS

MAP SHEET

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



MAP SHEET

AREA OF INTEREST

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

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **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 Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, handicap, or age.

Major fieldwork for this soil survey was completed in 1984. Soil names and descriptions were approved in 1985. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1985. This survey was made cooperatively by the Soil Conservation Service; the United States Department of the Interior, Bureau of Indian Affairs; and the South Dakota Agricultural Experiment Station. It is part of the technical assistance furnished to the Ziebach County Conservation District. Some financial assistance was furnished by the Bureau of Indian Affairs.

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

Cover: Thunder Butte, a prominent landmark in the northern part of Ziebach County.

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Issued March 1990

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Foreword

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

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

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

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

C. Budd Fountain
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Soil Survey of Ziebach County, South Dakota

By Wayne J. Bachman, Soil Conservation Service

Soils surveyed by Wayne J. Bachman, Thomas G. Groth, and
Alan W. Hardison, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service,
in cooperation with
United States Department of the Interior, Bureau of Indian Affairs,
and the South Dakota Agricultural Experiment Station

ZIEBACH COUNTY is in the northwestern part of South Dakota (fig. 1). It has a total of 1,262,746 acres, which includes about 2,388 acres of water. Nearly all of the county is in the Cheyenne River Indian Reservation. The extreme northern part, however, is in the Standing Rock Indian Reservation. About 550,000 acres is administered by the Bureau of Indian Affairs. This land is intermingled with private land throughout the county.

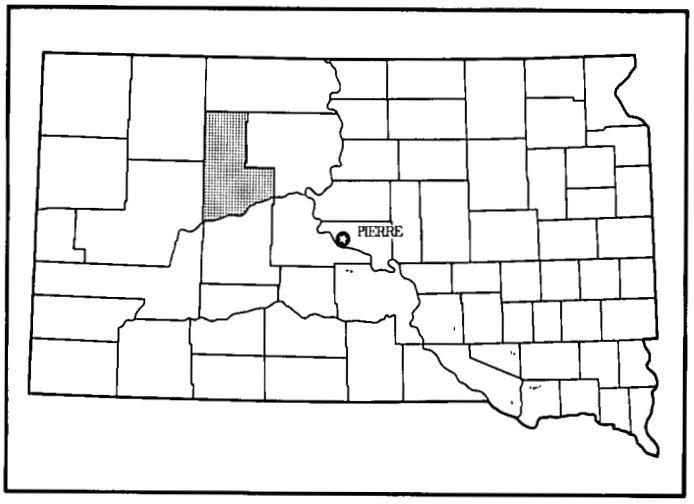

Figure 1.—Location of Ziebach County in South Dakota.

According to the 1980 census, the population of the county is 2,308. Dupree, the county seat and largest town, has a population of 562.

Ziebach County was established by an act of the Dakota Territorial Legislature in 1877 and reorganized in 1911 (*4*). It was named after Frank M. Ziebach, a territorial legislator.

South Dakota State Highways 20, 34, 63, and 65 and United States Highway 212 are the main thoroughfares. Many rural areas are served by poor motor roads. A small airport is at Dupree. Railroad transportation was extended into the county in 1910. It was discontinued in 1979.

General Nature of the County

This section gives general information concerning the county. It describes climate; physiography, relief, and drainage; ranching and farming; and natural resources.

Climate

Prepared by the National Climatic Center, Asheville, North Carolina.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Dupree in the period 1951 to 1981. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 19 degrees F, and the average daily minimum temperature is 8 degrees. The lowest temperature on record, which occurred at Dupree on January 29, 1966, is -39 degrees. In summer the average temperature is 70 degrees, and the average daily maximum temperature is 86 degrees. The highest recorded temperature, which occurred at Dupree on July 25, 1963, is 109 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 15.41 inches. Of this, about 12 inches, or 80 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 10 inches. The heaviest 1-day rainfall during the period of record was 3.67 inches at Dupree on May 22, 1972. Thunderstorms occur on about 42 days each year.

The average seasonal snowfall is about 34 inches. The greatest snow depth at any one time during the period of record was 24 inches. On the average, 47 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. Blizzards occur several times each winter.

The average relative humidity in midafternoon is about 50 percent. Humidity is higher at night, and the average at dawn is about 70 percent. The sun shines 70 percent of the time possible in summer and 55 percent in winter. The prevailing wind is from the north-northwest. Average windspeed is highest, 13 miles per hour, in spring.

Physiography, Relief, and Drainage

Ziebach County is on the Cretaceous Table Lands and Pierre Hills divisions of the Great Plains (*6*). Slopes generally are nearly level to strongly sloping. Near drainageways, however, they generally are moderately steep or steep. On the Cretaceous Table Lands, a few prominent buttes rise above the surrounding landscape.

The northern half of the county is drained by the Moreau River and its tributaries. The southern half is drained by the Cheyenne River and its tributaries. The Moreau and Cheyenne Rivers are both perennial and flow easterly into Lake Oahe.

Elevation ranges from about 1,620 feet above sea level in an area along Lake Oahe in the southeastern part of the county to 2,738 feet on Thunder Butte, in the northwestern part.

Ranching and Farming

Ranching is the principal enterprise in Ziebach County. Beef cattle and sheep are the main types of livestock. About 76 percent of the farm income is derived from the sale of livestock and livestock products. Many of the crops are used as livestock feed. Most of the small grain is sold as a cash crop.

In 1978, the county had 212 ranches and farms, which averaged about 5,702 acres in size. The trend is toward fewer and larger ranches and farms. Many ranchers lease additional grazing land from the Bureau of Indian Affairs.

About 83 percent of the total land acreage is range, and 17 percent is used for cultivated crops or for tame pasture and hay (*3*). Winter wheat, alfalfa, and oats are the main crops. Spring wheat also is grown (*5*). Alfalfa, crested wheatgrass, and intermediate wheatgrass are the main plants grown for tame pasture and hay.

The Tri-County Soil Conservation District, which included parts of Ziebach, Perkins, and Meade Counties, was organized in 1937. In 1953, the Ziebach County Conservation District was formed. It includes the entire county. It has been instrumental in planting grasses and trees to help control erosion. The trees also provide protection for farmsteads and wildlife.

Natural Resources

Soil is the most important natural resource in Ziebach County. It provides a growing medium for crops and the grasses grazed by livestock. Other natural resources are water, sand and gravel, and wildlife.

Stock water impoundments and shallow wells are the main sources of water for livestock. Wells drilled to a depth of about 2,200 feet also provide water. Water quantity generally is greater in the deep wells, but the quality is poor because of a high content of soluble salts. The Moreau and Cheyenne Rivers provide water for livestock, wildlife, and irrigation. These rivers are perennial, but all other drainageways flow only intermittently and provide water only during periods of snowmelt and heavy rainfall. Lake Oahe provides opportunities for boating and fishing.

Deposits of sand and gravel are mainly in scattered areas on terrace scarps along the Moreau and Cheyenne Rivers. They are a few inches to many feet thick. Because of an excessive amount of fine rock fragments, such as shale, the sand and gravel are unsuitable as concrete aggregate or as construction material. They are suitable, however, as subgrade material for roads and as bituminous aggregate.

Antelope, white-tailed deer, mule deer, sharp-tailed grouse, and gray partridge are the chief wildlife resources in Ziebach County. Coyote and fox are the main predators. Bass, bluegill, crappie, and perch inhabit

many stock water impoundments. Walleye, northern pike, and catfish inhabit Lake Oahe.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; 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 biologic activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil 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-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, acidity, 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. 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 interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were 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 were 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 state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot assure 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.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. 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 soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns 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 (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soil on the landscape.

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

General Soil Map Units

The general soil map at the back of this publication shows the soil associations in this survey area. Each association has a distinctive pattern of soils, relief, and drainage. Each is a unique natural landscape. Typically, an association consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The 14 associations on the general soil map of this county have been grouped for broad interpretive purposes. They are described on the pages that follow. The names of the associations do not coincide exactly with those on the general soil maps in the published surveys of adjacent counties. Differences are the result of variations in the design and composition of the associations or changes and refinements in series concepts.

Soil Descriptions

Gently Sloping to Very Steep, Clayey Soils on Uplands

These soils dominantly are strongly sloping to steep but are gently sloping or moderately sloping in some areas and very steep in others. They make up about 36 percent of the county. About 95 percent of the acreage is range. Maintaining the most productive grasses is the main concern in managing range. A few areas are used for alfalfa or small grain. Controlling erosion and conserving moisture are the main management concerns in cultivated areas.

1. Samsil-Pierre Association

Shallow and moderately deep, well drained, strongly sloping to very steep, clayey soils on uplands

This association is on breaks along the Cheyenne River and its tributaries. The landscape is characterized by deeply entrenched drainageways. Slopes generally are strongly sloping to steep but are very steep along some drainageways. The drainage pattern is well defined.

This association makes up about 25 percent of the county. It is about 60 percent Samsil soils, 20 percent Pierre soils, and 20 percent minor soils (fig. 2).

The shallow Samsil soils are on the upper side slopes and ridges. Slopes range from 9 to 60 percent. Typically, the surface layer is grayish brown, calcareous clay. The underlying material also is grayish brown, calcareous clay. Light brownish gray shale is at a depth of about 12 inches.

The moderately deep Pierre soils are on the mid and lower side slopes. In this association they generally have a slope of 9 to 30 percent. Typically, the surface layer is dark grayish brown clay. The subsoil is grayish brown and light brownish gray, calcareous clay. The underlying material is light brownish gray, calcareous clay. Light brownish gray shale is at a depth of about 32 inches.

Minor in this association are the Hisle, Kyle, Lohmiller, Schamber, and Swanboy soils and Rock outcrop. The sodium affected, moderately deep Hisle soils are on foot slopes and flats. The deep Kyle soils are on low side slopes. The deep, stratified Lohmiller soils are on flood plains. The gravelly Schamber soils are on ridges. The deep, dense Swanboy soils are on foot slopes. The Rock outcrop occurs as exposures of shale bedrock. It is intermingled with areas of the Samsil soils. It does not support vegetation.

Nearly all of this association supports native grasses and is used for grazing. Controlling erosion and maintaining the most productive grasses are the main management concerns. The major soils are suited to range. They generally are unsuited to cultivated crops and to tame pasture and hay because of the slope. Landslides are common because of the slope and the unstable nature of the underlying shale.

2. Pierre-Kyle Association

Moderately deep and deep, well drained, gently sloping to strongly sloping, clayey soils on uplands

This association is on uplands characterized by low ridges and shallow drainageways. Slopes generally are

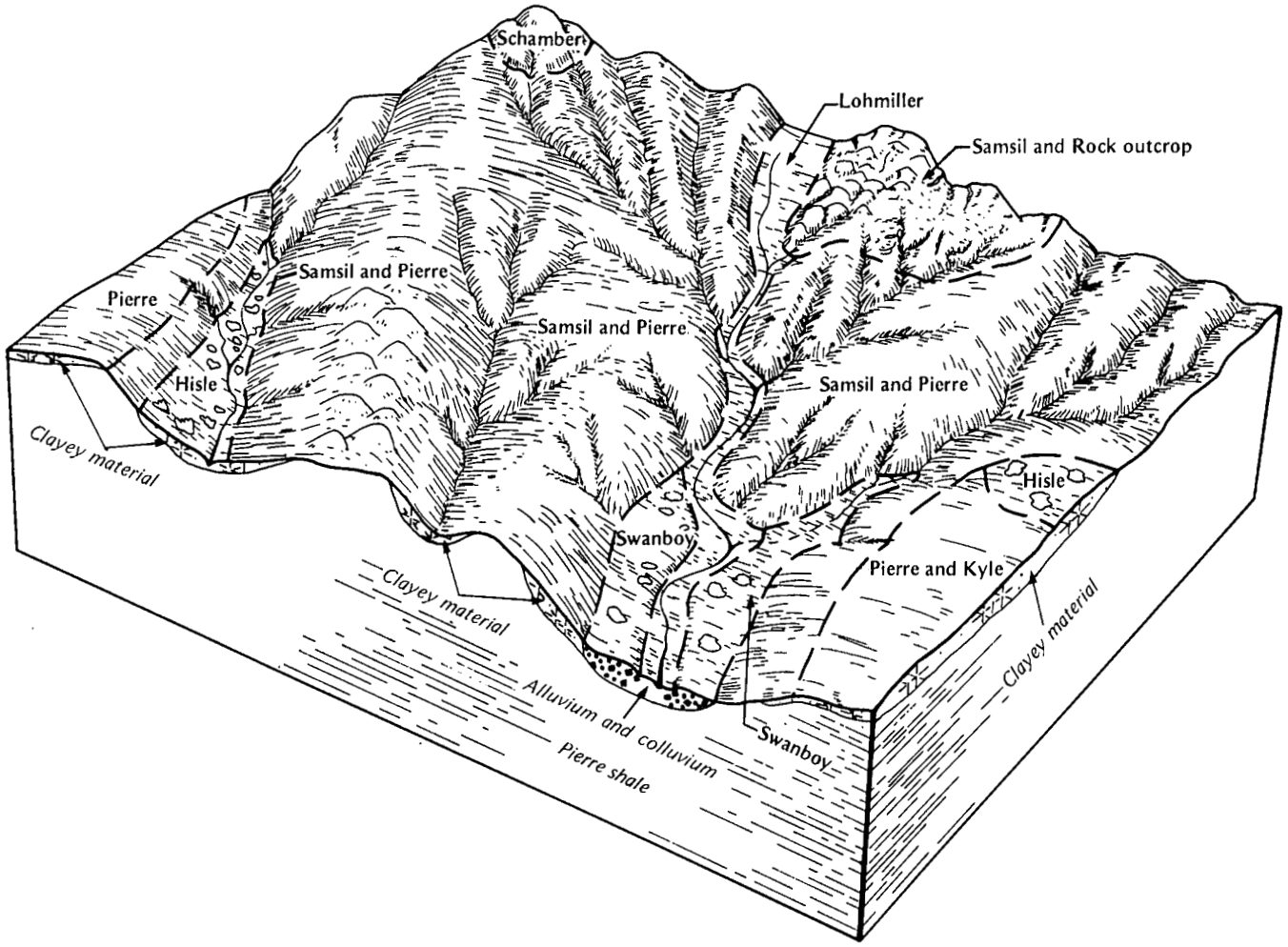

Figure 2.—Pattern of soils and parent material in the Samsil-Pierre association.

gently sloping and moderately sloping but are strongly sloping along some drainageways. The drainage pattern is well defined.

This association makes up about 10 percent of the county. It is about 50 percent Pierre soils, 20 percent Kyle soils, and 30 percent minor soils.

The moderately deep Pierre soils are on the convex parts of the landscape. In this association they generally have a slope of 2 to 15 percent. Typically, the surface layer is dark grayish brown clay. The subsoil is grayish brown and light brownish gray, calcareous clay. The underlying material is light brownish gray, calcareous clay. Light brownish gray shale is at a depth of about 32 inches.

The deep Kyle soils are on the smoother parts of the mid and lower side slopes. Slopes range from 2 to 6 percent. Typically, the surface layer and subsoil are grayish brown clay. The subsoil is calcareous in the lower part. The underlying material is grayish brown, calcareous clay.

Minor in this association are the Hisle, Promise, Samsil, and Swanboy soils. The sodium affected Hisle soils are on flats and foot slopes. The deep, nearly level Promise soils are on uplands. The shallow Samsil soils are on ridges and in steep areas. The deep, dense Swanboy soils are on foot slopes.

About 75 percent of this association is range. Some areas are used for crops, mainly small grain and alfalfa. The major soils are suited to cultivated crops, tame pasture and hay, and range. Maintaining the most productive grasses is the main concern in managing range. Improving tilth, conserving moisture, and controlling erosion are the main concerns in managing cultivated areas.

3. Dupree-Pierre Association

Shallow and moderately deep, well drained, gently sloping to strongly sloping, clayey soils on uplands

This association is on uplands characterized by low ridges and many small drainageways. Slopes generally are moderately sloping and strongly sloping but are gently sloping in some areas. The drainage pattern is well defined.

This association makes up about 1 percent of the county. It is about 55 percent Dupree soils, 20 percent Pierre soils, and 25 percent minor soils.

The shallow Dupree soils are on ridges and the upper side slopes. Slopes range from 3 to 15 percent. Typically, the surface layer and subsoil are grayish brown clay. Light brownish gray shale is at a depth of about 16 inches.

The moderately deep Pierre soils are on the mid and lower side slopes. In this association they generally have a slope of 2 to 15 percent. Typically, the surface layer is dark grayish brown clay. The subsoil is grayish brown and light brownish gray, calcareous clay. The underlying material is light brownish gray, calcareous clay. Light brownish gray shale is at a depth of about 32 inches.

Minor in this association are the Hisle, Samsil, and Swanboy soils and Slickspots. The sodium affected Hisle soils are on foot slopes and flats. The shallow Samsil soils are on ridges and in steep areas along drainageways. The deep Swanboy soils are on foot slopes. Slickspots are in slight depressions. They occur as small areas of highly dispersed, massive clay that does not support vegetation.

Nearly all of this association supports native grasses and is used for grazing. Controlling erosion and maintaining the most productive grasses are the main management concerns. The major soils are suited to range. They generally are unsuited to cultivated crops and to tame pasture and hay because of the slope of both soils and the shallowness of the Dupree soils.

Nearly Level and Gently Sloping, Loamy, Sandy, Silty, and Clayey Soils on Flood Plains, Terraces, and Foot Slopes

These soils make up about 4 percent of the county. About 90 percent of the acreage is range. Maintaining the most productive grasses is the main concern in managing range. Some areas are used for crops, mainly alfalfa and small grain. Conserving moisture, controlling erosion, and improving fertility are the main concerns in managing cultivated areas.

4. Trembles-Korchea-Banks Association

Deep, well drained and somewhat excessively drained, nearly level, loamy and sandy soils on flood plains and low terraces

This association is on flood plains and low terraces along the Moreau River. Narrow, low ridges, oxbows, and escarpments characterize some areas. Flooding occurs when ice dams the river and after heavy rainfall. The flooding usually is of short duration.

This association makes up about 2 percent of the county. It is about 30 percent Trembles soils, 30 percent Korchea soils, 10 percent Banks soils, and 30 percent minor soils (fig. 3).

The well drained Trembles soils are on flood plains. Typically, the surface layer is grayish brown fine sandy loam. The underlying material is grayish brown, calcareous fine sandy loam and loamy fine sand stratified with thin layers of loam.

The well drained Korchea soils are on low terraces. Typically, the surface layer is grayish brown, calcareous loam. The underlying material is grayish brown and light brownish gray, calcareous loam stratified with thin layers of fine sandy loam, silty clay loam, and silt loam.

The somewhat excessively drained Banks soils are near the stream channel. Typically, the surface layer is grayish brown, calcareous loamy fine sand. The underlying material is light brownish gray, calcareous, stratified fine sand, sandy loam, fine sandy loam, and loamy fine sand.

Minor in this association are the Lohler, Shambo, and Tally soils. The silty Lohler soils are on flood plains. The loamy Shambo and Tally soils are on terraces.

About 82 percent of this association is range. Some areas are used for crops, generally alfalfa and small grain, which are grown mainly on the Trembles and Korchea soils. The major soils are suited to cultivated crops, tame pasture and hay, and range. Controlling wind erosion and maintaining the most productive grasses are the main concerns in managing range. Conserving moisture and controlling wind erosion are the main concerns in managing cultivated areas. Trees and shrubs near the channel provide excellent cover for wildlife and livestock.

5. Craft-Bankard Association

Deep, well drained and somewhat excessively drained, nearly level, loamy and sandy soils on flood plains

This association is on flood plains along the Cheyenne River. Stream channels and oxbows characterize some areas. Flooding occurs when ice dams the river and after heavy rainfall. The flooding usually is of short duration.

This association makes up about 1 percent of the county. It is about 25 percent Craft soils, 25 percent Bankard soils, and 50 percent minor soils.

The well drained Craft soils are farther from the river than the Bankard soils. Typically, the surface layer is pale brown, calcareous very fine sandy loam. The underlying material is light brownish gray, calcareous, stratified very fine sandy loam, loamy very fine sand, and silt loam.

The somewhat excessively drained Bankard soils are near the river. Typically, the surface layer is pale brown

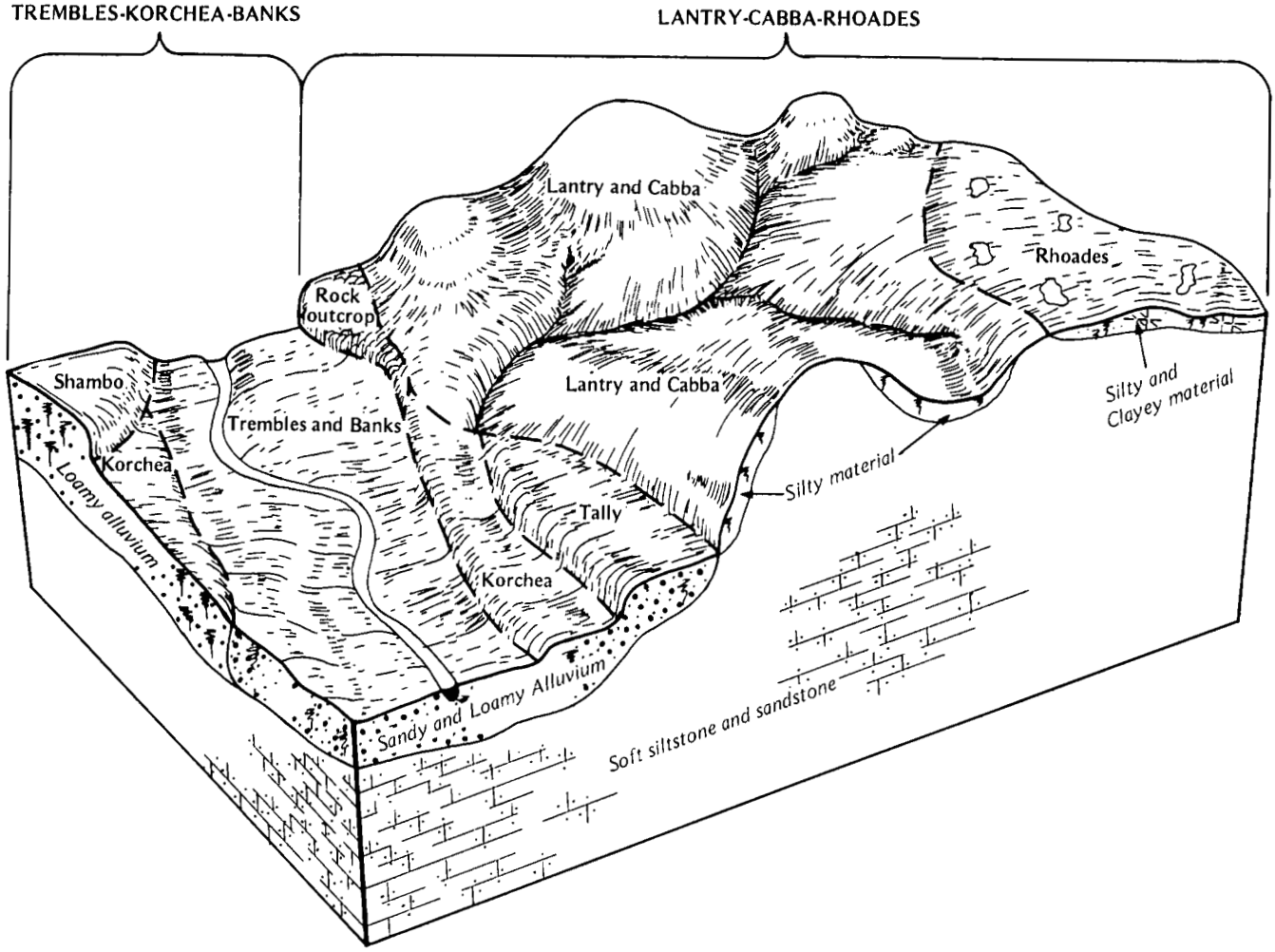

Figure 3.—Pattern of soils and parent material in the Trembles-Korchea-Banks and Lantry-Cabba-Rhoades associations.

loamy fine sand. The underlying material is light brownish gray loamy fine sand and fine sand stratified with thin layers of sandy loam and loam. The soils are calcareous throughout.

Minor in this association are the Bankard Variant, Lohmiller, Swanboy, and Wendte soils and Riverwash. The excessively drained Bankard Variant soils are 4 to 15 inches deep to gravelly material. They are adjacent to the Cheyenne River. The silty Lohmiller soils and the clayey Wendte soils are farther from the river than the Bankard and Craft soils. The clayey Swanboy soils are on foot slopes near the uplands. Riverwash is adjacent to the Cheyenne River. It has gravel at the surface. It generally does not support vegetation.

Nearly all of this association supports native grasses and is used for grazing. The major soils are suited to range. Controlling erosion and maintaining the most productive grasses are the main concerns in managing range. Trees and shrubs near the river provide excellent cover for wildlife and livestock. In some areas the Craft soils are used for crops, mainly alfalfa and small grain. These soils are suited to cultivated crops. Conserving moisture and improving fertility are the main concerns in managing these soils for cultivated crops. The Bankard soils are generally unsuited to cultivated crops and to tame pasture and hay because of a severe hazard of wind erosion, low fertility, and a low available water capacity.

6. Lohmiller-Swanboy Association

Deep, well drained, nearly level and gently sloping, silty and clayey soils on flood plains, terraces, and foot slopes

This association is on flood plains, terraces, and foot slopes along Cherry Creek. Low areas commonly are

dissected by stream channels. The Lohmiller soils are subject to flooding.

This association makes up about 1 percent of the county. It is about 40 percent Lohmiller soils, 35 percent Swanboy soils, and 25 percent minor soils.

The Lohmiller soils are on flood plains. Slopes range from 0 to 2 percent. Typically, the surface layer is grayish brown, calcareous silty clay loam. The underlying material is grayish brown, calcareous silty clay loam stratified with thin layers of loam, silty clay, and silt loam.

The Swanboy soils are on terraces and foot slopes. In this association they generally have a slope of 0 to 6 percent. Typically, the surface layer is light brownish gray clay. The subsoil is grayish brown, calcareous clay. It has accumulations of salts in the lower part. The underlying material is grayish brown, calcareous clay and silty clay.

Minor in this association are the Pierre, Samsil, and Wendte soils and Slickspots. The moderately deep Pierre soils and the shallow Samsil soils are on uplands. The clayey Wendte soils are in positions on the landscape similar to those of the Lohmiller soils. Slickspots are in slight depressions. They occur as small areas of highly dispersed, massive clay that does not support vegetation.

Nearly all of this association supports native grasses and is used for grazing. The major soils are suited to range. Maintaining the most productive grasses is the main concern in managing range. Trees and shrubs near some channels provide excellent cover for wildlife and livestock. Some areas of the Lohmiller soils are cultivated. The Lohmiller soils are suited to cultivated crops and to tame pasture and hay, but the Swanboy soils generally are unsuited because of very poor tilth and a high content of salts in the subsoil.

Nearly Level to Very Steep, Silty and Loamy Soils on Uplands and Terraces

These soils dominantly are nearly level to strongly sloping but are steeper along some drainageways and on some ridges. They make up about 60 percent of the county. About 75 percent of the acreage is range. Maintaining the most productive grasses is the main concern in managing range. Some areas are used for crops, mainly alfalfa and small grain. Controlling erosion, conserving moisture, and improving tilth are the main concerns in managing cultivated areas.

7. Regent-Ridgeview Association

Moderately deep and deep, well drained, nearly level to strongly sloping, silty soils on uplands

This association is on uplands characterized by low ridges and shallow drainageways. Slopes generally are gently sloping and moderately sloping but are nearly level in some areas and strongly sloping in others. The drainage pattern is well defined.

This association makes up about 4 percent of the county. It is about 45 percent Regent soils, 25 percent Ridgeview soils, and 30 percent minor soils.

The moderately deep Regent soils are on the convex parts of the landscape. Slopes range from 2 to 15 percent. Typically, the surface layer is dark grayish brown silty clay loam. The subsoil is dark grayish brown and grayish brown silty clay. It is calcareous in the lower part. Light brownish gray, calcareous shale is at a depth of about 28 inches.

The deep Ridgeview soils are on the smooth parts of the landscape. Slopes range from 0 to 6 percent. Typically, the surface layer is dark grayish brown silty clay loam. The subsoil is dark grayish brown and grayish brown clay. It is calcareous in the lower part. The underlying material is light brownish gray, calcareous silty clay.

Minor in this association are the Daglum, Grail, Lantry, Reeder, and Rhoades soils. The sodium affected Daglum and Rhoades soils are in shallow depressions. Grail soils are dark to a depth of more than 16 inches. They are in swales. Lantry soils are on ridges and knolls. They contain less clay throughout than the Regent and Ridgeview soils. The loamy Reeder soils are in positions on the landscape similar to those of the Regent soils.

About 70 percent of this association is cropland. Alfalfa and small grain are the main crops. The major soils are suited to cultivated crops, tame pasture and hay, and range. Improving tilth, conserving moisture, and controlling erosion are the main concerns in managing cultivated areas. Maintaining the most productive grasses is the main concern in managing range.

8. Regent-Rhoades Association

Moderately deep and deep, well drained, nearly level to strongly sloping, silty and loamy soils on uplands

This association is on uplands characterized by ridges and nearly level areas. Slopes generally are gently sloping and moderately sloping but are nearly level in some areas and strongly sloping in others. The drainage pattern is well defined.

This association makes up about 13 percent of the county. It is about 45 percent Regent soils, 20 percent Rhoades soils, and 35 percent minor soils.

The moderately deep Regent soils are on the convex parts of the landscape. Slopes range from 2 to 15 percent. Typically, the surface layer is dark grayish brown silty clay loam. The subsoil is dark grayish brown and grayish brown silty clay. It is calcareous in the lower part. Light brownish gray, calcareous shale is at a depth of about 28 inches.

The deep, sodium affected Rhoades soils are on the less sloping parts of the landscape. In this association they generally have a slope of 0 to 9 percent. Typically, they have a thin surface layer of grayish brown loam. The subsoil is dark grayish brown and grayish brown silty

clay. In the lower part it is calcareous and has accumulations of salts. The underlying material is light olive brown, calcareous silty clay loam. Light olive brown shale is at a depth of about 50 inches.

Minor in this association are the Daglum, Grail, Ridgeview, Lantry, and Vebar soils and Slickspots. The sodium affected Daglum soils have a surface layer that is thicker than that of the Rhoades soils. They are in small depressions. The deep Grail and Ridgeview soils do not have a sodium affected subsoil. They are in swales and the less sloping areas. The silty Lantry and loamy Vebar soils are on knolls and ridges. They have less clay throughout than the Regent and Rhoades soils. Slickspots are in scattered slight depressions. They occur as small areas of highly dispersed, massive clay that does not support vegetation.

About 80 percent of this association supports native vegetation and is used for grazing. The major soils are suited to range. Maintaining the most productive grasses is the main concern in managing range. Some areas are used for crops, mainly alfalfa and small grain. The Regent soils are suited to cultivated crops and to tame pasture and hay, but the Rhoades soils generally are unsuited. Conserving moisture and controlling erosion are the main concerns in managing cultivated areas.

9. Rhoades Association

Deep, well drained, nearly level to moderately sloping, loamy soils on uplands and terraces

This association is on terraces and in swales and on low ridges in the uplands. Slopes generally are long and are smooth or concave, but they are short and steep along some of the drainageways. The surface is uneven in most areas. The drainage pattern is well defined.

This association makes up about 5 percent of the county. It is about 70 percent Rhoades soils and 30 percent minor soils.

The sodium affected Rhoades soils have a slope of 0 to 9 percent. Typically, they have a thin surface layer of grayish brown loam. The subsoil is dark grayish brown and grayish brown silty clay. In the lower part it is calcareous and has accumulations of salts. The underlying material is light olive brown, calcareous silty clay loam.

Minor in this association are the Daglum, Reeder, Regent, and Vebar soils and Slickspots. Daglum soils have a surface layer that is thicker than that of the Rhoades soils. They are in small depressions. The moderately deep Reeder, Regent, and Vebar soils are on ridges and the upper side slopes. They do not have a sodium affected subsoil. Slickspots are in scattered slight depressions. They occur as small areas of highly dispersed, massive clay that does not support vegetation.

About 95 percent of this association supports native grasses and is used for grazing. Maintaining the most productive grasses is the main management concern. The Rhoades soils are suited to range. They generally are unsuited to cultivated crops and to tame pasture and hay because of the sodium affected subsoil.

10. Reeder-Daglum Association

Moderately deep and deep, well drained, nearly level to moderately sloping, loamy soils on uplands

This association is on uplands characterized by ridges and valleys. Slopes generally are gently sloping but are nearly level in some areas and moderately sloping in others. The drainage pattern is well defined.

This association makes up about 2 percent of the county. It is about 50 percent Reeder soils, 30 percent Daglum soils, and 20 percent minor soils.

The moderately deep Reeder soils are on ridges and the upper side slopes. Slopes range from 2 to 9 percent. Typically, the surface layer is dark grayish brown loam. The subsoil is brown and light olive brown clay loam and light yellowish brown, calcareous loam. Light yellowish brown bedrock is at a depth of about 35 inches.

The deep, sodium affected Daglum soils are on low side slopes. Slopes range from 0 to 9 percent. Typically, the surface layer is dark grayish brown loam. The subsurface layer is grayish brown loam. The subsoil is dark grayish brown and grayish brown clay. It is calcareous in the lower part. The underlying material is grayish brown, calcareous clay and clay loam. Grayish brown shale is at a depth of about 50 inches.

Minor in this association are the Cabba, Lantry, Regent, Rhoades, and Vebar soils. The shallow Cabba soils are on the steeper slopes. The silty Lantry soils are on knolls and ridges. The silty Regent soils are on side slopes. The sodium affected Rhoades soils have a surface layer that is not so thick as that of the Daglum soils. They are in positions on the landscape similar to those of the Daglum soils. The loamy Vebar soils contain more sand and less clay throughout than the Reeder soils.

About 60 percent of this association supports native grasses and is used for grazing. Some areas are used for crops, mainly alfalfa and small grain. The major soils are suited to cultivated crops, tame pasture and hay, and range. Maintaining the most productive grasses is the main concern in managing range. Controlling erosion and conserving moisture are the main concerns in managing cultivated areas. The sodium affected subsoil in the Daglum soils also is a concern.

11. Reeder-Lantry Association

Moderately deep, well drained, gently sloping to strongly sloping, loamy and silty soils on uplands

This association is on uplands characterized by many knolls, hills, and ridges intermingled with swales that terminate in depressions. Slopes generally are gently sloping or moderately sloping but are steeper along

some drainageways. The drainage pattern is poorly defined where the drainageways terminate in small depressions. It is well defined along the larger drainageways.

This association makes up about 5 percent of the county. It is about 50 percent Reeder soils, 30 percent Lantry soils, and 20 percent minor soils (fig. 4).

The Reeder soils are on mid and low side slopes. Slopes range from 2 to 9 percent. Typically, the surface layer is dark grayish brown loam. The subsoil is brown and light olive brown clay loam and light yellowish brown, calcareous loam. Light yellowish brown bedrock is at a depth of about 35 inches.

The Lantry soils are on the upper side slopes and ridges. In this association they generally have a slope of 2 to 15 percent. Typically, the surface layer is brown silt loam. The subsoil is light yellowish brown, calcareous silt loam. Light yellowish brown and light brownish gray, calcareous bedrock is at a depth of about 33 inches.

Minor in this association are the Cabba, Daglum, Heil, Regent, Rhoades, and Savage soils. The shallow Cabba soils are on ridges and the sides of entrenched drainageways. The sodium affected Daglum and Rhoades soils are in small pits and depressions on the low parts of the landscape. The poorly drained Heil soils are in large depressions. Regent soils are in positions on the landscape similar to those of the Reeder soils. They have more clay in the subsoil than the Reeder and Lantry soils. The deep Savage soils are on side slopes and the less sloping parts of the landscape.

About 85 percent of this association is cropland. Alfalfa and small grain are the main crops. The major soils are suited to cultivated crops, tame pasture and hay, and range. Controlling erosion, conserving moisture, and improving fertility are the main concerns in managing cultivated areas. Maintaining the most productive grasses is the main concern in managing range.

12. Lantry-Cabba-Rhoades Association

Shallow to deep, well drained, gently sloping to very steep, silty and loamy soils on uplands

This association is on ridges, hills, and breaks adjacent to the major drainageways in the uplands. It is dissected by many well defined drainageways. Slopes

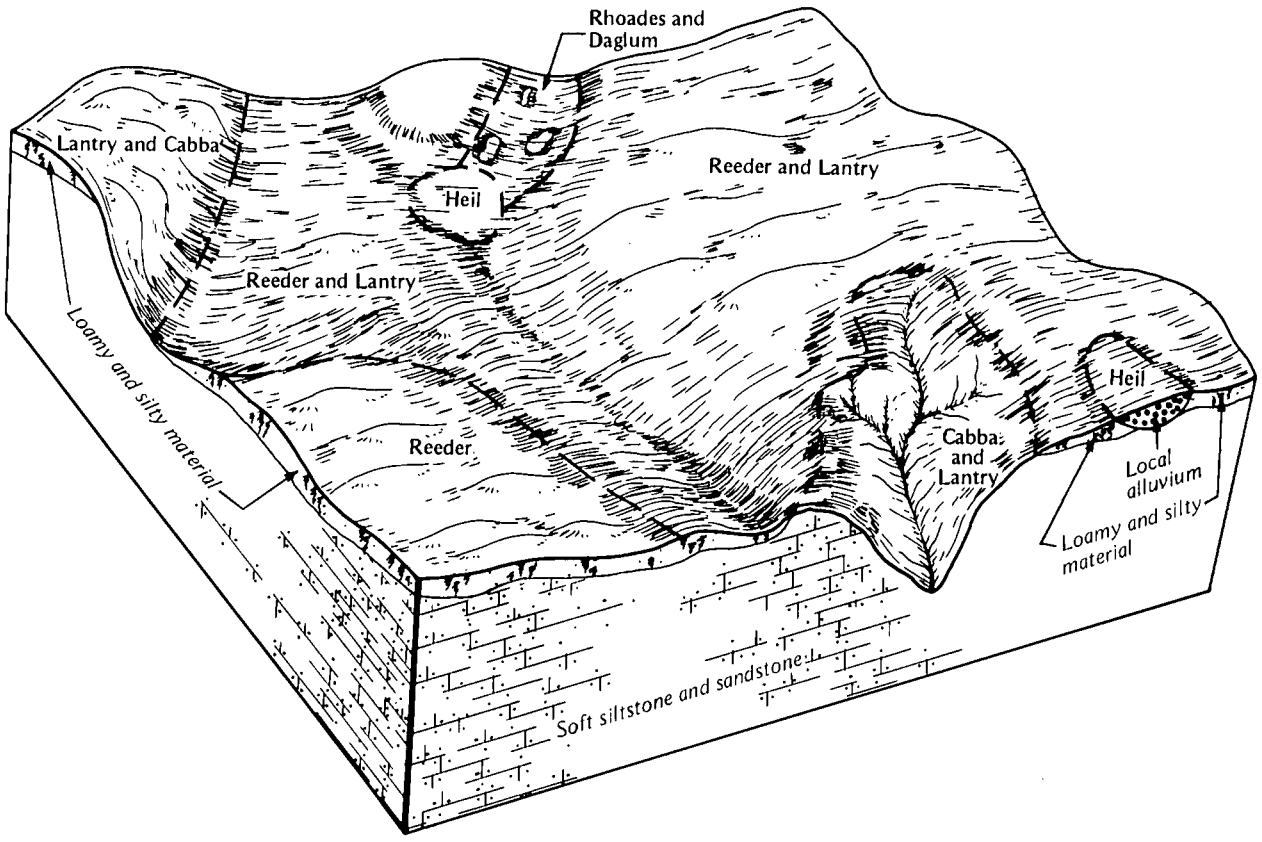

Figure 4.—Pattern of soils and parent material in the Reeder-Lantry association.

dominantly are strongly sloping to steep but are gently sloping or moderately sloping in some areas and very steep in others.

This association makes up about 14 percent of the county. It is about 35 percent Lantry soils, 30 percent Cabba soils, 15 percent Rhoades soils, and 20 percent minor soils (fig. 3).

The moderately deep Lantry soils are on the mid and lower side slopes. In this association they generally have a slope of 6 to 30 percent. Typically, the surface layer is brown silt loam. The subsoil is light yellowish brown, calcareous silt loam. Light yellowish brown and light brownish gray, calcareous bedrock is at a depth of about 33 inches.

The shallow Cabba soils are on the upper side slopes and ridges. Slopes range from 6 to 60 percent. Typically, the surface layer is grayish brown, calcareous loam. The next layer is light brownish gray, calcareous loam. The underlying material is grayish brown and light yellowish brown, calcareous clay loam. Light brownish gray and light yellowish brown bedrock is at a depth of about 16 inches.

The deep, sodium affected Rhoades soils are on the less sloping parts of the landscape. In this association they generally have a slope of 2 to 15 percent. Typically, they have a thin surface layer of grayish brown loam. The subsoil is dark grayish brown and grayish brown silty clay. In the lower part it is calcareous and has accumulations of salts. The underlying material is light olive brown, calcareous silty clay loam. Light olive brown shale is at a depth of about 50 inches.

Minor in this association are the Cohagen, Glenross, Korchea, Reeder, Vebar, and Wayden soils and Rock outcrop. The shallow Cohagen and Wayden soils are on the upper side slopes and ridges. The poorly drained, saline Glenross soils and the stratified Korchea soils are along drainageways. The moderately deep, loamy Reeder and Vebar soils are on the mid and lower side slopes. The Rock outcrop occurs as exposures of bedrock on some steep side slopes and ridges. It does not support vegetation.

Nearly all of this association supports native grasses and is used for grazing. Controlling erosion and maintaining the most productive grasses are the main management concerns. The major soils are suited to range. They generally are unsuited to cultivated crops and to tame pasture and hay because of the slope, the shallowness to bedrock in the Cabba soils, and the sodium affected subsoil in the Rhoades soils.

13. Bullock-Vebar-Parchin Association

Moderately deep, well drained, nearly level to steep, loamy soils on uplands

This association is on uplands characterized by ridges and broad drainageways. Slopes generally are nearly level to moderately sloping but are strongly sloping to steep in some areas. Microrelief is common in areas of the Bullock and Parchin soils. The drainage pattern is well defined.

This association makes up about 9 percent of the county. It is about 35 percent Bullock soils, 25 percent Vebar soils, 15 percent Parchin soils, and 25 percent minor soils (fig. 5).

The sodium affected Bullock soils are in small, shallow depressions. Slopes range from 0 to 25 percent. Typically, these soils have a thin surface layer of light brownish gray fine sandy loam. The subsoil is brown and light olive brown clay loam. It has accumulations of carbonate and salts in the lower part. Grayish brown bedrock is at a depth of about 23 inches.

The Vebar soils are on the upper side slopes and ridges. Slopes range from 2 to 40 percent. Typically, the surface layer is dark grayish brown fine sandy loam. The subsoil is dark grayish brown, yellowish brown, and light yellowish brown fine sandy loam. Light yellowish brown sandstone is at a depth of about 30 inches.

The sodium affected Parchin soils are on the mid and low parts of the landscape. Slopes range from 0 to 25 percent. Typically, the surface layer is grayish brown fine sandy loam. The subsurface layer is light brownish gray fine sandy loam. The subsoil is grayish brown and light brownish gray sandy clay loam. It has accumulations of carbonate and salts in the lower part. Light brownish gray bedrock is at a depth of about 24 inches.

Minor in this association are the Cohagen, Evridge, Glenross, Reeder, and Rhoades soils and Slickspots. The shallow Cohagen soils are on ridges and on steep side slopes along drainageways. The sodium affected Evridge soils have a surface layer that is thicker than that of the Bullock and Parchin soils. They are on the smoother parts of the landscape. The poorly drained, saline Glenross soils are along drainageways. Reeder soils have more clay and less sand throughout than the Vebar soils. Also, they are lower on the landscape. The deep, sodium affected Rhoades soils are in slight depressions. Slickspots are in scattered slight depressions. They occur as small areas of highly dispersed, massive clay or clay loam that does not support vegetation.

Nearly all of this association supports native grasses and is used for grazing. The major soils are suited to range. Controlling erosion and maintaining the most productive grasses are the main management concerns. The less sloping Parchin and Vebar soils are suited to cultivated crops and to tame pasture and hay, but crops are not likely to be grown because ranching is preferred.

14. Vebar-Daglum Association

Moderately deep and deep, well drained, nearly level to steep, loamy soils on uplands

This association is on uplands characterized by many knolls, hills, and ridges that are intermingled with swales. Slopes generally are gently sloping and moderately

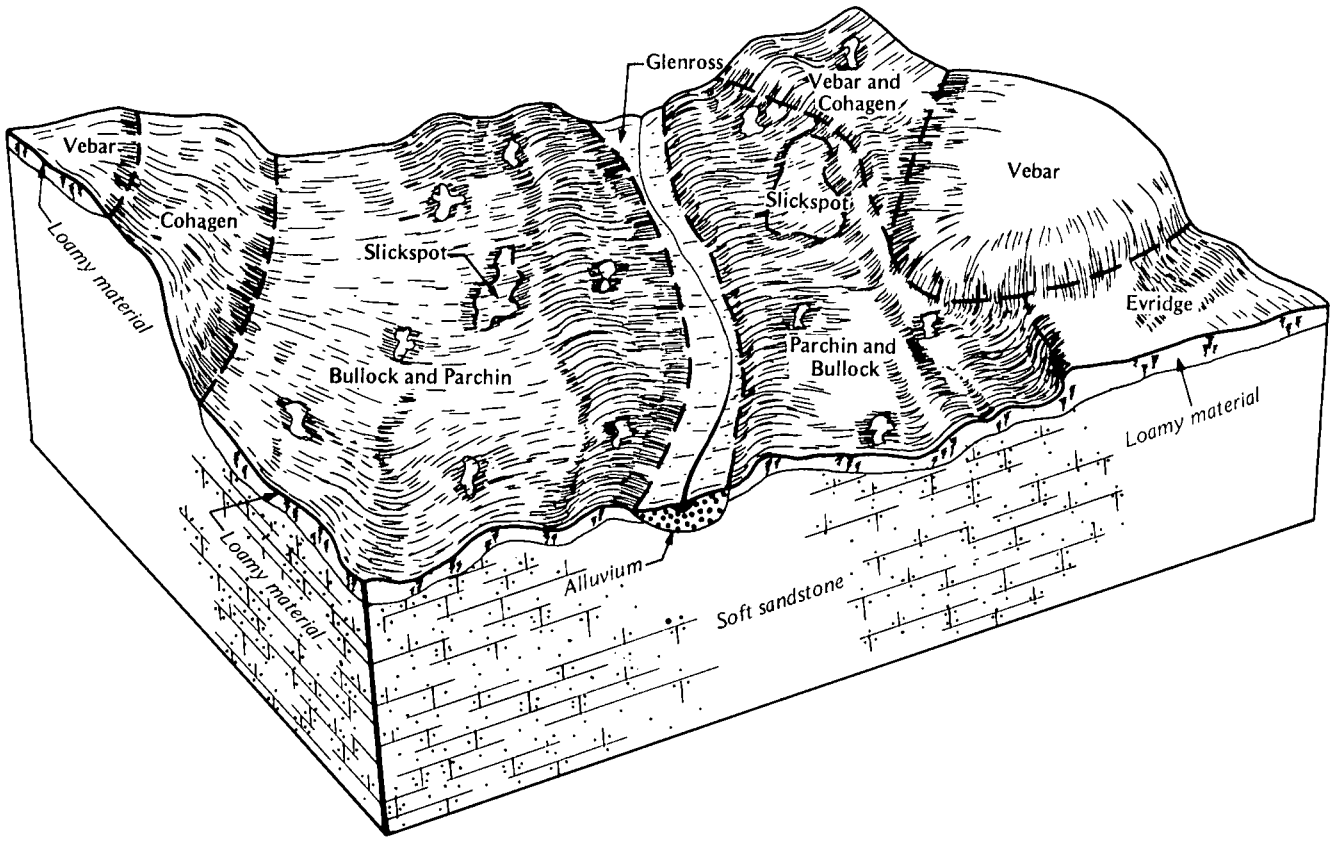

Figure 5.—Pattern of soils and parent material in the Bullock-Vebar-Parchin association.

sloping but are steeper along drainageways and on ridges and hills and are nearly level in some areas. The drainage pattern is well defined.

This association makes up about 8 percent of the county. It is about 50 percent Vebar soils, 30 percent Daglum soils, and 20 percent minor soils.

The moderately deep Vebar soils are on the upper side slopes and on ridges. Slopes range from 2 to 40 percent. Typically, the surface layer is dark grayish brown fine sandy loam. The subsoil is dark grayish brown, yellowish brown, and light yellowish brown fine sandy loam. Light yellowish brown sandstone is at a depth of about 30 inches.

The deep, sodium affected Daglum soils are on low side slopes. Slopes range from 0 to 9 percent. Typically, the surface layer is dark grayish brown loam. The subsurface layer is grayish brown loam. The subsoil is dark grayish brown and grayish brown clay. It is calcareous in the lower part. The underlying material is grayish brown, calcareous clay and clay loam. Grayish brown shale is at a depth of about 50 inches.

Minor in this association are the Bullock, Cabba, Cohagen, Parchin, Reeder, and Rhoades soils. The sodium affected Bullock, Parchin, and Rhoades soils are on the low parts of the landscape. The shallow Cabba and Cohagen soils are on ridges, hills, and side slopes along drainageways. The moderately deep Reeder soils are on mid and low side slopes.

About 60 percent of this association supports native grasses and is used for grazing. Some of the less sloping areas are used for crops, mainly alfalfa and small grain. The major soils are suited to range. In the less sloping areas, they are suited to cultivated crops and to tame pasture and hay. Controlling erosion and maintaining the most productive grasses are the main concerns in managing range. Controlling erosion and conserving moisture are the main concerns in managing cultivated areas. The sodium affected subsoil in the Daglum soils also is a concern.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

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

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Regent silty clay loam, 2 to 6 percent slopes, is a phase of the Regent series.

Some map units are made up of two or more major soils. These map units are called soil complexes. A *soil complex* consists of two or more soils, or one or more soils and a miscellaneous area, in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Vebar-Daglum complex, 3 to 9 percent slopes, is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Badland is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

The names of some map units identified on the detailed soil maps of this county do not fully agree with those identified on the maps in the published surveys of adjacent counties. Differences are the result of variations in the design and composition of the map units or changes and refinements in series concepts.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Soil Descriptions

AcD—Amor-Cabba loams, 9 to 15 percent slopes. These well drained, strongly sloping soils are on uplands. The moderately deep Amor soil is on the mid and lower side slopes. The shallow Cabba soil is on ridges and along drainageways. Areas are 10 to 120 acres in size and are irregular in shape. They are 50 to 60 percent Amor soil and 25 to 35 percent Cabba soil. The two soils occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Amor soil is dark brown loam about 5 inches thick. The subsoil is brown and light yellowish brown, friable loam about 31 inches thick. It is calcareous in the lower part. Light brownish gray and light yellowish brown, soft bedrock is at a depth of about 36 inches. In some areas the depth to bedrock is more than 40 inches. In some places the subsoil contains more sand. In other places it contains more clay.

Typically, the surface layer of the Cabba soil is grayish brown, calcareous loam about 4 inches thick. The next 5 inches is light brownish gray, calcareous loam. The underlying material is grayish brown and light yellowish brown, calcareous clay loam. Light brownish gray and light yellowish brown, soft bedrock is at a depth of about 16 inches. In some areas the soil contains more sand

throughout. In places soft bedrock is at a depth of 20 to 40 inches.

Included with these soils in mapping are small areas of Daglum, Regent, and Rhoades soils. These included soils make up less than 15 percent of any one mapped area. Daglum and Rhoades soils have a sodium affected subsoil. They are on the low parts of the landscape. Regent soils contain more clay throughout than the Amor soil. They are in positions on the landscape similar to those of the Amor soil.

The content of organic matter is moderate and fertility medium in the Amor soil. The content of organic matter and fertility are low in the Cabba soil. Tilth is good in both soils. Permeability is moderate. Available water capacity is moderate in the Amor soil and low in the Cabba soil. Runoff is medium on both soils. The shrink-swell potential is moderate.

Most of the acreage supports native grasses and is used for grazing. Generally, no major hazards or limitations affect the use of these soils for range. Water erosion is a hazard, however, if the range is overgrazed. In places gullies form along cattle trails. Fencing and other means of controlling livestock traffic patterns help to prevent gullying.

This map unit is poorly suited to cultivated crops and to tame pasture and hay because of the slope of both soils and the shallowness to bedrock in the Cabba soil. Alfalfa and intermediate wheatgrass are examples of suitable pasture plants on the Amor soil. No pasture plants are suited to the shallow Cabba soil. Wheat and oats are the main cultivated crops. Measures that control erosion and conserve moisture are the main management needs in cultivated areas. Examples are minimizing tillage, leaving crop residue on the surface, including grasses and legumes in the cropping system, and contour farming.

The Amor soil is suited to windbreaks and environmental plantings, but the Cabba soil is generally unsuited. The depth to bedrock is a limitation, especially in the Cabba soil. Windbreaks can be established in areas of the Amor soil, but optimum growth is unlikely. No trees or shrubs grow well on the Cabba soil. Planting on the contour helps to control erosion and conserves moisture.

The Amor soil is in capability unit IVe-1, Silty range site, and windbreak suitability group 6R; the Cabba soil is in capability unit VIe-11, Shallow range site, and windbreak suitability group 10.

Ba—Badland. This map unit consists of eroding exposures of soft shale, siltstone, and sandstone at the head of drainageways and on the sides of ridges and knolls. Slopes range from nearly level on hilltops to very steep on the sides of entrenched drainageways. Vertical walls or escarpments several hundred feet high are common. Deep, narrow gullies are on the low parts of the landscape. Areas are 10 to 150 acres in size and are irregular in shape.

Included with the Badland in mapping are scattered small areas of Cabba, Cohagen, Samsil, and Wayden soils. These soils make up less than 10 percent of any one mapped area. They are 10 to 20 inches deep over soft bedrock. They are in the less sloping, grass-covered areas.

Runoff is very rapid on the Badland. This map unit is subject to severe geologic erosion. It is unsuited to cultivated crops, tame pasture and hay, and windbreaks and environmental plantings.

Nearly all areas are used as wildlife habitat. These areas generally are scenic and provide excellent opportunities for sightseeing and hiking. Some of the included soils are used for grazing, but many of these soils are in isolated areas that are inaccessible to livestock.

The capability unit is VIIIs-2; no range site or windbreak suitability group is assigned.

Bk—Bankard loamy fine sand. This deep, somewhat excessively drained, nearly level soil is on flood plains along the Cheyenne River. It is frequently flooded for brief periods. Areas are 20 to 500 acres in size and are long and narrow.

Typically, the surface layer is pale brown loamy fine sand about 4 inches thick. The underlying material to a depth of 60 inches is light brownish gray loamy fine sand and fine sand stratified with thin layers of sandy loam and loam. The soil is calcareous throughout.

Included with this soil in mapping are small areas of Bankard Variant, Craft, and Haverson soils. These soils make up less than 15 percent of any one mapped area. Bankard Variant soils are 4 to 15 inches deep to gravelly material. They are closer to the stream channel than the Bankard soil. The well drained Craft and Haverson soils contain less sand throughout than the Bankard soil. Also, they are farther from the channel.

The content of organic matter and fertility are low in the Bankard soil. Permeability is very rapid. Available water capacity is low. Runoff is slow.

Most of the acreage supports native grasses and is used for grazing. Wind erosion is a severe hazard if the range is overgrazed. If overgrazing continues, bare areas are common and the risk of sand blowouts increases along livestock trails and around watering facilities. Fencing and other means of controlling livestock traffic patterns help to prevent the formation of sand blowouts. Range seeding is needed on some sites. In most areas scattered clumps of trees and shrubs provide protection for livestock and wildlife.

This soil generally is unsuited to cultivated crops and to tame pasture and hay. Wind erosion is a severe hazard, and the low fertility and low available water capacity are limitations.

This soil is suited to environmental plantings, but only evergreen trees and shrubs can be successfully established. Planting directly in sod helps to control wind erosion.

The capability unit is VIe-8; Sands range site; windbreak suitability group 7.

Bn—Bankard Variant loamy fine sand. This excessively drained, nearly level soil is on flood plains along the Cheyenne River. It is shallow over sand and gravel. It is frequently flooded for brief periods. Areas are 10 to 80 acres in size and are long and narrow.

Typically, the surface layer is grayish brown, calcareous loamy fine sand about 4 inches thick. The upper 9 inches of the underlying material is grayish brown, calcareous sand stratified with thin layers of fine sandy loam. The lower part to a depth of 60 inches is multicolored very gravelly sand.

Included with this soil in mapping are small areas of Bankard and Craft soils and Riverwash. These inclusions make up less than 15 percent of any one mapped area. Bankard and Craft soils are farther from the stream channel than the Bankard Variant soil. Bankard soils are not underlain by gravel. The well drained, loamy Craft soils do not have gravel within a depth of 40 inches. Riverwash has gravel at the surface. It does not support vegetation. It is adjacent to the channel.

The content of organic matter and fertility are low in the Bankard Variant soil. Permeability is rapid in the upper part of the soil and very rapid in the lower part. A seasonal high water table is at a depth of 3 to 6 feet. Available water capacity is low. Runoff is very slow.

Most of the acreage supports a sparse stand of native grasses and is used for grazing or hay. Sparse stands of small cottonwood and willows are throughout the map unit. They provide protection for livestock and wildlife. Wind erosion is a hazard if the range is overgrazed. If overgrazing continues, bare areas are common and the risk of sand blowouts increases along livestock trails and around watering facilities. Fencing and other means of controlling livestock traffic patterns help to prevent the formation of sand blowouts.

This soil generally is unsuited to cultivated crops, tame pasture and hay, and windbreaks and environmental plantings. Wind erosion is a severe hazard, and droughtiness is a limitation. The soil is a potential source of sand and gravel.

The capability unit is VIe-8; Shallow to Gravel range site; windbreak suitability group 10.

Bo—Banks loamy fine sand. This deep, somewhat excessively drained, nearly level soil is on flood plains along the Moreau River. It is frequently flooded for brief periods. Areas are 20 to 500 acres in size and generally are long and narrow.

Typically, the surface layer is grayish brown, calcareous loamy fine sand about 3 inches thick. The underlying material to a depth of 60 inches is light brownish gray, calcareous, stratified fine sand, sandy loam, fine sandy loam, and loamy fine sand.

Included with this soil in mapping are small areas of the well drained Korchea, Tally, and Trembles soils. These soils make up less than 15 percent of any one mapped area. They contain less sand between depths of 10 and 40 inches than the Banks soil. Korchea and Trembles soils are in positions on the landscape similar to those of the Banks soil. Tally soils are on the slightly higher terraces.

The content of organic matter and fertility are low in the Banks soil. Permeability is rapid. Available water capacity is low. Runoff is slow.

Most of the acreage supports native grasses and is used for grazing or hay. Wind erosion is a severe hazard if the range is overgrazed. After continued overgrazing, bare areas are common and the risk of sand blowouts increases along livestock trails and around watering facilities. Fencing and other means of controlling livestock traffic patterns help to prevent the formation of sand blowouts. Range seeding is needed on some sites. In most areas scattered clumps of trees and shrubs provide protection for livestock and wildlife.

This soil generally is unsuited to cultivated crops and to tame pasture and hay. Wind erosion is a severe hazard, and the low fertility and low available water capacity are limitations.

This soil is suited to environmental plantings, but only evergreen trees and shrubs can be successfully established. Planting directly in sod helps to control wind erosion.

The capability unit is VIe-8; Sands range site; windbreak suitability group 7.

BpB—Bullock-Parchin fine sandy loams, 0 to 9 percent slopes. These moderately deep, well drained, nearly level to gently rolling, sodium affected soils are on uplands. The Bullock soil is in small pits and depressions. The Parchin soil is on slight rises. Areas are 20 to several thousand acres in size and are irregular in shape. They are 55 to 70 percent Bullock soil and 15 to 30 percent Parchin soil. The two soils occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Bullock soil is light brownish gray fine sandy loam about 3 inches thick. The subsoil is brown and light olive brown, firm clay loam about 20 inches thick. It has accumulations of carbonate and salts in the lower part. Grayish brown, soft bedrock is at a depth of about 23 inches.

Typically, the surface layer of the Parchin soil is grayish brown fine sandy loam about 4 inches thick. The subsurface layer is light brownish gray fine sandy loam about 5 inches thick. The subsoil is grayish brown and light brownish gray, firm sandy clay loam about 15 inches thick. It has accumulations of carbonate and salts

in the lower part. Light brownish gray, soft sandstone is at a depth of about 24 inches.

Included with these soils in mapping are small areas of Evridge, Glenross, Seroco, and Vebar soils and Slickspots. These inclusions make up less than 20 percent of any one mapped area. Evridge soils are 20 to 30 inches deep to a dense, compact subsoil. They are in positions on the landscape similar to those of the Parchin soil. The poorly drained Glenross soils are along some of the drainageways. Seroco and Vebar soils do not have a sodium affected subsoil. The excessively drained Seroco soils are on hummocks. Vebar soils are on side slopes and small knolls. Slickspots support little or no vegetation and have visible salts at or near the surface. They are in positions on the landscape similar to those of the Bullock soil.

The content of organic matter and fertility are low in the Bullock and Parchin soils. The sodium affected subsoil restricts the penetration of roots. Permeability is very slow in the Bullock soil and slow in the Parchin soil. Available water capacity is low in both soils. Runoff is medium. The shrink-swell potential is moderate.

Most of the acreage supports native grasses and is used for grazing. Surface compaction is a problem on the Bullock soil. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth. Wind erosion is a hazard in overgrazed areas of the Parchin soil. Proper stocking rates and timely deferment of grazing help to maintain maximum productivity.

This map unit generally is unsuited to cultivated crops, tame pasture and hay, and windbreaks and environmental plantings. Although the Parchin soil is suited to these uses, the use of this unit is determined by the suitability of the Bullock soil. The sodium affected subsoil in both soils is a limitation.

The Bullock soil is in capability unit VIs-3, Thin Claypan range site, and windbreak suitability group 10; the Parchin soil is in capability unit IVe-12, Claypan range site, and windbreak suitability group 9.

BsC—Bullock-Slickspots-Parchin complex, 2 to 25 percent slopes. This map unit occurs as areas of moderately deep, well drained, undulating to hilly, sodium affected Bullock and Parchin soils intermingled with Slickspots. The unit is on uplands. The Bullock soil and the Slickspots are in small pits and depressions, generally on the low parts of the landscape. The Parchin soil is on the high parts of the landscape. Some areas are dissected by deep gullies. Areas are 30 to 750 acres in size and are irregular in shape. They are 30 to 45 percent Bullock soil, 25 to 40 percent Slickspots, and 15 to 20 percent Parchin soil. The two soils and the Slickspots occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Bullock soil is light brownish gray fine sandy loam about 3 inches thick. The subsoil is brown and light olive brown, firm clay loam about 20 inches thick. It has accumulations of carbonate and salts in the lower part. Grayish brown, soft bedrock is at a depth of about 23 inches.

The Slickspots occur as slightly depressional, barren areas that have a puddled or slick surface. Visible accumulations of salts are at or near the surface. The soil material to a depth of about 25 inches is massive clay or clay loam.

Typically, the surface layer of the Parchin soil is grayish brown fine sandy loam about 4 inches thick. The subsurface layer is light brownish gray fine sandy loam about 5 inches thick. The subsoil is grayish brown and light brownish gray, firm sandy clay loam about 15 inches thick. It has accumulations of carbonate and salts in the lower part. Light brownish gray, soft sandstone is at a depth of about 24 inches.

Included with the Bullock and Parchin soils and the Slickspots in mapping are small areas of Cohagen, Evridge, Glenross, Seroco, and Vebar soils. These included soils make up less than 20 percent of any one mapped area. Cohagen, Seroco, and Vebar soils do not have a sodium affected subsoil. Cohagen and Vebar soils are on ridges and small knolls. The excessively drained Seroco soils are in hummocky areas. Evridge soils are 20 to 30 inches deep to a dense, compact subsoil. They are in positions on the landscape similar to those of the Parchin soil. The poorly drained Glenross soils are along some of the drainageways. Also included are some areas where shale and siltstone outcrops occur as steep escarpments.

The content of organic matter and fertility are low in the Bullock and Parchin soils. The sodium affected subsoil restricts the penetration of roots. Permeability is very slow in the Bullock soil and slow in the Parchin soil. Available water capacity is low in both soils. Runoff is medium. The shrink-swell potential is moderate.

Most of the acreage supports native grasses and is used for grazing. Surface compaction is a problem on the Bullock soil. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth. Slickspots generally support little or no vegetation, but they do support a sparse stand of weeds and pricklypear during wet periods. Wind erosion is a hazard in overgrazed areas of the Parchin soil. Proper stocking rates and timely deferment of grazing help to maintain maximum productivity.

This map unit generally is unsuited to cultivated crops, tame pasture and hay, and windbreaks and environmental plantings. The sodium affected subsoil and the slope of both soils and the salts in the Slickspots are limitations.

The Bullock soil is in capability unit VIs-3, Thin Claypan range site, and windbreak suitability group 10; the Slickspots are in capability unit VIIIs-3 and are not assigned to a range site or a windbreak suitability group; the Parchin soil is in capability unit VIe-5, Claypan range site, and windbreak suitability group 9.

CaE—Cabba-Lantry complex, 25 to 40 percent slopes. These well drained, steep soils are on uplands. The shallow Cabba soil is on the upper side slopes and ridges. The moderately deep Lantry soil is on side slopes below the Cabba soil. Areas are 20 to 700 acres in size and are irregular in shape. They are 50 to 60 percent Cabba soil and 30 to 40 percent Lantry soil. The two soils occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Cabba soil is grayish brown, calcareous loam about 4 inches thick. The next 5 inches is light brownish gray, calcareous loam. The underlying material is grayish brown and light yellowish brown, calcareous clay loam. Light brownish gray and light yellowish brown, soft bedrock is at a depth of about 16 inches. In some areas the soil contains more sand throughout.

Typically, the surface layer of the Lantry soil is brown silt loam about 4 inches thick. The subsoil is light yellowish brown, friable, calcareous silt loam about 29 inches thick. Light yellowish brown and light brownish gray, calcareous, soft bedrock is at a depth of about 33 inches. In some areas the soil contains more sand throughout.

Included with these soils in mapping are small areas of Amor, Glenross, and Korchea soils and Rock outcrop and Slickspots. These inclusions make up less than 15 percent of any one mapped area. Amor soils are deeper to carbonates than the Lantry soil and have a darker surface layer. They are on the lower parts of the landscape. The poorly drained Glenross soils are along drainageways. They have visible salts at or near the surface. Korchea soils are stratified. They are on flood plains. The Rock outcrop is soft siltstone or sandstone on the steeper parts of the landscape. Slickspots have a dispersed surface and support little or no vegetation. They have visible salts at or near the surface. They are in small pits and depressions.

The content of organic matter and fertility are low in the Cabba and Lantry soils. Permeability is moderate. Available water capacity is low. Runoff is rapid. The shrink-swell potential is moderate in the Cabba soil and low in the Lantry soil.

Most of the acreage supports native grasses and is used for grazing. Water erosion is a hazard unless an adequate plant cover is maintained. In places gullies form along cattle trails. Fencing and other means of controlling livestock traffic patterns help to prevent gullying. Reestablishing vegetation is difficult. Sites for stock water impoundments are plentiful; however, seepage is a problem.

These soils are not suited to cultivated crops, tame pasture and hay, or windbreaks and environmental plantings. The slope of both soils and the shallowness to bedrock in the Cabba soil are limitations.

The Cabba soil is in capability unit VIIe-7, Shallow range site; the Lantry soil is in capability unit VIIe-3, Thin Upland range site; both soils are in windbreak suitability group 10.

CcF—Cabba-Rock outcrop complex, 9 to 60 percent slopes. This map unit occurs as areas of a shallow, well drained, strongly sloping to very steep Cabba soil closely intermingled with areas where bedrock crops out. The unit is on uplands that generally are dissected by deep gullies. The Cabba soil generally is on the upper slopes and on ridges. The Rock outcrop is on steep escarpments. Areas are 20 to 200 acres in size and are irregular in shape. They are 55 to 75 percent Cabba soil and 20 to 35 percent Rock outcrop. The Cabba soil and Rock outcrop occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Cabba soil is grayish brown, calcareous loam about 4 inches thick, The next 5 inches is light brownish gray, calcareous loam. The underlying material is grayish brown and light yellowish brown, calcareous clay loam. Light brownish gray and light yellowish brown, soft bedrock is at a depth of about 16 inches. In some areas the soil contains more sand throughout. In places the depth to soft bedrock is 20 to 40 inches.

The Rock outcrop is light brownish gray, soft bedrock. It does not support vegetation.

Included with the Cabba soil and Rock outcrop in mapping are small areas of Reeder and Rhoades soils. These soils make up less than 10 percent of any one mapped area. Reeder soils are 20 to 40 inches deep over bedrock. They are on the smooth parts of the landscape. Rhoades soils have a sodium affected subsoil. They are on the low parts of the landscape.

The content of organic matter and fertility are low in the Cabba soil. Permeability is moderate. Available water capacity is low. Runoff is rapid. The shrink-swell potential is moderate.

Most areas of the Cabba soil support native grasses and are used for grazing. Water erosion is a hazard unless an adequate plant cover is maintained. In places gullies form along cattle trails. Fencing and other means of controlling livestock traffic patterns help to prevent gullying. Reestablishing vegetation is difficult.

This map unit is too steep and too shallow for cultivated crops, tame pasture and hay, and windbreaks and environmental plantings. The Rock outcrop is an additional limitation.

The Cabba soil is in capability unit VIIe-7, Shallow range site, and windbreak suitability group 10; the Rock outcrop is in capability unit VIIIs-1 and is not assigned to a range site or a windbreak suitability group.

CkF—Cohagen-Rock outcrop complex, 9 to 50 percent slopes. This map unit occurs as areas of a shallow, well drained, strongly sloping to very steep Cohagen soil intermingled with areas of Rock outcrop.

The unit is on uplands. The Cohagen soil is on side slopes. The Rock outcrop is on the high parts of the landscape. Areas are 20 to 650 acres in size and are irregular in shape. They are 50 to 65 percent Cohagen Soil and 30 to 45 percent Rock outcrop. Cohagen soil and Rock outcrop occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Cohagen soil is grayish brown, calcareous fine sandy loam about 3 inches thick. The underlying material is light yellowish brown, calcareous fine sandy loam. Light brownish gray and light yellowish brown, soft sandstone is at a depth of about 11 inches. In some areas the soil contains more clay throughout.

The Rock outcrop generally consists of vertical escarpments of light brownish gray and light yellowish brown, soft bedrock. It does not support vegetation.

Included with the Cohagen soil and Rock outcrop in mapping are small areas of Bullock, Parchin, and Vebar soils. These soils make up less than 10 percent of any one mapped area. Bullock and Parchin soils have a sodium affected subsoil. They are on the low parts of the landscape. The moderately deep Vebar soils are on mid and low side slopes.

The content of organic matter and fertility are low in the Cohagen soil. Permeability is moderately rapid. Available water capacity is low. Runoff is rapid.

The Cohagen soil supports native grasses and is used for grazing. Water erosion is a hazard if the range is overgrazed. In places gullies form along cattle trails. Fencing and other means of controlling livestock traffic patterns help to prevent gullying. Reestablishing vegetation is difficult.

This map unit is unsuited to cultivated crops, tame pasture and hay, and windbreaks and environmental plantings because of the slope, the shallowness to bedrock, and the Rock outcrop.

The Cohagen soil is in capability unit VIIe-4, Shallow range site, and windbreak suitability group 10; the Rock outcrop is in capability unit VIIIs-1 and is not assigned to a range site or a windbreak suitability group.

CoE—Cohagen-Vebar fine sandy loams, 15 to 40 percent slopes. These well drained, moderately steep and steep soils are on uplands. The shallow Cohagen soil is on ridges and the upper side slopes. The moderately deep Vebar soil is on mid and low side slopes. Areas are 20 to 450 acres in size and are irregular in shape. They are 45 to 65 percent Cohagen soil and 20 to 40 percent Vebar soil. The two soils occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Cohagen soil is grayish brown, calcareous fine sandy loam about 3 inches thick. The underlying material is light yellowish brown, calcareous fine sandy loam. Light brownish gray and light yellowish brown, soft sandstone is at a depth of about 11 inches. In some areas the soil contains more clay throughout.

Typically, the surface layer of the Vebar soil is dark grayish brown fine sandy loam about 4 inches thick. The subsoil is dark grayish brown, yellowish brown, and light yellowish brown, very friable fine sandy loam about 26 inches thick. Light yellowish brown, soft sandstone is at a depth of about 30 inches. In some areas the depth to soft bedrock is more than 40 inches. In places the dark colors extend to a depth of less than 7 inches.

Included with these soils in mapping are small areas of Bullock and Glenross soils and Rock outcrop. These inclusions make up less than 15 percent of any one mapped area. Bullock soils have a sodium affected subsoil. They are in small pits and depressions. The poorly drained Glenross soils are along drainageways. They have visible salts at or near the surface. The Rock outcrop occurs as steep escarpments of soft sandstone. It does not support vegetation.

The content of organic matter and fertility are low in the Cohagen soil. The content of organic matter is moderate and fertility medium in the Vebar soil. Permeability is moderately rapid in both soils. Available water capacity is low. Runoff is medium or rapid.

Most of the acreage supports native grasses and is used for grazing. Erosion is a hazard unless an adequate plant cover is maintained. Reestablishing vegetation is difficult. In places gullies form along cattle trails. Fencing and other means of controlling livestock traffic patterns help to prevent gullying.

These soils generally are unsuited to cultivated crops, tame pasture and hay, and windbreaks and environmental plantings because of the shallowness to sandstone in the Cohagen soil and the slope of both soils.

The Cohagen soil is in capability unit VIIe-4, Shallow range site; the Vebar soil is in capability unit VIe-6, Sandy range site; both soils are in windbreak suitability group 10.

CrD—Cohagen-Vebar-Bullock fine sandy loams, 6 to 25 percent slopes. These well drained, moderately sloping to moderately steep soils are on uplands that are dissected by well defined drainageways. The shallow Cohagen soil is on the upper convex slopes and ridges. The moderately deep Vebar soil is on side slopes and foot slopes. The moderately deep, sodium affected Bullock soil is in small pits and depressions on the low parts of the landscape. Areas are 20 to 550 acres in size and are irregular in shape. They are 30 to 45 percent Cohagen soil, 30 to 40 percent Vebar soil, and 20 to 30 percent Bullock soil. The three soils occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Cohagen soil is grayish brown, calcareous fine sandy loam about 3

inches thick. The underlying material is light yellowish brown, calcareous fine sandy loam. Light brownish gray and light yellowish brown, soft sandstone is at a depth of about 11 inches.

Typically, the surface layer of the Vebar soil is dark grayish brown fine sandy loam about 4 inches thick. The subsoil is dark grayish brown, yellowish brown, and light yellowish brown, very friable fine sandy loam about 26 inches thick. Light yellowish brown, soft sandstone is at a depth of about 30 inches. In some areas the depth to soft bedrock is more than 40 inches. In places the dark colors extend to a depth of less than 7 inches.

Typically, the surface layer of the Bullock soil is light brownish gray fine sandy loam about 3 inches thick. The subsoil is brown and light olive brown, firm clay loam about 20 inches thick. It has accumulations of carbonate and salts in the lower part. Grayish brown, soft bedrock is at a depth of about 23 inches.

Included with these soils in mapping are small areas of Glenross, Parchin, and Trembles soils and Rock outcrop and Slickspots. These inclusions make up less than 20 percent of any one mapped area. The poorly drained Glenross soils are along drainageways. They have visible salts at or near the surface. Parchin soils have a surface soil that is thicker than that of the Bullock soil. They are in positions on the landscape similar to those of the Bullock soil. Trembles soils are stratified. They are on flood plains. The Rock outcrop occurs as exposures of soft sandstone or siltstone on the steep parts of the landscape. Slickspots have a slick or puddled surface and have visible salts at or near the surface. They are in positions on the landscape similar to those of the Bullock soil. The Rock outcrop and Slickspots support little or no vegetation.

The content of organic matter and fertility are low in the Cohagen and Bullock soils. The content of organic matter is moderate and fertility medium in the Vebar soil. The sodium affected subsoil in the Bullock soil restricts the penetration of roots. Permeability is moderately rapid in the Cohagen and Vebar soils and very slow in the Bullock soil. Available water capacity is low in all three soils. Runoff is rapid on the Cohagen and Vebar soils and medium on the Bullock soil. The shrink-swell potential is moderate in the Bullock soil and low in the Cohagen and Vebar soils.

Most of the acreage supports native grasses and is used for grazing (fig. 6). Erosion is a hazard if areas of the Cohagen and Vebar soils are overgrazed. In places gullies form along cattle trails. Fencing and other means of controlling livestock traffic patterns help to prevent gullying. Surface compaction is a problem on the Bullock soil. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth.

These soils generally are unsuited to cultivated crops, tame pasture and hay, and windbreaks and environmental plantings. The shallowness to bedrock in the Cohagen soil, the dense, compact subsoil in the Bullock soil, and the slope of all three soils are limitations. The less sloping areas of the Vebar soil can be planted to alfalfa or intermediate wheatgrass for tame pasture and hay.

The Cohagen soil is in capability unit VIe-10, Shallow range site; the Vebar soil is in capability unit VIe-6, Sandy range site; and the Bullock soil is in capability unit VIs-3, Thin Claypan range site. The Cohagen and Bullock soils are in windbreak suitability group 10, and the Vebar soil is in windbreak suitability group 6R.

Ct—Craft very fine sandy loam. This deep, well drained, nearly level soil is on flood plains along the Cheyenne River. It is subject to rare flooding. Areas are 20 to 200 acres in size and are long and narrow.

Typically, the surface layer is pale brown, calcareous very fine sandy loam about 6 inches thick. The underlying material to a depth of 60 inches is light brownish gray, calcareous, stratified very fine sandy loam, loamy very fine sand, and silt loam. In places the soil is dark to a depth of more than 7 inches.

Included with this soil in mapping are small areas of Bankard and Haverson soils. These soils make up less than 15 percent of any one mapped area. The somewhat excessively drained Bankard soils are nearer the stream channel than the Craft soil. Also, they contain more sand between depths of 10 and 40 inches. Haverson soils are farther from the river than the Craft soil. Also, they contain more clay between depths of 10 and 40 inches.

The content of organic matter and fertility are low in the Craft soil. Tilth is good. Permeability is moderate. Available water capacity is low. Runoff is slow.

Most of the acreage supports native grasses and is used for grazing or hay. Generally, no major hazards or limitations affect the use of this soil for range. Wind erosion is a hazard, however, if the range is overgrazed. Some areas support a sparse stand of deciduous trees and shrubs, which provide protection for livestock and wildlife. Proper stocking rates and timely deferment of grazing or rotation grazing help to maintain maximum productivity.

This soil is suited to cultivated crops and to tame pasture and hay. Alfalfa, crested wheatgrass, and intermediate wheatgrass are examples of suitable pasture plants. Alfalfa, wheat, and oats are the main cultivated crops. Measures that control erosion, improve fertility, and conserve moisture are the main management needs in cultivated areas. Examples are leaving crop residue on the surface, minimizing tillage, and including grasses and legumes in the cropping system. Stripcropping and field windbreaks also help to control wind erosion. Floodwater delays planting in some years, but in most years the additional moisture is beneficial and the flood damage is minor.

This soil is suited to windbreaks and environmental plantings. All climatically suited trees and shrubs grow well.

Figure 6.—An area of Cohagen-Vebar-Bullock fine sandy loams, 6 to 25 percent slopes, used for range.

The capability unit is IIc-1; Loamy Terrace range site; windbreak suitability group 1.

DaA—Daglum loam, 0 to 2 percent slopes. This deep, well drained, nearly level, sodium affected soil is on flats and in swales on uplands. Areas are 10 to 150 acres in size and are irregular in shape.

Typically, the surface layer is dark grayish brown loam about 4 inches thick. The subsurface layer is grayish brown loam about 2 inches thick. The subsoil is dark grayish brown and grayish brown, firm clay about 16 inches thick. It is calcareous in the lower part. The underlying material to a depth of 60 inches is grayish brown, calcareous clay and clay loam. It has accumulations of salts in the upper part. In places bedrock is at a depth of 20 to 40 inches.

Included with this soil in mapping are small areas of Grail, Rhoades, and Savage soils. These soils make up

less than 15 percent of any one mapped area. Grail and Savage soils do not have a sodium affected subsoil. They are slightly higher on the landscape than the Daglum soil. Rhoades soils have a surface layer that is thinner than that of the Daglum soil and have visible salts closer to the surface. They are in small pits and depressions.

The content of organic matter is moderate in the Daglum soil, and fertility is low. Tilth is poor. The sodium affected subsoil restricts the penetration of plant roots. Permeability is slow. Available water capacity is moderate. Runoff is slow. The shrink-swell potential is high.

About half of the acreage supports native grasses and is used for grazing or hay. Generally, no major hazards or limitations affect the use of this soil for range. Surface compaction can be a problem, however, if the range is grazed during wet periods. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth.

This soil is poorly suited to cultivated crops and to tame pasture and hay because the sodium affected subsoil restricts root penetration. Examples of suitable pasture plants are alfalfa, intermediate wheatgrass, and pubescent wheatgrass. Alfalfa, wheat, and oats are the main crops. Measures that improve tilth and conserve moisture are the main management needs in cultivated areas. Examples are leaving crop residue on the surface and including grasses and legumes in the cropping system. Chiseling or subsoiling helps to break up the dense claypan subsoil and increases the rate of water intake.

This soil is suited to windbreaks and environmental plantings, but the sodium affected subsoil severely restricts the growth rate. Trees and shrubs can be established, but optimum growth, survival, and vigor are unlikely.

The capability unit is IVs-2; Claypan range site; windbreak suitability group 9.

DrB—Daglum-Rhoades loams, 2 to 6 percent slopes. These deep, well drained, sodium affected, undulating soils are on uplands. The Daglum soil is on slight rises. The Rhoades soil is in small pits and depressions. Areas are 10 to 350 acres in size and are irregular in shape. They are 55 to 65 percent Daglum soil and 20 to 30 percent Rhoades soil. The two soils occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Daglum soil is dark grayish brown loam about 4 inches thick. The subsurface layer is grayish brown loam about 2 inches thick. The subsoil is dark grayish brown and grayish brown, firm clay about 16 inches thick. It is calcareous in the lower part. The underlying material to a depth of 60 inches is grayish brown, calcareous clay and clay loam. It has accumulations of salts in the upper part. In places bedrock is at a depth of 20 to 40 inches.

Typically, the surface layer of the Rhoades soil is grayish brown loam about 2 inches thick. The subsoil is dark grayish brown and grayish brown, very firm and firm silty clay about 41 inches thick. In the lower part it is calcareous and has accumulations of salts. The underlying material to a depth of 60 inches is light olive brown, calcareous silty clay loam. It has accumulations of salts throughout. In some areas bedrock is at a depth of 20 to 40 inches.

Included with these soils in mapping are small areas of Reeder, Regent, Ridgeview, Savage, and Vebar soils. These included soils make up less than 20 percent of any one mapped area. They do not have a sodium affected subsoil. They are slightly higher on the landscape than the Rhoades and Daglum soils.

The content of organic matter is moderate in the Daglum and Rhoades soils, and fertility is low. Tilth is poor. The sodium affected subsoil restricts the penetration of roots. Permeability is slow. Available water capacity is moderate. Runoff is medium. The shrink-swell potential is high.

Most of the acreage supports native grasses and is used for grazing or hay. Surface compaction is a major problem on the Rhoades soil. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth. Proper stocking rates and timely deferment of grazing or rotation grazing help to maintain maximum productivity.

This map unit is poorly suited to cultivated crops and to tame pasture and hay. Crop growth is severely restricted on the Daglum soil because of the dense, sodium affected subsoil. No crops grow well on the Rhoades soil. Crested wheatgrass and pubescent wheatgrass are examples of suitable pasture plants. Alfalfa, wheat, and oats are the main cultivated crops. Measures that conserve moisture and improve tilth are the main management needs in cultivated areas. Examples are leaving crop residue on the surface and including grasses and legumes in the cropping system. Chiseling or subsoiling improves tilth and increases the rate of water intake.

The Daglum soil is suited to windbreaks and environmental plantings, but the Rhoades soil generally is unsuited. The sodium affected subsoil in both soils is a limitation. Trees and shrubs can be established on the Daglum soil, but optimum growth, survival, and vigor are unlikely. No trees or shrubs grow well on the Rhoades soil.

The Daglum soil is in capability unit IVs-3, Claypan range site, and windbreak suitability group 9; the Rhoades soil is in capability unit VIs-1, Thin Claypan range site, and windbreak suitability group 10.

DuC—Dupree clay, 3 to 15 percent slopes. This shallow, well drained, gently sloping to strongly sloping

soil is on uplands. When dry, it is characterized by cracks, which are 0.5 inch to 2.0 inches wide and several feet long and extend through the subsoil. Areas are 20 to 700 acres in size and are irregular in shape.

Typically, the surface layer is grayish brown clay about 2 inches thick. The subsoil is grayish brown, very firm clay about 14 inches thick. Light brownish gray shale is at a depth of about 16 inches. Accumulations of gypsum are between the shale plates. In some areas the soil is not so dense.

Included with this soil in mapping are small areas of Pierre and Swanboy soils. These soils make up less than 10 percent of any one mapped area. Pierre soils are 20 to 40 inches deep over shale. They are in positions on the landscape similar to those of the Dupree soil. The deep Swanboy soils have visible salts at or near the surface. They are on foot slopes and along drainageways.

The content of organic matter and fertility are low in the Dupree soil. Tilth is very poor. Permeability is very slow. Available water capacity is low. Runoff is medium. The shrink-swell potential is very high.

Most of the acreage supports native grasses and is used for grazing or hay. Surface compaction is a problem. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth. Reestablishing vegetation is difficult.

This soil generally is unsuited to cultivated crops, tame pasture and hay, and windbreaks and environmental plantings because of the very poor tilth and the shallowness to shale.

The capability unit is VIe-12; Dense Clay range site; windbreak suitability group 10.

EvB—Evridge loamy fine sand, 0 to 6 percent slopes. This moderately deep, well drained, sodium affected, nearly level and gently sloping soil is on uplands. Areas are 10 to 350 acres in size and are irregular in shape.

Typically, the surface layer is brown loamy fine sand about 15 inches thick. The subsurface layer is light brownish gray loamy fine sand about 9 inches thick. The subsoil is grayish brown and light brownish gray, friable fine sandy loam about 11 inches thick. It has accumulations of carbonate and salts in the lower part. Light brownish gray, calcareous, soft sandstone is at a depth of about 35 inches. In places the depth to soft sandstone is more than 40 inches.

Included with this soil in mapping are small areas of Bullock, Parchin, Seroco, and Tally soils. These soils make up less than 15 percent of any one mapped area. Bullock and Parchin soils have a sodium affected subsoil within a depth of 15 inches. They are in slight depressions. Seroco and Tally soils do not have a sodium affected subsoil. They are on slight rises.

The content of organic matter and fertility are low in the Evridge soil. Tilth is good. Permeability is moderately rapid in the upper part of the soil and slow in the lower part. Available water capacity is low. Runoff is slow.

Most of the acreage supports native grasses and is used for grazing or hay. Wind erosion is a hazard if the range is overgrazed. Sand blowouts can form in overgrazed areas, along livestock trails, and around watering facilities. Maintaining an adequate plant cover helps to control wind erosion. Reseeding is needed in some areas.

This soil is poorly suited to cultivated crops and to tame pasture and hay because it is droughty and is highly susceptible to wind erosion. It is better suited to spring grain than to winter wheat because of a severe hazard of wind erosion. Alfalfa, crested wheatgrass, intermediate wheatgrass, and pubescent wheatgrass are examples of suitable pasture species. Measures that control erosion and conserve moisture are the main management needs in cultivated areas. Examples are leaving crop residue on the surface, minimizing tillage, and including grasses and legumes in the cropping system. Stripcropping and field windbreaks also help to control wind erosion.

This soil is suited to windbreaks and environmental plantings. All climatically suited trees and shrubs grow well. Because of the hazard of wind erosion, the site should be prepared for planting in the spring.

The capability unit is IVe-13; Sandy range site; windbreak suitability group 5.

FaA—Farland silt loam, 0 to 2 percent slopes. This deep, well drained, nearly level soil is on terraces and uplands. Areas are 20 to 250 acres in size and are irregular in shape.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The subsoil is about 30 inches thick. It is friable. It is brown silty clay loam in the upper part and pale brown, calcareous silt loam in the lower part. The underlying material to a depth of 60 inches is brown, calcareous loam. In some areas the dark colors extend to a depth of more than 16 inches.

Included with this soil in mapping are small areas of Daglum, Savage, and Stady soils. These soils make up less than 15 percent of any one mapped area. Daglum soils have a sodium affected subsoil. They are in shallow depressions. Savage soils have more clay in the subsoil than the Farland soil. They are in swales. Stady soils are 20 to 40 inches deep to gravelly material. They are in positions on the landscape similar to those of the Farland soil.

The content of organic matter is moderate in the Farland soil, and fertility is medium. Tilth is good. Permeability is moderate. Available water capacity is high. Runoff is slow. The shrink-swell potential is moderate.

Most of the acreage is cropland. This soil is suited to cultivated crops and to tame pasture and hay (fig. 7). Alfalfa, crested wheatgrass, intermediate wheatgrass,

and pubescent wheatgrass are examples of suitable pasture plants. Alfalfa, wheat, and oats are the main crops. Measures that conserve moisture are the main management needs in cultivated areas. Examples are leaving crop residue on the surface and minimizing tillage.

No major hazards or limitations affect the use of this soil for range. Proper stocking rates and timely deferment of grazing or rotation grazing help to maintain maximum productivity.

This soil is suited to windbreaks and environmental plantings. All climatically suited trees and shrubs grow well, except for those that require an abundant supply of moisture.

The capability unit is IIc-2; Silty range site; windbreak suitability group 3.

FaB—Farland silt loam, 2 to 6 percent slopes. This deep, well drained, gently sloping soil is on terraces and uplands. Areas are 20 to 450 acres in size and are irregular in shape.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The subsoil is about 30 inches thick. It is friable. It is brown silty clay loam in the upper part and pale brown, calcareous silt loam in the lower part. The underlying material to a depth of 60 inches is brown, calcareous loam. In some areas the dark colors extend to a depth of more than 16 inches.

Included with this soil in mapping are small areas of Daglum, Lantry, and Savage soils. These soils make up less than 15 percent of any one mapped area. Daglum soils have a sodium affected subsoil. They are in shallow depressions. The moderately deep Lantry soils do not

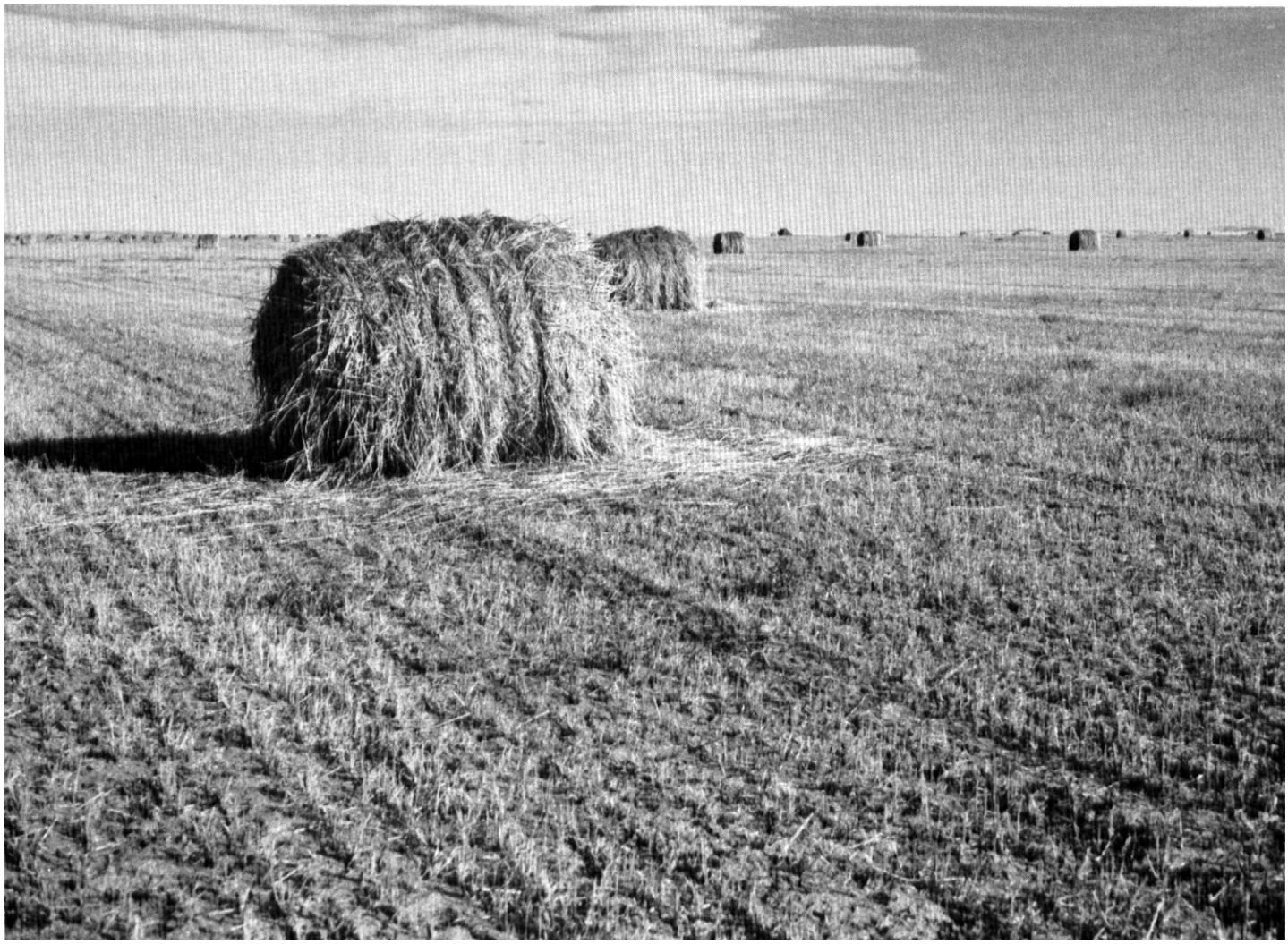

Figure 7.—Baled hay in an area of Farland silt loam, 0 to 2 percent slopes.

have a dark surface layer. They are on ridges. Savage soils have more clay in the subsoil than the Farland soil. They are in swales and low areas.

The content of organic matter is moderate in the Farland soil, and fertility is medium. Tilth is good. Permeability is moderate. Available water capacity is high. Runoff is medium. The shrink-swell potential is moderate.

About half of the acreage supports native grasses and is used for grazing. No major hazards or limitations affect the use of this soil for range. Proper stocking rates and timely deferment of grazing or rotation grazing help to maintain maximum productivity.

This soil is suited to cultivated crops and to tame pasture and hay. Examples of suitable pasture plants are alfalfa, crested wheatgrass, intermediate wheatgrass, and pubescent wheatgrass. Alfalfa, wheat, and oats are the main crops. Measures that control erosion and conserve moisture are the main management needs in cultivated areas. Examples are leaving crop residue on the surface, minimizing tillage, and including grasses and legumes in the cropping system. Contour farming, grassed waterways, and terraces also help to control erosion. In some areas, however, the slopes are too short or too irregular for contouring and terracing.

This soil is suited to windbreaks and environmental plantings. All climatically suited trees and shrubs grow well, except for those that require an abundant supply of moisture. Planting on the contour helps to control erosion and conserves moisture.

The capability unit is IIe-1; Silty range site; windbreak suitability group 3.

Fv—Fluvaquents, ponded. These nearly level, very poorly drained, alluvial soils are on flood plains along the Cheyenne River. They are ponded when the water level of Lake Oahe is high or when the Cheyenne River floods. Areas are 10 to several hundred acres in size. They are long and narrow or are irregular in shape.

Typically, the surface layer is gray, very firm silty clay about 4 inches thick. The underlying material to a depth of 60 inches is gray and olive gray, calcareous silty clay. In some areas stratified silt and sand are below a depth of 40 inches.

Included with these soils in mapping are small areas of Bankard, Craft, and Wendte soils. These included soils make up less than 10 percent of any one mapped area. They are higher on the landscape than the Fluvaquents. They do not have a water table within a depth of 3 feet.

A water table is within a depth of 3 feet when the water level in Lake Oahe is low. As much as 2 feet of water ponds on the surface when the water level in the lake is high.

Nearly all areas support aquatic vegetation and are used as wetland wildlife habitat. The native vegetation dominantly is willow, cottonwood, cattail, and rushes. These soils are well suited to wetland wildlife habitat. Because of the ponding, however, they are unsuited to cultivated crops, tame pasture and hay, and windbreaks and environmental plantings.

The capability unit is VIIIw-1; no range site or windbreak suitability group is assigned.

Gn—Glenross fine sandy loam. This deep, poorly drained, sodium affected, nearly level soil is along drainageways in the uplands. It is occasionally flooded for brief periods. Areas are 10 to 100 acres in size and are long and narrow.

Typically, the surface layer is grayish brown, calcareous fine sandy loam about 1 inch thick. The subsoil is about 18 inches thick. It is friable and calcareous. It is grayish brown clay loam in the upper part and light brownish gray sandy clay loam in the lower part. It has accumulations of salts throughout. The underlying material to a depth of 60 inches is light brownish gray, calcareous fine sandy loam. It has accumulations of salts throughout. In places the soil contains more clay throughout.

Included with this soil in mapping are small areas of Bullock and Rhoades soils. These soils make up less than 15 percent of any one mapped area. They are well drained and are on uplands along the edges of the mapped areas.

The content of organic matter is moderate in the Glenross soil, and fertility is low. The high content of salts inhibits root development. Permeability is slow. Available water capacity is moderate. A seasonal high water table is within a depth of 1 foot. Runoff is very slow. The shrink-swell potential is moderate.

Most of the acreage supports native grasses and is used for grazing. Because of the high content of salts, the only suitable grasses are salt-tolerant species, such as inland saltgrass and western wheatgrass. Surface compaction is a problem. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth. Many areas are potential sites for excavated ponds; however, the water may be quite saline.

This soil generally is unsuited to cultivated crops, tame pasture and hay, and windbreaks and environmental plantings because of the high content of salts and the high water table.

The capability unit is VIw-4; Saline Lowland range site; windbreak suitability group 10.

Gr—Grail silt loam. This deep, well drained, nearly level soil is in swales on uplands. It is frequently flooded for very brief periods. Areas are 10 to 80 acres in size and are irregular in shape.

Typically, the surface soil is dark grayish brown and dark gray silt loam about 9 inches thick. The subsoil is dark grayish brown and grayish brown, firm silty clay about 27 inches thick. It is calcareous in the lower part. The underlying material to a depth of 60 inches is

grayish brown, calcareous silty clay loam. It has accumulations of salts in the lower part.

Included with this soil in mapping are small areas of Daglum, Regent, Rhoades, and Savage soils. These soils make up less than 15 percent of any one mapped area. Daglum and Rhoades soils have a sodium affected subsoil. They are in small pits and depressions. The moderately deep Regent and deep Savage soils are in the more sloping areas. They are dark to a depth of less than 16 inches.

The content of organic matter and fertility are high in the Grail soil. Tilth is good. Permeability is moderately slow. Available water capacity is high. A seasonal high water table is at a depth of 3 to 5 feet during wet periods. Runoff is slow. The shrink-swell potential is high.

Most of the acreage is cropland. This soil is suited to cultivated crops and to tame pasture and hay. Examples of suitable pasture plants are alfalfa, crested wheatgrass, intermediate wheatgrass, and western wheatgrass. Alfalfa, wheat, and oats are the main crops. Measures that conserve moisture during dry periods are the main management needs in cultivated areas. Leaving crop residue on the surface and minimizing tillage are examples. In some years fieldwork is delayed because the soil receives runoff from adjacent soils, but in most years the additional moisture is beneficial.

No major hazards or limitations affect the use of this soil for range. Proper stocking rates and timely deferment of grazing or rotation grazing help to maintain maximum productivity.

This soil is suited to windbreaks and environmental plantings. All climatically suited trees and shrubs grow well. Those that require an abundant supply of moisture grow especially well.

The capability unit is IIc-3; Loamy Overflow range site; windbreak suitability group 1.

Hc—Haverson silt loam, channeled. This deep, well drained, nearly level soil is on flood plains that are dissected into many small tracts by narrow channels and partly filled old stream meanders. The channels are 5 to 20 feet wide and 2 to 20 feet deep. The soil is occasionally flooded for brief periods. Areas are 10 to 80 acres in size and are long and narrow.

Typically, the surface layer is grayish brown, calcareous silt loam about 4 inches thick. The underlying material to a depth of 60 inches is grayish brown, calcareous, stratified silty clay loam, fine sandy loam, loam, and silt loam. In some areas the surface layer is darker.

Included with this soil in mapping are small areas of Craft and Lohmiller soils. These soils make up less than 15 percent of any one mapped area. They are in positions on the landscape similar to those of the Haverson soil. Craft soils contain less clay between depths of 10 and 40 inches than the Haverson soil, and Lohmiller soils contain more clay between depths of 10 and 40 inches.

The content of organic matter and fertility are low in the Haverson soil. Permeability is moderate. Available water capacity is high. Runoff is slow.

Most of the acreage supports native grasses and is used for grazing. Some areas near the stream channels support deciduous trees and shrubs, which provide protection for livestock and wildlife. Although the occasional flooding is a hazard, the additional moisture is beneficial. Ponds in some of the channels provide temporary watering sites for livestock and wildlife.

This soil generally is unsuited to cultivated crops because it is dissected by channels and is occasionally flooded. It is suited to tame pasture and hay, but harvesting hay is difficult because of the meandering channels. Alfalfa, intermediate wheatgrass, crested wheatgrass, and smooth bromegrass are examples of suitable pasture plants.

This soil is suited to windbreaks and environmental plantings. All climatically suited trees and shrubs grow well. Because of the meandering stream channels, hand planting generally is needed.

The capability unit is VIw-1; Loamy Overflow range site; windbreak suitability group 1.

He—Heil silt loam. This deep, poorly drained, sodium affected, level soil is in depressions on uplands. It is ponded during wet periods. Areas are oval and are 10 to 500 acres in size.

Typically, the surface layer is gray silt loam about 2 inches thick. The subsoil is about 58 inches thick. It is dark gray, very firm and extremely firm clay in the upper part and olive gray, very firm, calcareous silty clay in the lower part. In places the soil does not have a sodium affected subsoil.

Included with this soil in mapping are small areas of Heil Variant and Rhoades soils and Slickspots. These inclusions make up less than 10 percent of any one mapped area. The very poorly drained Heil Variant soils are in the low parts of the depressions. The well drained Rhoades soils are along the edges of the depressions. Slickspots are in positions on the landscape similar to those of the Heil soil. They support little or no vegetation and have visible salts at or near the surface.

The content of organic matter is high in the Heil soil, and fertility is medium. Permeability is very slow. Available water capacity is high. A seasonal high water table is within a depth of 1 foot. As much as 1 foot of water ponds on the surface during some wet periods. Runoff is ponded. The shrink-swell potential is high.

Most of the acreage supports native grasses and is used for grazing. Surface compaction and ponding are problems. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth. Many areas are potential sites for excavated ponds.

This soil generally is unsuited to cultivated crops, tame pasture and hay, and windbreaks and environmental plantings because of seasonal wetness. Artificial drainage generally is not feasible because suitable outlets are not available. Western wheatgrass is the best species for planting if cultivated areas are seeded.

The capability unit is VIs-1; Closed Depression range site; windbreak suitability group 10.

Hn—Heil Variant silty clay loam, ponded. This deep, very poorly drained, level soil is in depressions on uplands. It is ponded most of the year. Areas are oval and are 10 to 200 acres in size.

Typically, the surface layer is gray silty clay loam about 3 inches thick. The underlying material to a depth of 60 inches is gray, olive gray, light olive gray, and pale olive, calcareous silty clay loam and clay. In places the soil has a sodium affected subsoil.

Included with this soil in mapping are small areas of the well drained, sodium affected Daglum and Rhoades soils. These soils make up less than 10 percent of any one mapped area. They are on the edges of the depressions.

The content of organic matter and fertility are low in the Heil Variant soil. Permeability is very slow. Available water capacity is moderate. A seasonal high water table is within a depth of 1 foot. As much as 2 feet of water ponds on the surface during much of the year. Runoff is ponded. The shrink-swell potential is high.

Most areas support native vegetation and are used as wetland wildlife habitat. The natural plant cover is cattail, reeds, and other marsh plants. Some areas do not support plants. Many areas are potential sites for excavated ponds.

This soil generally is unsuited to cultivated crops, tame pasture and hay, and windbreaks and environmental plantings because of the ponding.

The capability unit is VIIIw-1; no range site or windbreak suitability group is assigned.

HpC—Hisle-Pierre complex, 2 to 9 percent slopes. These moderately deep, well drained, gently sloping and moderately sloping soils are on uplands. The sodium affected Hisle soil is in small, shallow depressions, generally on low side slopes. The Pierre soil is on the upper side slopes and in convex areas. When dry, it is characterized by cracks, which are 0.5 inch to 2.0 inches wide and several feet long and extend through the subsoil. Areas are 10 to 350 acres in size and are irregular in shape. They are 40 to 50 percent Hisle soil and 35 to 45 percent Pierre soil. The two soils occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Hisle soil is light brownish gray silt loam about 1 inch thick. The subsoil is about 34 inches thick. It is firm and calcareous. The upper part is grayish brown clay, and the lower part is light brownish gray silty clay that has accumulations of salts. Light brownish gray shale is at a depth of about 35 inches.

Typically, the surface layer of the Pierre soil is dark grayish brown clay about 5 inches thick. The subsoil is grayish brown and light brownish gray, very firm and firm, calcareous clay about 21 inches thick. It has accumulations of carbonate in the lower part. The underlying material is light brownish gray, calcareous clay. It has accumulations of carbonate and gypsum throughout. Light brownish gray shale is at a depth of about 32 inches. In some areas the depth to shale is more than 40 inches.

Included with these soils in mapping are small areas of Samsil soils and Slickspots. These inclusions make up less than 15 percent of any one mapped area. The shallow Samsil soils do not have a sodium affected subsoil. They are on ridges and the sides of drainageways. Slickspots have a slick or puddled surface and have salts at or near the surface. They support little or no vegetation. They are in positions on the landscape similar to those of the Hisle soil.

The content of organic matter and fertility are low in the Hisle and Pierre soils. The sodium affected subsoil of the Hisle soil restricts the penetration of plant roots. Permeability is very slow in both soils. Available water capacity is low. Runoff is medium. The shrink-swell potential is very high.

Most of the acreage supports native grasses and is used for grazing. Surface compaction is a problem. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth. Reestablishing vegetation is difficult.

This map unit generally is unsuited to cultivated crops, tame pasture and hay, and windbreaks and environmental plantings. The sodium affected subsoil of the Hisle soil is the main limitation. Although the Pierre soil is suited to these uses, the use of this unit is determined by the suitability of the Hisle soil.

The Hisle soil is in capability unit VIs-1, Thin Claypan range site, and windbreak suitability group 10; the Pierre soil is in capability unit IVe-4, Clayey range site, and windbreak suitability group 4C.

HsB—Hisle-Slickspots complex, 2 to 9 percent slopes. This map unit occurs as areas of a moderately deep, well drained, gently sloping and moderately sloping, sodium affected Hisle soil intermingled with Slickspots. The unit is on uplands. The Hisle soil is on the high parts of the landscape. Slickspots generally are in slight depressions. Areas are 10 to 300 acres in size and are irregular in shape. They are 60 to 70 percent Hisle soil and 15 to 25 percent Slickspots. The Hisle soil and Slickspots occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Hisle soil is light brownish gray silt loam about 1 inch thick. The subsoil is

about 34 inches thick. It is firm and calcareous. The upper part is grayish brown clay, and the lower part is light brownish gray silty clay that has accumulations of salts. Light brownish gray shale is at a depth of about 35 inches.

Slickspots occur as slightly depressional, barren areas that have a puddled or slick surface. Accumulations of salts are at or near the surface. The soil material is massive clay. Shale is at a depth of about 35 inches.

Included with the Hisle soil and Slickspots in mapping are small areas of Dupree, Lohmiller, Pierre, and Swanboy soils. These included soils make up less than 15 percent of any one mapped area. They do not have a sodium affected subsoil. Dupree and Pierre soils are slightly higher on the landscape than the Hisle soil. The stratified Lohmiller soils are along drainageways. Swanboy soils are more than 40 inches deep over soft bedrock. They are in positions on the landscape similar to those of the Hisle soil.

The content of organic matter and fertility are low in the Hisle soil. Tilth is poor. The sodium affected subsoil restricts the penetration of plant roots. Permeability is very slow. Available water capacity is low. Runoff is medium. The shrink-swell potential is very high.

Most of the acreage supports native grasses and is used for grazing. Slickspots generally support little or no vegetation, but they do support a sparse stand of weeds and pricklypear during wet periods. Surface compaction is a problem on the Hisle soil. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth.

This map unit generally is unsuited to cultivated crops, tame pasture and hay, and windbreaks and environmental plantings. The sodium affected subsoil in the Hisle soil and the Slickspots are the main limitations.

The Hisle soil is in capability unit VIs-1, Thin Claypan range site, and windbreak suitability group 10; the Slickspots are in capability unit VIIIs-3 and are not assigned to a range site or a windbreak suitability group.

Ka—Korchea loam. This deep, well drained, nearly level soil is on low terraces. It is subject to rare flooding. Areas are 10 to 80 acres in size and are long and narrow.

Typically, the surface layer is grayish brown, calcareous loam about 6 inches thick. The underlying material to a depth of 60 inches is grayish brown and light brownish gray, calcareous loam stratified with thin layers of fine sandy loam, silty clay loam, and silt loam. In some areas the soil is dark to a depth of less than 7 inches.

Included with this soil in mapping are small areas of Lohler and Trembles soils. These soils make up less than 15 percent of any one mapped area. They are in positions on the landscape similar to those of the Korchea soil. Lohler soils contain more clay between depths of 10 and 40 inches than the Korchea soil, and Trembles soils contain more sand between depths of 10 and 40 inches.

The content of organic matter and fertility are high in the Korchea soil. Tilth is good. Permeability is moderate. Available water capacity is high. Runoff is slow. The shrink-swell potential is moderate.

Most of the acreage supports native grasses and is used for grazing or hay. Generally, no major hazards or limitations affect the use of this soil for range. Proper stocking rates and timely deferment of grazing or rotation grazing help to maintain maximum productivity.

This soil is suited to cultivated crops and to tame pasture and hay. Examples of suitable pasture plants are alfalfa, smooth bromegrass, and intermediate wheatgrass. Alfalfa, wheat, and oats are the main crops. Measures that conserve moisture during dry periods are the main management needs in cultivated areas. Leaving crop residue on the surface and minimizing tillage are examples. Floodwater delays planting in some years, but in most years the additional moisture is beneficial and the flood damage is minor.

This soil is suited to windbreaks and environmental plantings. All climatically suited trees and shrubs grow well. Those that require an abundant supply of moisture grow especially well.

The capability unit is IIc-1; Loamy Terrace range site; windbreak suitability group 1.

Kc—Korchea loam, channeled. This deep, well drained, nearly level soil is on flood plains that are dissected into many small tracts by narrow channels and partly filled old stream meanders. The channels are 5 to 20 feet wide and 2 to 20 feet deep. The soil is frequently flooded for brief periods. Areas are 20 to 350 acres in size and are long and narrow.

Typically, the surface layer is grayish brown, calcareous loam about 6 inches thick. The underlying material to a depth of 60 inches is grayish brown and light brownish gray, calcareous, stratified loam, fine sandy loam, silty clay loam, and silt loam. In some areas the soil is dark to a depth of less than 7 inches.

Included with this soil in mapping are small areas of Lohler and Trembles soils. These soils make up less than 15 percent of any one mapped area. Lohler soils contain more clay between depths of 10 and 40 inches than the Korchea soil. Also, they are farther from the channels. Trembles soils contain more sand between depths of 10 and 40 inches than the Korchea soil. Also, they are closer to the channels.

The content of organic matter and fertility are high in the Korchea soil. Permeability is moderate. Available water capacity is high. Runoff is slow. The shrink-swell potential is moderate.

Most of the acreage supports native grasses and is used for grazing. Some areas near the stream channels support deciduous trees and shrubs, which provide protection for livestock and wildlife. Although the

frequent flooding is a hazard, the additional moisture is beneficial. Ponds in some areas of the channels provide temporary watering sites for livestock and wildlife.

This soil generally is unsuited to cultivated crops because it is dissected into many small tracts and is occasionally flooded. It is suited to tame pasture and hay, but harvesting hay is difficult because of the meandering channels. Alfalfa, intermediate wheatgrass, and smooth bromegrass are examples of suitable pasture plants.

This soil is suited to windbreaks and environmental plantings. All climatically suited trees and shrubs grow well. Because of the meandering stream channels, hand planting generally is needed.

The capability unit is VIw-1; Loamy Overflow range site; windbreak suitability group 1.

KyB—Kyle clay, 2 to 6 percent slopes. This deep, well drained, gently sloping soil is on uplands characterized by gilgai relief. When dry, it is characterized by cracks, which are 0.5 inch to 2.0 inches wide and several feet long and extend through the subsoil. Areas are 10 to 650 acres in size and are irregular in shape.

Typically, the surface layer is grayish brown clay about 3 inches thick. The subsoil is grayish brown, very firm clay about 30 inches thick. It is calcareous in the lower part. The underlying material to a depth of 60 inches is grayish brown, calcareous clay. In some areas the surface layer is dark grayish brown. In places the depth to shale is 20 to 40 inches.

Included with this soil in mapping are small areas of Hisle and Swanboy soils. These soils make up less than 10 percent of any one mapped area. Hisle soils have a sodium affected subsoil. They are in scattered areas throughout the unit. Swanboy soils have visible salts at or near the surface. They are on foot slopes.

The content of organic matter and fertility are low in the Kyle soil. Tilth is poor. Permeability is very slow. Available water capacity is moderate. Runoff is medium. The shrink-swell potential is very high.

Most of the acreage supports native grasses and is used for grazing or hay. Surface compaction is a problem. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth.

This soil is suited to cultivated crops and to tame pasture and hay. Examples of suitable pasture plants are alfalfa, intermediate wheatgrass, pubescent wheatgrass, and western wheatgrass. The soil becomes compacted if farmed when wet and is difficult to till when dry. Wheat, alfalfa, and oats are the main crops. Measures that control erosion, increase the rate of water intake, improve tilth and fertility, and conserve moisture are the main management needs. Leaving crop residue on the surface and including grasses and legumes in the cropping system are examples. Contour farming, terraces, and grassed waterways help to control erosion. Chiseling or subsoiling improves tilth and increases the rate of water intake.

This soil is suited to windbreaks and environmental plantings, but the clayey subsoil can restrict the penetration of plant roots. Trees and shrubs can be established, but optimum growth is unlikely. Planting on the contour helps to control erosion and conserves moisture.

The capability unit is IIIe-4; Clayey range site; windbreak suitability group 4C.

LcD—Lantry-Cabba complex, 9 to 30 percent slopes. These well drained, strongly sloping to steep soils are on uplands. The moderately deep Lantry soil is on smooth or concave, mid and low side slopes. The shallow Cabba soil is on ridges and sharp slope breaks. Areas are 20 to several thousand acres in size and are irregular in shape. They are 50 to 70 percent Lantry soil and 15 to 35 percent Cabba soil. The two soils occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Lantry soil is brown silt loam about 4 inches thick. The subsoil is light yellowish brown, friable, calcareous silt loam about 29 inches thick. Light yellowish brown and light brownish gray, calcareous, soft sandstone is at a depth of about 33 inches. In some areas the soil contains more sand throughout.

Typically, the surface layer of the Cabba soil is grayish brown, calcareous loam about 4 inches thick. The next 5 inches is light brownish gray, calcareous loam. The underlying material is grayish brown and light yellowish brown, calcareous clay loam. Light brownish gray and light yellowish brown, soft bedrock is at a depth of about 16 inches. In some areas the soil contains more sand throughout.

Included with these soils in mapping are small areas of Amor, Glenross, Korchea, and Rhoades soils and Rock outcrop and Slickspots. These inclusions make up less than 15 percent of any one mapped area. Amor soils are deeper to carbonates than the Lantry soil. They are on the low parts of the landscape. The poorly drained Glenross soils have visible salts at or near the surface. They are along drainageways. Korchea soils are stratified. They are on flood plains. Rhoades soils and Slickspots are in scattered areas throughout the lower parts of the landscape. Rhoades soils have a sodium affected subsoil. Slickspots have visible salts at or near the surface. They support little or no vegetation. The Rock outcrop occurs as steep escarpments.

The content of organic matter and fertility are low in the Lantry and Cabba soils. Permeability is moderate. Available water capacity is low. Runoff is rapid. The shrink-swell potential is low in the Lantry soil and moderate in the Cabba soil.

Most of the acreage supports native grasses and is used for grazing (fig. 8). Water erosion is a hazard if the

range is overgrazed. In places gullies form along cattle trails. Fencing and other means of controlling livestock traffic patterns help to prevent gullying. Sites for stock water impoundments are available in some of the draws. Seepage from these impoundments could be a problem.

These soils generally are unsuited to cultivated crops, tame pasture and hay, and windbreaks and environmental plantings because of the shallowness to bedrock in the Cabba soil and the slope of both soils.

The Lantry soil is in capability unit VIe-3, Thin Upland range site; the Cabba is in capability unit VIe-11, Shallow range site; both soils are in windbreak suitability group 10.

LdD—Lantry-Cabba-Rhoades complex, 9 to 30 percent slopes. These well drained, strongly sloping to steep soils are on uplands. The moderately deep Lantry soil is on smooth or concave, mid and low side slopes. The shallow Cabba soil is on ridges. The sodium affected Rhoades soil is on the low parts of the landscape. Areas are 20 to 500 acres in size and are irregular in shape. They are 40 to 55 percent Lantry soil, 15 to 30 percent Cabba soil, and 15 to 25 percent Rhoades soil. The three soils occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Lantry soil is brown silt loam about 4 inches thick. The subsoil is light yellowish brown, friable, calcareous silt loam about 29

Figure 8.—An area of Lantry-Cabba complex, 9 to 30 percent slopes, used for range.

inches thick. Light yellowish brown and light brownish gray, calcareous, soft sandstone is at a depth of about 33 inches.

Typically, the surface layer of the Cabba soil is grayish brown, calcareous loam about 4 inches thick. The next 5 inches is light brownish gray, calcareous loam. The underlying material is grayish brown and light yellowish brown, calcareous clay loam. Light brownish gray and light yellowish brown, soft bedrock is at a depth of about 16 inches. In some areas the soil contains more sand throughout.

Typically, the surface layer of the Rhoades soil is grayish brown loam about 2 inches thick. The subsoil is dark grayish brown and grayish brown, very firm and firm silty clay about 41 inches thick. In the lower part it is calcareous and has accumulations of salts. The underlying material is light olive brown, calcareous silty clay loam. It has accumulations of salts. Light olive brown, soft shale is at a depth of about 50 inches. In some areas the depth to soft bedrock is 20 to 40 inches. In some places the surface layer is not so dark. In other places the soil contains less clay throughout.

Included with these soils in mapping are small areas of Amor, Glenross, Reeder, and Regent soils and Slickspots. These inclusions make up less than 15 percent of any one mapped area. Amor, Reeder, and Regent soils are deeper to carbonates than the Lantry soil. They are on the low parts of the landscape. The poorly drained Glenross soils are along narrow drainageways. They have visible salts at or near the surface. Slickspots also have visible salts at or near the surface. They support little or no vegetation. They occur in a random pattern throughout areas of the Rhoades soil. Also included are some areas where shale and siltstone outcrops occur as steep escarpments.

The content of organic matter is low in the Lantry and Cabba soils and moderate in the Rhoades soil. Fertility is low in all three soils. The sodium affected subsoil in the Rhoades soil restricts the penetration of roots. Permeability is moderate in the Lantry and Cabba soils and slow in the Rhoades soil. Available water capacity is low in the Lantry and Cabba soils and moderate in the Rhoades soil. Runoff is rapid on all three soils. The shrink-swell potential is low in the Lantry soil, moderate in the Cabba soil, and high in the Rhoades soil.

Most of the acreage supports native grasses and is used for grazing. Water erosion is a hazard if the range is overgrazed. In places gullies form along cattle trails. Fencing and other means of controlling livestock traffic patterns help to prevent gullying. Surface compaction is a problem on the Rhoades soil. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth. Sites for stock water impoundments are available in some of the draws. Seepage from these impoundments could be a problem.

These soils generally are unsuited to cultivated crops, tame pasture and hay, and windbreaks and environmental plantings. The shallowness to bedrock in the Cabba soil, the sodium affected subsoil in the Rhoades soil, and the slope of all three soils are limitations.

The Lantry soil is in capability unit VIe-3, Thin Upland range site; the Cabba soil is in capability unit VIe-11, Shallow range site; the Rhoades soil is in capability unit VIs-1, Thin Claypan range site; all three soils are in windbreak suitability group 10.

LeD—Lantry-Korchea-Cabba complex, 1 to 25 percent slopes. These well drained, nearly level to moderately steep soils are along drainageways in the uplands. The moderately deep Lantry soil is on side slopes. The deep, channeled Korchea soil is on flood plains. It is frequently flooded for brief periods. The shallow Cabba soil is on the upper side slopes and ridges. Areas are 50 to 180 acres in size and are long and narrow. They are 40 to 50 percent Lantry soil, 20 to 30 percent Korchea soil, and 15 to 25 percent Cabba soil. The three soils occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Lantry soil is brown silt loam about 4 inches thick. The subsoil is light yellowish brown, friable, calcareous silt loam about 29 inches thick. Light yellowish brown and light brownish gray, calcareous, soft sandstone is at a depth of about 33 inches.

Typically, the surface layer of the Korchea soil is grayish brown, calcareous loam about 6 inches thick. The underlying material to a depth of 60 inches is grayish brown and light brownish gray, calcareous, stratified loam, fine sandy loam, silty clay loam, and silt loam. In some areas the soil is dark to a depth of less than 7 inches.

Typically, the surface layer of the Cabba soil is grayish brown, calcareous loam about 4 inches thick. The next 5 inches is light brownish gray, calcareous loam. The underlying material is grayish brown and light yellowish brown, calcareous clay loam. Light brownish gray and light yellowish brown, soft bedrock is at a depth of about 16 inches. In some areas the soil contains more sand throughout.

Included with these soils in mapping are small areas of Amor, Rhoades, and Trembles soils and Rock outcrop and Slickspots. These inclusions make up less than 15 percent of any one mapped area. Amor soils have a dark surface layer that is more than 7 inches thick. They are on side slopes below the Lantry soil. Rhoades soils have a sodium affected subsoil. They are in shallow depressions on foot slopes. Trembles soils contain more sand between depths of 10 and 40 inches than the Korchea soil. They are in positions on the landscape similar to those of the Korchea soil. The Rock outcrop occurs as steep escarpments. Slickspots have visible

salts at or near the surface. They are on low side slopes. They support little or no vegetation.

The content of organic matter, fertility, and available water capacity are low in the Lantry and Cabba soils and high in the Korchea soil. Permeability is moderate in all three soils. Runoff is rapid on the Lantry and Cabba soils and slow on the Korchea soil. The shrink-swell potential is low in the Lantry soil and moderate in the Korchea and Cabba soils.

Most of the acreage supports native grasses and is used for grazing or hay. Water erosion is a problem if areas of the Lantry and Cabba soils are overgrazed. In places gullies form along cattle trails. Fencing and other means of controlling livestock traffic patterns help to prevent gullying. No major hazards or limitations affect the use of the Korchea soil for range. In some areas scattered clumps of trees and shrubs provide protection for livestock and wildlife.

This map unit generally is unsuited to cultivated crops, tame pasture and hay, and windbreaks and environmental plantings. The slope of the Lantry and Cabba soils, the flooding and channels in areas of the Korchea soils, and the shallowness to bedrock in the Cabba soil are limitations. Hay can be harvested in some areas of the Korchea soil. Because of the meandering stream channels, windbreaks and environmental plantings cannot be planted by machine on the Korchea soil. They can be planted by hand.

The Lantry soil is in capability unit VIe-3, Thin Upland range site; the Korchea soil is in capability unit VIw-1, Loamy Overflow range site; and the Cabba soil is in capability unit VIe-11, Shallow range site. Lantry and Cabba soils are in windbreak suitability group 10, and the Korchea soil is in windbreak suitability group 1.

Lh—Lohler silty clay loam. This deep, well drained soil is on flood plains. It is subject to rare flooding. Slopes generally are nearly level. On some terrace escarpments, however, they are as much as 25 percent. Areas are 10 to 200 acres in size and are irregular in shape.

Typically, the surface layer is grayish brown silty clay loam about 4 inches thick. The underlying material to a depth of 60 inches is grayish brown, calcareous, stratified silty clay loam and loam. In some areas the soil is dark to a depth of more than 7 inches.

Included with this soil in mapping are small areas of Korchea and Trembles soils. These soils make up less than 15 percent of any one mapped area. They contain less clay between depths of 10 and 40 inches than the Lohler soil. They are in positions on the landscape similar to those of the Lohler soil.

The content of organic matter and fertility are low in the Lohler soil. Tilth is fair. Permeability is slow. Available water capacity is high. Runoff is slow. The shrink-swell potential is high.

Most of the acreage supports native grasses and is used for grazing or hay. Surface compaction is a problem. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth.

This soil is suited to cultivated crops and to tame pasture and hay. Examples of suitable pasture plants are alfalfa, crested wheatgrass, intermediate wheatgrass, and pubescent wheatgrass. Wheat and alfalfa are the main crops. Measures that conserve moisture and improve tilth are the main management needs in cultivated areas. Examples are leaving crop residue on the surface, minimizing tillage, and including grasses and legumes in the cropping system. Floodwater delays planting in some years, but in most years the additional moisture is beneficial and the flood damage is minor.

This soil is suited to windbreaks and environmental plantings. All climatically suited trees and shrubs grow well. Those that require an abundant supply of moisture grow especially well.

The capability unit is IIc-1; Loamy Terrace range site; windbreak suitability group 1.

Lk—Lohler silty clay loam, channeled. This deep, well drained, nearly level soil is on flood plains that are dissected into many small tracts by narrow channels and partly filled old stream meanders. The channels are 5 to 20 feet wide and 2 to 20 feet deep. The soil is frequently flooded for brief periods. Areas are 10 to 500 acres in size and are long and narrow.

Typically, the surface layer is grayish brown silty clay loam about 4 inches thick. The underlying material to a depth of 60 inches is grayish brown, calcareous, stratified silty clay loam and loam. In some areas the soil is dark to a depth of more than 7 inches.

Included with this soil in mapping are small areas of Korchea and Trembles soils. These soils make up less than 15 percent of any one mapped area. They contain less clay between depths of 10 and 40 inches than the Lohler soil. They are in positions on the landscape similar to those of the Lohler soil.

The content of organic matter and fertility are low in the Lohler soil. Tilth is fair. Permeability is slow. Available water capacity is high. Runoff is slow. The shrink-swell potential is high.

Most of the acreage supports native grasses and is used for grazing. Surface compaction is a problem. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth. In some areas scattered clumps of trees and shrubs provide protection for livestock and wildlife. Although the frequent flooding is a hazard, the additional moisture is beneficial. Ponds in some areas of the channels provide temporary watering sites for livestock and wildlife.

This soil generally is unsuited to cultivated crops because it is dissected into many small tracts and is frequently flooded. It is suited to tame pasture and hay, but harvesting hay is difficult because of the meandering

channels. Alfalfa, intermediate wheatgrass, and smooth bromegrass are examples of suitable pasture plants.

This soil is suited to windbreaks and environmental plantings. All climatically suited trees and shrubs grow well. Because of the meandering stream channels, hand planting generally is needed.

The capability unit is VIw-1; Loamy Overflow range site; windbreak suitability group 1.

Ln—Lohmiller silty clay loam. This deep, well drained soil is on flood plains. It is subject to rare flooding. Slopes generally are nearly level. On some terrace escarpments, however, they are as much as 25 percent. Areas are 10 to 200 acres in size and are irregular in shape.

Typically, the surface layer is grayish brown, calcareous silty clay loam about 5 inches thick. The underlying material to a depth of 60 inches is grayish brown, calcareous silty clay loam stratified with thin layers of loam, silty clay, and silt loam. In some areas the soil contains more clay throughout.

Included with this soil in mapping are small areas of Haverson and Swanboy soils. These soils make up less than 15 percent of any one mapped area. Haverson soils contain less clay between depths of 10 and 40 inches than the Lohmiller soil. They are in positions on the landscape similar to those of the Lohmiller soil. The clayey Swanboy soils are not stratified and have visible salts at or near the surface. They are on fans along the edge of the mapped areas.

The content of organic matter is moderate in the Lohmiller soil, and fertility is medium. Tilth is fair. Permeability is slow. Available water capacity is high. Runoff is slow. The shrink-swell potential is high.

Most of the acreage supports native grasses and is used for grazing or hay. Surface compaction is a problem. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth.

This soil is suited to cultivated crops and to tame pasture and hay. Examples of suitable pasture plants are alfalfa, intermediate wheatgrass, and pubescent wheatgrass. Wheat, alfalfa, and oats are the main crops. Measures that conserve moisture and improve tilth are the main management needs in cultivated areas. Examples are leaving crop residue on the surface, minimizing tillage, and including grasses and legumes in the cropping system. Floodwater delays planting in some years, but in most years the additional moisture is beneficial and the flood damage is minor.

This soil is suited to windbreaks and environmental plantings. All climatically suited trees and shrubs grow well. Those that require an abundant supply of moisture grow especially well.

The capability unit is IIc-1; Loamy Terrace range site; windbreak suitability group 1.

Lo—Lohmiller silty clay loam, channeled. This deep, well drained, nearly level soil is on flood plains that are dissected into many small tracts by narrow channels and partly filled old stream meanders. The channels are 5 to 20 feet wide and 2 to 20 feet deep. The soil is frequently flooded for brief periods. Areas are 40 to 500 acres in size and are long and narrow.

Typically, the surface layer is grayish brown, calcareous silty clay loam about 5 inches thick. The underlying material to a depth of 60 inches is grayish brown, calcareous silty clay loam stratified with thin layers of loam, silty clay, and silt loam. In some areas the soil contains more clay throughout.

Included with this soil in mapping are small areas of Craft and Haverson soils. These soils make up less than 15 percent of any one mapped area. They contain less clay between depths of 10 and 40 inches than the Lohmiller soil. They are in positions on the landscape similar to those of the Lohmiller soil.

The content of organic matter is moderate in the Lohmiller soil, and fertility is medium. Permeability is slow. Available water capacity is high. Runoff is slow. The shrink-swell potential is high.

Most of the acreage supports native grasses and is used for grazing. Surface compaction is a problem. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth. In some areas scattered clumps of trees and shrubs provide protection for livestock and wildlife. Although the frequent flooding is a hazard, the additional moisture is beneficial. Ponds in some areas of the channels provide temporary watering sites for livestock and wildlife.

This soil generally is unsuited to cultivated crops because it is dissected into many small tracts and is frequently flooded. It is suited to tame pasture and hay, but harvesting hay is difficult because of the meandering channels. Alfalfa, intermediate wheatgrass, and smooth bromegrass are examples of suitable pasture plants.

This soil is suited to windbreaks and environmental plantings. All climatically suited trees and shrubs grow well. Because of the meandering stream channels, hand planting generally is needed.

The capability unit is VIw-1; Loamy Overflow range site; windbreak suitability group 1.

PbB—Parchin-Bullock fine sandy loams, 1 to 6 percent slopes. These moderately deep, well drained, sodium affected, nearly level and undulating soils are on uplands. The Parchin soil is on slight rises. The Bullock soil is in small pits and depressions. Areas are 10 to 350 acres in size and are irregular in shape. They are 55 to 65 percent Parchin soil and 20 to 30 percent Bullock soil. The two soils occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Parchin soil is grayish brown fine sandy loam about 4 inches thick. The

subsurface layer is light brownish gray fine sandy loam about 5 inches thick. The subsoil is grayish brown and light brownish gray, firm sandy clay loam about 15 inches thick. It has accumulations of carbonate and salts in the lower part. Light brownish gray, soft sandstone is at a depth of about 24 inches.

Typically, the surface layer of the Bullock soil is light brownish gray fine sandy loam about 3 inches thick. The subsoil is brown and light olive brown, firm clay loam about 20 inches thick. It has accumulations of carbonate and salts in the lower part. Grayish brown, soft bedrock is at a depth of about 23 inches.

Included with these soils in mapping are small areas of Evridge, Glenross, Seroco, and Vebar soils. These included soils make up less than 20 percent of any one mapped area. Evridge soils have a surface soil that is thicker than that of the Parchin soil. They are in positions on the landscape similar to those of the Parchin soil. The poorly drained Glenross soils are along some of the drainageways. Seroco and Vebar soils do not have a sodium affected subsoil. They are on the high parts of the landscape.

The content of organic matter and fertility are low in the Parchin and Bullock soils. Tilth is poor. The sodium affected subsoil restricts the penetration of plant roots. Permeability is slow in the Parchin soil and very slow in the Bullock soil. Available water capacity is low in both soils. Runoff is medium. The shrink-swell potential is moderate.

Most of the acreage supports native grasses and is used for grazing or hay. Wind erosion is a hazard in overgrazed areas of the Parchin soil. Surface compaction is a problem on the Bullock soil. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth. Proper stocking rates and timely deferment of grazing help to maintain maximum productivity.

This map unit is poorly suited to cultivated crops and to tame pasture and hay. Western wheatgrass and crested wheatgrass are examples of suitable pasture plants. Alfalfa, wheat, and oats are the main crops. No crops grow well on the Bullock soil. The sodium affected subsoil in both soils restricts the penetration of plant roots. Measures that improve tilth and control wind erosion are the main management needs in cultivated areas. Leaving crop residue on the surface, including grasses and legumes in the cropping system, and minimizing tillage are examples. Chiseling or subsoiling improves tilth and increases the rate of water intake.

The Parchin soil is suited to windbreaks and environmental plantings, but the Bullock soil is generally unsuited. The sodium affected subsoil in both soils restricts the penetration of plant roots. Trees and shrubs can be established on the Parchin soil, but optimum growth, survival, and vigor are unlikely. No trees or shrubs grow well on the Bullock soil.

The Parchin soil is in capability unit IVe-12, Claypan range site, and windbreak suitability group 9; the Bullock soil is in capability unit VIs-3, Thin Claypan range site, and windbreak suitability group 10.

PeB—Pierre clay, 2 to 6 percent slopes. This moderately deep, well drained, gently sloping soil is on uplands characterized by gilgai relief. When dry, it is characterized by cracks, which are 0.5 inch to 2.0 inches wide and several feet long and extend through the subsoil. Areas are 10 to 600 acres in size and are irregular in shape.

Typically, the surface layer is dark grayish brown clay about 5 inches thick. The subsoil is grayish brown and light brownish gray, very firm and firm, calcareous clay about 21 inches thick. It has accumulations of carbonate in the lower part. The underlying material is light brownish gray, calcareous clay. It has accumulations of carbonate and gypsum throughout. Light brownish gray shale is at a depth of about 32 inches. In some areas the depth to shale is more than 40 inches.

Included with this soil in mapping are small areas of Hisle and Swanboy soils. These soils make up less than 15 percent of any one mapped area. Hisle soils have a sodium affected subsoil. They are in shallow depressions. Swanboy soils have visible salts at or near the surface. They are on the low parts of the landscape.

The content of organic matter and fertility are low in the Pierre soil. Tilth is poor. Permeability is very slow. Available water capacity is low. Runoff is medium. The shrink-swell potential is very high.

Most of the acreage supports native grasses and is used for grazing or hay. Surface compaction is a problem. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth.

This soil is suited to cultivated crops and to tame pasture and hay, but it becomes compacted if farmed when wet and is difficult to till when dry. Examples of suitable pasture plants are alfalfa, green needlegrass, intermediate wheatgrass, pubescent wheatgrass, and western wheatgrass. Wheat and oats are the main crops. Measures that control erosion, improve tilth and fertility, and conserve moisture are the main management needs in cultivated areas. Leaving crop residue on the surface, minimizing tillage, and including grasses and legumes in the cropping system are examples. Contour farming, grassed waterways, terraces, and stripcropping help to control erosion. In some areas, however, the slopes are too short or too irregular for contouring or terracing. Chiseling or subsoiling improves tilth and increases the rate of water intake.

This soil is suited to windbreaks and environmental plantings, but it takes in water slowly and the clayey subsoil can restrict the penetration of plant roots. Windbreaks can be established, but optimum growth is unlikely. Planting on the contour helps to control erosion and conserves moisture.

The capability unit is IIIe-4; Clayey range site; windbreak suitability group 4C.

PeC—Pierre clay, 6 to 9 percent slopes. This moderately deep, well drained, moderately sloping soil is on uplands characterized by gilgai relief. When dry, it is characterized by cracks, which are 0.5 inch to 2.0 inches wide and several feet long and extend through the subsoil. Areas are 10 to 400 acres in size and are irregular in shape.

Typically, the surface layer is dark grayish brown clay about 5 inches thick. The subsoil is grayish brown and light brownish gray, very firm and firm, calcareous clay about 21 inches thick. It has accumulations of carbonate in the lower part. The underlying material is light brownish gray, calcareous clay. It has accumulations of carbonate and gypsum throughout. Light brownish gray shale is at a depth of about 32 inches. In some areas the depth to shale is more than 40 inches.

Included with this soil in mapping are small areas of Hisle and Samsil soils. These soils make up less than 15 percent of any one mapped area. Hisle soils have a sodium affected subsoil. They are in shallow depressions on the lower parts of the landscape. The shallow Samsil soils are on ridges.

The content of organic matter and fertility are low in the Pierre soil. Tilth is poor. Permeability is very slow. Available water capacity is low. Runoff is medium. The shrink-swell potential is very high.

Most of the acreage supports native grasses and is used for grazing. Surface compaction is a problem. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth. Water erosion is a problem if the range is overgrazed. In places gullies form along cattle trails. Fencing and other means of controlling livestock traffic patterns help to prevent gullying.

This soil is suited to cultivated crops and to tame pasture and hay, but it becomes compacted if farmed when wet and is difficult to till when dry. Examples of suitable pasture plants are alfalfa, green needlegrass, intermediate wheatgrass, pubescent wheatgrass, and western wheatgrass. Wheat and oats are the main crops. Measures that control erosion, improve tilth and fertility, and conserve moisture are the main management needs. Leaving crop residue on the surface, minimizing tillage, and including grasses and legumes in the cropping system are examples. Contour farming, grassed waterways, and terraces help to control erosion. In some areas, however, the slopes are too short or too irregular for contouring or terracing. Chiseling or subsoiling improves tilth and increases the rate of water intake.

This soil is suited to windbreaks and environmental plantings, but it takes in water slowly and the clayey subsoil can restrict the penetration of plant roots. Windbreaks can be established, but optimum growth is unlikely. Planting on the contour helps to control erosion and conserves moisture.

The capability unit is IVe-4; Clayey range site; windbreak suitability group 4C.

PmD—Pierre-Samsil clays, 9 to 30 percent slopes. These well drained, strongly sloping and moderately steep soils are on uplands. The moderately deep Pierre soil is on side slopes. When dry, it is characterized by cracks, which are 0.5 inch to 2.0 inches wide and several feet long and extend through the subsoil. The shallow Samsil soil is on ridges and sharp slope breaks. Areas are 20 to 1,100 acres in size and are irregular in shape. They are 55 to 70 percent Pierre soil and 15 to 30 percent Samsil soil. The two soils occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Pierre soil is dark grayish brown, friable clay about 5 inches thick. The subsoil is grayish brown and light brownish gray, very firm and firm, calcareous clay about 21 inches thick. It has accumulations of carbonate in the lower part. The underlying material is light brownish gray, calcareous clay. It has accumulations of carbonate and gypsum throughout. Light brownish gray shale is at a depth of about 32 inches. In some areas the depth to shale is more than 40 inches.

Typically, the surface layer of the Samsil soil is grayish brown, calcareous clay about 3 inches thick. The underlying material is grayish brown, calcareous clay. Light brownish gray shale is at a depth of about 12 inches.

Included with these soils in mapping are small areas of Hisle, Lohmiller, and Swanboy soils. These included soils make up less than 15 percent of any one mapped area. Hisle soils have a sodium affected subsoil. They are in shallow depressions on the low parts of the landscape. Lohmiller soils are stratified. They are on flood plains along drainageways. Swanboy soils have visible salts at or near the surface. They are on foot slopes and fans.

The content of organic matter and fertility are low in the Pierre and Samsil soils. Permeability is very slow in the Pierre soil and slow in the Samsil soil. Available water capacity is low in both soils. Runoff is rapid. The shrink-swell potential is very high.

Most of the acreage supports native grasses and is used for grazing. Water erosion is a hazard if the range is overgrazed. In places gullies form along cattle trails. Fencing and other means of controlling livestock traffic patterns help to prevent gullying. Sites for stock water impoundments are available in some of the draws. Seepage from these impoundments could be a problem.

These soils generally are too steep or too shallow for cultivated crops. The less sloping areas of the Pierre soil can be seeded to tame pasture plants. If special management is applied, they also can be used for windbreaks and environmental plantings.

The Pierre soil is in capability unit VIe-4, Clayey range site, and windbreak suitability group 4C; the Samsil soil is in capability unit VIe-12, Shallow Clay range site, and windbreak suitability group 10.

Po—Pits, gravel. These areas are open excavations, 5 to 30 feet deep, from which sand and gravel are being removed. They are irregular in shape and range from 10 to 30 acres in size. Slopes are uneven and broken. They range from nearly level on the pit bottoms to almost vertical on the rims.

The pit bottoms typically are sand and gravel, but they are bedrock where all the sand and gravel has been removed. Mounds of mixed cobbly, stony, and loamy overburden are on the edges of the pits. The bottoms and sides support little or no vegetation during periods when the pits are used.

Most of the gravel pits are used only as a source of sand and gravel for construction purposes. Some provide limited wildlife habitat. Abandoned pits can be restored to range or to tame pasture and hay if reclamation measures are applied. These measures include shaping the areas and using the mounds of overburden material as topsoil dressing. Applying fertilizer as needed helps to establish range or pasture plants.

The capability unit is VIIIs-2; no range site or windbreak suitability group is assigned.

PrA—Promise clay, silty substratum, 0 to 2 percent slopes. This deep, well drained, nearly level soil is on uplands. When dry, it is characterized by cracks, which are 0.5 inch to 2.0 inches wide and several feet long and extend through the subsoil. Areas are 10 to 500 acres in size and are irregular in shape.

Typically, the surface layer is grayish brown clay about 4 inches thick. The subsoil is grayish brown and light brownish gray, very firm and firm, calcareous clay about 42 inches thick. It has accumulations of salts and carbonate in the lower part. The underlying material to a depth of 60 inches is light brownish gray, calcareous silty clay loam. It has accumulations of salts and carbonate throughout. In some areas shale bedrock is at a depth of 20 to 40 inches. In places the surface layer is not so dark.

Included with this soil in mapping are small areas of Hisle and Swanboy soils. These soils make up less than 10 percent of any one mapped area. Hisle soils have a sodium affected subsoil. They are in small, shallow depressions. Swanboy soils have visible salts at or near the surface. They are in swales.

The content of organic matter is moderate in the Promise soil, and fertility is medium. Tilth is poor. Permeability is very slow. Available water capacity is moderate. Runoff is slow. The shrink-swell potential is very high.

Most of the acreage supports native grasses and is used for grazing or hay. Surface compaction is a problem. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth.

This soil is suited to cultivated crops and to tame pasture and hay, but it becomes compacted if farmed when wet and is difficult to till when dry. Examples of suitable pasture plants are alfalfa, crested wheatgrass, intermediate wheatgrass, pubescent wheatgrass, and western wheatgrass. Wheat, alfalfa, and oats are the main crops. Measures that control wind erosion, improve tilth, and conserve moisture are the main management needs in cultivated areas. Leaving crop residue on the surface, minimizing tillage, stripcropping, and including grasses and legumes in the cropping system are examples. Chiseling or subsoiling improves tilth and increases the rate of water intake.

This soil is suited to windbreaks and environmental plantings, but it takes in water slowly and the clayey subsoil can restrict the penetration of plant roots. Windbreaks can be established, but optimum growth is unlikely.

The capability unit is IIIs-3; Dense Clay range site; windbreak suitability group 4C.

RaA—Ree loam, 0 to 2 percent slopes. This deep, well drained, nearly level soil is on terraces. Areas are 10 to 150 acres in size and are irregular in shape.

Typically, the surface layer is dark grayish brown loam about 7 inches thick. The subsoil is about 33 inches thick. It is grayish brown and brown, friable clay loam in the upper part and light brownish gray, very friable, calcareous loam in the lower part. The underlying material to a depth of 60 inches is light brownish gray, calcareous fine sandy loam.

Included with this soil in mapping are small areas of Reliance soils. These soils make up less than 10 percent of any one mapped area. They contain more clay throughout than the Ree soil. They are in positions on the landscape similar to those of the Ree soil.

The content of organic matter is moderate in the Ree soil, and fertility is medium. Tilth is good. Permeability is moderate. Available water capacity is high. Runoff is slow. The shrink-swell potential is moderate.

Most of the acreage supports native grasses and is used for grazing or hay. No major hazards or limitations affect the use of this soil for range. Proper stocking rates and timely deferment of grazing or rotation grazing help to maintain maximum productivity.

This soil is suited to cultivated crops and to tame pasture and hay. Examples of suitable pasture plants are alfalfa, crested wheatgrass, and intermediate wheatgrass. Alfalfa, wheat, and oats are the main crops. Measures that conserve moisture are the main management needs in cultivated areas. Leaving crop residue on the surface and minimizing tillage are examples.

This soil is suited to windbreaks and environmental plantings. All climatically suited trees and shrubs grow well, except for those that require an abundant supply of moisture.

The capability unit is IIc-2; Silty range site; windbreak suitability group 3.

RaB—Ree loam, 2 to 6 percent slopes. This deep, well drained, gently sloping soil is on terraces. Areas are 10 to 80 acres in size and are irregular in shape.

Typically, the surface layer is dark grayish brown loam about 7 inches thick. The subsoil is about 33 inches thick. It is grayish brown and brown, friable clay loam in the upper part and light brownish gray, very friable, calcareous loam in the lower part. The underlying material to a depth of 60 inches is light brownish gray, calcareous fine sandy loam. In some areas soft bedrock is at a depth of 20 to 40 inches.

Included with this soil in mapping are small areas of Reliance soils. These soils make up less than 15 percent of any one mapped area. They have more clay throughout than the Ree soil. They are in swales and on the low parts of the landscape.

The content of organic matter is moderate in the Ree soil, and fertility is medium. Tilth is good. Permeability is moderate. Available water capacity is high. Runoff is medium. The shrink-swell potential is moderate.

Most of the acreage supports native grasses and is used for grazing or hay. No major hazards or limitations affect the use of this soil for range. Proper stocking rates and timely deferment of grazing help to maintain maximum productivity.

This soil is suited to cultivated crops and to tame pasture and hay. Examples of suitable pasture plants are alfalfa, crested wheatgrass, intermediate wheatgrass, and pubescent wheatgrass. Wheat, oats, and alfalfa are the main crops. Measures that control erosion and conserve moisture are the main management needs in cultivated areas. Leaving crop residue on the surface, minimizing tillage, and including grasses and legumes in the cropping system are examples. Contour farming, grassed waterways, and terraces help to control erosion, but in some areas the slopes are too short or too irregular for contouring or terracing.

This soil is suited to windbreaks and environmental plantings. All climatically suited trees and shrubs grow well, except for those that require an abundant supply of moisture. Planting on the contour helps to control erosion and conserves moisture.

The capability unit is IIe-1; Silty range site; windbreak suitability group 3.

RbB—Reeder loam, 2 to 6 percent slopes. This moderately deep, well drained, gently sloping soil is on uplands. Areas are 10 to 400 acres in size and are irregular in shape.

Typically, the surface layer is dark grayish brown loam about 5 inches thick. The subsoil is about 30 inches thick. It is friable. It is brown and light olive brown clay loam in the upper part and light yellowish brown, calcareous loam in the lower part. Light yellowish brown, soft bedrock is at a depth of about 35 inches. In some areas the depth to bedrock is more than 40 inches. In places the subsoil has less clay.

Included with this soil in mapping are small areas of Daglum, Grail, Lantry, Regent, and Rhoades soils. These soils make up less than 15 percent of any one mapped area. Daglum and Rhoades soils have a sodium affected subsoil. They are in shallow depressions on the low parts of the landscape. Grail and Regent soils have more clay in the subsoil than the Reeder soil. Grail soils are in swales. Regent soils are in positions on the landscape similar to those of the Reeder soil. Lantry soils have a brown surface layer and contain less sand in the subsoil than the Reeder soil. They are on knolls and ridges.

The content of organic matter is moderate in the Reeder soil, and fertility is medium. Tilth is good. Permeability and available water capacity are moderate. Runoff is medium. The shrink-swell potential is moderate.

Most of the acreage is cropland. This soil is suited to cultivated crops and to tame pasture and hay, but droughtiness is a limitation. Examples of suitable pasture plants are alfalfa, crested wheatgrass, intermediate wheatgrass, and pubescent wheatgrass. Alfalfa, oats, and wheat are the main crops. Measures that control erosion and conserve moisture are the main management needs. Leaving crop residue on the surface, minimizing tillage, and including grasses and legumes in the cropping system are examples. Contour farming and grassed waterways also help to control erosion, but in some areas the slopes are too short or too irregular for contouring.

No major hazards or limitations affect the use of this soil for range. Proper stocking rates and timely deferment of grazing or rotation grazing help to maintain maximum productivity.

This soil is suited to windbreaks and environmental plantings, but the droughtiness is a limitation. Trees and shrubs can be established, but optimum growth is unlikely. Planting on the contour helps to control erosion and conserves moisture.

The capability unit is IIe-1; Silty range site; windbreak suitability group 6R.

RbC—Reeder loam, 6 to 9 percent slopes. This moderately deep, well drained, moderately sloping soil is on uplands. Areas are 10 to 180 acres in size and are irregular in shape.

Typically, the surface layer is dark grayish brown loam about 5 inches thick. The subsoil is about 30 inches thick. It is friable. It is brown and light olive brown clay

loam in the upper part and light yellowish brown, calcareous loam in the lower part. Light yellowish brown, soft bedrock is at a depth of about 35 inches. In some areas the depth to bedrock is more than 40 inches. In places the subsoil has less clay.

Included with this soil in mapping are small areas of Cabba, Daglum, Lantry, Regent, and Rhoades soils. These soils make up less than 15 percent of any one mapped area. The shallow Cabba and silty Lantry soils do not have a dark surface layer. They are on ridges. Daglum and Rhoades soils have a sodium affected subsoil. They are in shallow depressions on the low parts of the landscape. Regent soils contain more clay throughout than the Reeder soil. They are in positions on the landscape similar to those of the Reeder soil.

The content of organic matter is moderate in the Reeder soil, and fertility is medium. Tilth is good. Permeability and available water capacity are moderate. Runoff is medium. The shrink-swell potential is moderate.

Most of the acreage supports native grasses and is used for grazing or hay. No major hazards or limitations affect the use of this soil for range. Proper stocking rates and timely deferment of grazing or rotation grazing help to maintain maximum productivity.

This soil is suited to cultivated crops and to tame pasture and hay, but droughtiness is a limitation. Examples of suitable pasture plants are alfalfa, intermediate wheatgrass, and pubescent wheatgrass. Alfalfa, oats, and wheat are the main crops. Measures that control erosion and conserve moisture are the main management needs in cultivated areas. Leaving crop residue on the surface and including grasses and legumes in the cropping system are examples. Contour farming and grassed waterways also help to control erosion, but in some areas the slopes are too short or too irregular for contouring.

This soil is suited to windbreaks and environmental plantings, but the droughtiness is a limitation. Trees and shrubs can be established, but optimum growth is unlikely. Planting on the contour helps to control erosion and conserves moisture.

The capability unit is IIIe-1; Silty range site; windbreak suitability group 6R.

RcB—Reeder-Daglum loams, 1 to 6 percent slopes. These well drained, nearly level and undulating soils are on uplands. The moderately deep Reeder soil is on the high parts of the landscape. The deep, sodium affected Daglum soil is in slight depressions on the low parts of the landscape. Areas are 10 to 200 acres in size and are irregular in shape. They are 45 to 55 percent Reeder soil and 30 to 40 percent Daglum soil. The two soils occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Reeder soil is dark grayish brown loam about 5 inches thick. The subsoil is about 30 inches thick. It is friable. It is brown and light olive brown clay loam in the upper part and light yellowish brown, calcareous loam in the lower part. Light yellowish brown, soft bedrock is at a depth of about 35 inches. In some areas the depth to bedrock is more than 40 inches.

Typically, the surface layer of the Daglum soil is dark grayish brown loam about 4 inches thick. The subsurface layer is grayish brown loam about 2 inches thick. The subsoil is dark grayish brown and grayish brown, firm clay about 16 inches thick. It is calcareous in the lower part. The underlying material is grayish brown, calcareous clay and clay loam. It has accumulations of salts in the upper part. Grayish brown shale is at a depth of about 50 inches. In some areas the depth to bedrock is 20 to 40 inches. In places the surface layer is not so dark.

Included with these soils in mapping are small areas of Lantry, Regent, and Rhoades soils. These included soils make up less than 15 percent of any one mapped area. The silty Lantry soils do not have a dark surface layer. They are on ridges. Regent soils have more clay throughout than the Reeder soil. They are in positions on the landscape similar to those of the Reeder soil. Rhoades soils have a surface layer that is thinner than that of the Daglum soil and have visible salts closer to the surface. They are in positions on the landscape similar to those of the Daglum soil.

The content of organic matter is moderate in the Reeder and Daglum soils. Fertility is medium in the Reeder soil and low in the Daglum soil. The sodium affected subsoil in the Daglum soil restricts the penetration of roots. Tilth is good in the Reeder soil and poor in the Daglum soil. Permeability is moderate in the Reeder soil and slow in the Daglum soil. Available water capacity is moderate in both soils. Runoff is medium. The shrink-swell potential is moderate in the Reeder soil and high in the Daglum soil.

Most of the acreage is cropland. These soils are suited to cultivated crops and to tame pasture and hay, but droughtiness is a limitation. The dense, sodium affected subsoil in the Daglum soil also is a limitation. Examples of suitable pasture plants are alfalfa, intermediate wheatgrass, western wheatgrass, and pubescent wheatgrass. Alfalfa, oats, and wheat are the main crops. Measures that control erosion, conserve moisture, and improve tilth are the main management needs. Examples are leaving crop residue on the surface, minimizing tillage, and including grasses and legumes in the cropping system. Chiseling or subsoiling improves tilth.

Generally, no major hazards or limitations affect the use of these soils for range. Surface compaction is a problem, however, on the Daglum soil. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth.

These soils are suited to windbreaks and environmental plantings, but the droughtiness is a limitation. The sodium affected subsoil in the Daglum soil also is a limitation. Trees and shrubs can be established, but optimum growth is unlikely. Planting on the contour helps to control erosion and conserves moisture.

The Reeder soil is in capability unit IIe-1, Silty range site, and windbreak suitability group 6R; the Daglum soil is in capability unit IVs-3, Claypan range site, and windbreak suitability group 9.

RdC—Reeder-Lantry complex, 2 to 9 percent slopes. These moderately deep, well drained, undulating and gently rolling soils are on uplands. The Reeder soil is on the low parts of the landscape. The Lantry soil is on ridges. Areas are 10 to several thousand acres in size and are irregular in shape. They are 45 to 70 percent Reeder soil and 15 to 40 percent Lantry soil. The two soils occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Reeder soil is dark grayish brown loam about 5 inches thick. The subsoil is about 30 inches thick. It is friable. It is brown and light olive brown clay loam in the upper part and light yellowish brown, calcareous loam in the lower part. Light yellowish brown, soft bedrock is at a depth of about 35 inches. In some areas the depth to bedrock is more than 40 inches. In places the soil contains more sand throughout.

Typically, the surface layer of the Lantry soil is brown silt loam about 4 inches thick. The subsoil is light yellowish brown, friable, calcareous silt loam about 29 inches thick. Light yellowish brown and light brownish gray, calcareous, soft bedrock is at a depth of about 33 inches. In some areas the depth to bedrock is 10 to 20 inches.

Included with these soils in mapping are small areas of Daglum, Regent, Rhoades, and Savage soils. These included soils make up less than 15 percent of any one mapped area. Daglum and Rhoades soils have a sodium affected subsoil. They are on the low parts of the landscape. Regent soils contain more clay throughout than the Reeder soil. They are in positions on the landscape similar to those of the Reeder soil. The deep Savage soils are in shallow swales.

The content of organic matter is moderate and fertility medium in the Reeder soil. The content of organic matter and fertility are low in the Lantry soil. Tilth is good in both soils. Permeability is moderate. Available water capacity is moderate in the Reeder soil and low in the Lantry soil. Runoff is medium on both soils. The shrink-swell potential is moderate in the Reeder soil and low in the Lantry soil.

Most of the acreage is cropland. These soils are suited to cultivated crops and to tame pasture and hay, but droughtiness is a limitation. Examples of suitable pasture plants are alfalfa, intermediate wheatgrass, and pubescent wheatgrass. Alfalfa, wheat, and oats are the main crops. Measures that control erosion, conserve moisture, and improve fertility are the main management concerns. Leaving crop residue on the surface and including grasses and legumes in the cropping system are examples. Contour farming and grassed waterways also help to control erosion, but in some areas the slopes are too short or too irregular for contouring.

No major hazards or limitations affect the use of these soils for range. Proper stocking rates and timely deferment of grazing or rotation grazing help to maintain maximum productivity.

These soils are suited to windbreaks and environmental plantings, but the droughtiness is a limitation. Trees and shrubs can be established, but optimum growth and vigor are unlikely. Planting on the contour helps to control erosion and conserves moisture.

The Reeder soil is in capability unit IIe-1, Silty range site, and windbreak suitability group 6R; the Lantry soil is in capability unit IVe-3, Thin Upland range site, and windbreak suitability group 8.

ReC—Reeder-Rhoades-Lantry complex, 2 to 9 percent slopes. These well drained, undulating and gently rolling soils are on uplands. The moderately deep Reeder soil is on mid and low side slopes. The deep, sodium affected Rhoades soil is in small, shallow depressions on toe slopes. The moderately deep Lantry soil is on convex slopes and ridges. Areas are 10 to 400 acres in size and are irregular in shape. They are 30 to 40 percent Reeder soil, 20 to 30 percent Rhoades soil, and 15 to 25 percent Lantry soil. The three soils occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Reeder soil is dark grayish brown loam about 5 inches thick. The subsoil is about 30 inches thick. It is friable. It is brown and light olive brown clay loam in the upper part and light yellowish brown, calcareous loam in the lower part. Light yellowish brown, soft bedrock is at a depth of about 35 inches. In some areas the depth to bedrock is more than 40 inches.

Typically, the surface layer of the Rhoades soil is grayish brown loam about 2 inches thick. The subsoil is dark grayish brown and grayish brown, very firm and firm silty clay about 41 inches thick. In the lower part it is calcareous and has accumulations of salts. The underlying material is light olive brown, calcareous silty clay loam. It has accumulations of salts throughout. Light olive brown, soft shale is at a depth of about 50 inches. In some areas the depth to soft bedrock is 20 to 40 inches. In places the surface layer is not so dark.

Typically, the surface layer of the Lantry soil is brown silt loam about 4 inches thick. The subsoil is light yellowish brown, friable, calcareous silt loam about 29 inches thick. Light yellowish brown and light brownish gray, calcareous, soft bedrock is at a depth of about 33

inches. In some areas the depth to bedrock is 10 to 20 inches.

Included with these soils in mapping are small areas of Daglum, Regent, and Savage soils. These included soils make up less than 20 percent of any one mapped area. The sodium affected Daglum soils have a surface layer that is thicker than that of the Rhoades soil. They are in small, shallow depressions. Regent and Savage soils contain more clay in the subsoil than the Reeder soil. They are in positions on the landscape similar to those of the Reeder soil.

The content of organic matter is moderate in the Reeder and Rhoades soils. Fertility is medium in the Reeder soil and low in the Rhoades soil. The content of organic matter and fertility are low in the Lantry soil. The sodium affected subsoil in the Rhoades soil restricts the penetration of roots. Tilth is good in the Reeder and Lantry soils and poor in the Rhoades soil. Permeability is moderate in the Reeder and Lantry soils and slow in the Rhoades soil. Available water capacity is moderate in the Reeder and Rhoades soils and low in the Lantry soil. Runoff is medium on all three soils. The shrink-swell potential is moderate in the Reeder soil, high in the Rhoades soil, and low in the Lantry soil.

Most of the acreage supports native grasses and is used for grazing or hay. Generally, no major hazards or limitations affect the use of these soils for range. Surface compaction is a problem, however, on the Rhoades soil. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth. Proper stocking rates and timely deferment of grazing or rotation grazing help to maintain maximum productivity.

These soils are suited to cultivated crops and to tame pasture and hay, but droughtiness is a limitation. The sodium affected subsoil in the Rhoades soil also is a limitation. Examples of suitable pasture plants are alfalfa, crested wheatgrass, intermediate wheatgrass, and pubescent wheatgrass. Alfalfa, oats, and wheat are the main crops. Measures that control erosion, conserve moisture, and improve tilth and fertility are the main management needs in cultivated areas. Leaving crop residue on the surface, minimizing tillage, and including grasses and legumes in the cropping system are examples. Contour farming and grassed waterways also help to control erosion, but in some areas the slopes are too short or too irregular for contouring. Chiseling or subsoiling helps to break up the dense claypan subsoil in the Rhoades soil and increases the rate of water intake.

This map unit is suited to windbreaks and environmental plantings, but the moderate depth to bedrock in the Reeder soil, a high content of lime near the surface of the Lantry soil, and the sodium affected subsoil in the Rhoades soil are limitations. No trees and shrubs grow well on the Rhoades soil. Trees and shrubs can be established on the Reeder and Lantry soils, but optimum survival, growth, and vigor are unlikely. Planting on the contour helps to control erosion and conserves moisture.

The Reeder soil is in capability unit IIe-1, Silty range site, and windbreak suitability group 6R; the Rhoades soil is in capability unit VIs-1, Thin Claypan range site, and windbreak suitability group 10; the Lantry soil is in capability unit IVe-3, Thin Upland range site, and windbreak suitability group 8.

RgB—Regent silty clay loam, 2 to 6 percent slopes. This moderately deep, well drained, gently sloping soil is on uplands. Areas are 10 to 1,700 acres in size and are irregular in shape.

Typically, the surface layer is dark grayish brown silty clay loam about 7 inches thick. The subsoil is dark grayish brown and grayish brown, firm silty clay about 21 inches thick. It is calcareous in the lower part. Light brownish gray, calcareous shale is at a depth of about 28 inches. In some areas the depth to bedrock is more than 40 inches.

Included with this soil in mapping are small areas of Daglum, Grail, Lantry, Rhoades, and Vebar soils. These soils make up less than 15 percent of any one mapped area. The sodium affected Daglum and Rhoades soils are in shallow depressions on the low parts of the landscape. Grail soils are dark to a depth of more than 16 inches. They are in swales. Lantry and Vebar soils contain less clay throughout than the Regent soil. They are on ridges.

The content of organic matter is moderate in the Regent soil, and fertility is medium. Tilth is fair. Permeability is slow. Available water capacity is low. Runoff is medium. The shrink-swell potential is high.

Most of the acreage is cropland. This soil is suited to cultivated crops and to tame pasture and hay. Examples of suitable pasture plants are alfalfa, crested wheatgrass, intermediate wheatgrass, and pubescent wheatgrass. Alfalfa, wheat, and oats are the main crops. Measures that control erosion, conserve moisture, and improve tilth are the main management needs in cultivated areas. Leaving crop residue on the surface, minimizing tillage, and including grasses and legumes in the cropping system are examples. Contour farming and grassed waterways also help to control erosion, but in some areas the slopes are too short or too irregular for contouring. Stripcropping and field windbreaks help to control wind erosion (fig. 9).

If this soil is used for range, surface compaction is a problem. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth.

This soil is suited to windbreaks and environmental plantings, but it takes in water slowly and the clayey subsoil can restrict the penetration of plant roots. Windbreaks can be established, but optimum growth is unlikely. Planting on the contour helps to control erosion and conserves moisture.

Figure 9.—Stripcropping in an area of Regent silty clay loam, 2 to 6 percent slopes.

The capability unit is IIe-1; Clayey range site; windbreak suitability group 4C.

RgC—Regent silty clay loam, 6 to 9 percent slopes. This moderately deep, well drained, moderately sloping soil is on uplands. Areas are 10 to 500 acres in size and are irregular in shape.

Typically, the surface layer is dark grayish brown silty clay loam about 7 inches thick. The subsoil is dark grayish brown and grayish brown, firm silty clay about 21 inches thick. It is calcareous in the lower part. Light brownish gray, calcareous shale is at a depth of about 28 inches. In some areas the depth to bedrock is more than 40 inches.

Included with this soil in mapping are small areas of Daglum, Lantry, Rhoades, Vebar, and Wayden soils. These soils make up less than 15 percent of any one mapped area. The sodium affected Daglum and Rhoades soils are in shallow depressions on the low parts of the landscape. Lantry and Vebar soils contain less clay throughout than the Regent soil. They are on ridges. Wayden soils are 10 to 20 inches deep over soft bedrock. They are on the shoulders of ridges above the Regent soil.

The content of organic matter is moderate in the Regent soil, and fertility is medium. Tilth is fair. Permeability is slow. Available water capacity is low. Runoff is medium. The shrink-swell potential is high.

Most of the acreage is cropland. This soil is suited to cultivated crops and to tame pasture and hay. Examples of suitable pasture plants are alfalfa, intermediate wheatgrass, and pubescent wheatgrass. Alfalfa, wheat, and oats are the main crops. Measures that control erosion, improve tilth, and conserve moisture are the main management needs in cultivated areas. Leaving crop residue on the surface, minimizing tillage, and including grasses and legumes in the cropping system are examples. Contour farming and grassed waterways

also help to control erosion, but in some areas the slopes are too short or too irregular for contouring.

If this soil is used for range, surface compaction is a problem. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth. Water erosion is a hazard if the range is overgrazed. In places gullies form along cattle trails. Fencing and other means of controlling livestock traffic patterns help to prevent gullying.

This soil is suited to windbreaks and environmental plantings, but it takes in water slowly and the clayey subsoil can restrict the penetration of plant roots. Windbreaks can be established, but optimum growth is unlikely. Planting on the contour helps to control erosion and conserves moisture.

The capability unit is IIIe-1; Clayey range site; windbreak suitability group 4C.

RhD—Regent-Cabba complex, 6 to 15 percent slopes. These well drained, moderately sloping and strongly sloping soils are on uplands. The moderately deep Regent soil is on mid and low side slopes. The shallow Cabba soil is on ridges and the upper side slopes. Areas are 10 to 180 acres in size and are irregular in shape. They are 55 to 70 percent Regent soil and 15 to 30 percent Cabba soil. The two soils occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Regent soil is dark grayish brown silty clay loam about 7 inches thick. The subsoil is dark grayish brown and grayish brown, firm silty clay about 21 inches thick. It is calcareous in the lower part. Light brownish gray, calcareous shale is at a depth of about 28 inches. In some areas the depth to bedrock is more than 40 inches.

Typically, the surface layer of the Cabba soil is grayish brown, calcareous loam about 4 inches thick. The next 5 inches is light brownish gray, calcareous loam. The underlying material is grayish brown and light yellowish brown, calcareous clay loam. Light brownish gray and light yellowish brown, soft bedrock is at a depth of about 16 inches. In places the depth to bedrock is 20 to 40 inches.

Included with these soils in mapping are small areas of Daglum, Rhoades, and Wayden soils. These included soils make up less than 15 percent of any one mapped area. The sodium affected Daglum and Rhoades soils are in small depressions. Wayden soils contain more clay throughout than the Cabba soil. They are in positions on the landscape similar to those of the Cabba soil.

The content of organic matter is moderate and fertility medium in the Regent soil. The content of organic matter and fertility are low in the Cabba soil. Tilth is fair in the Regent soil and good in the Cabba soil. Permeability is slow in the Regent soil and moderate in the Cabba soil. Available water capacity is low in both soils. Runoff is medium. The shrink-swell potential is high in the Regent soil and moderate in the Cabba soil.

Most of the acreage supports native grasses and is used for grazing or hay. Surface compaction is a problem on the Regent soil. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth. Water erosion is a hazard if the range is overgrazed. In places gullies form along cattle trails. Fencing and other means of controlling livestock traffic patterns help to prevent gullying.

This map unit generally is poorly suited to cultivated crops and to tame pasture and hay because of the slope of both soils and the shallowness to bedrock in the Cabba soil. Alfalfa and intermediate wheatgrass are examples of suitable pasture plants on the Regent soil. No pasture plants are suited to the shallow Cabba soil. Wheat and oats are the main cultivated crops. Measures that control erosion and conserve moisture are the main management needs in cultivated areas. Examples are minimizing tillage, leaving crop residue on the surface, including grasses and legumes in the cropping system, and farming on the contour.

The Regent soil is suited to windbreaks and environmental plantings, but the Cabba soil is generally unsuited. The depth to bedrock is a limitation, especially in the Cabba soil. Windbreaks can be established on the Regent soil, but optimum growth is unlikely. No trees and shrubs grow well on the Cabba soil. Planting on the contour helps to control erosion and conserves moisture.

The Regent soil is in capability unit IVe-1, Clayey range site, and windbreak suitability group 4C; the Cabba soil is in capability unit VIe-11, Shallow range site, and windbreak suitability group 10.

RmB—Regent-Daglum complex, 2 to 6 percent slopes. These well drained, gently sloping soils are on uplands. The moderately deep Regent soil is on the high parts of the landscape. The deep, sodium affected Daglum soil is in small depressions on the low parts of the landscape. Areas are 10 to 250 acres in size and are irregular in shape. They are 45 to 70 percent Regent soil and 15 to 40 percent Daglum soil. The two soils occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Regent soil is dark grayish brown silty clay loam about 7 inches thick. The subsoil is dark grayish brown and grayish brown, firm silty clay about 21 inches thick. It is calcareous in the lower part. Light brownish gray, calcareous shale is at a depth of about 28 inches. In some areas the depth to bedrock is more than 40 inches.

Typically, the surface layer of the Daglum soil is dark grayish brown loam about 4 inches thick. The subsurface layer is grayish brown loam about 2 inches thick. The subsoil is dark grayish brown and grayish brown, firm clay about 16 inches thick. It is calcareous in the lower part. The underlying material is grayish brown,

calcareous clay and clay loam. It has accumulations of salts in the upper part. Grayish brown shale is at a depth of about 50 inches. In some areas the depth to bedrock is 20 to 40 inches. In places the surface layer is not so dark.

Included with these soils in mapping are small areas of Reeder and Rhoades soils. These included soils make up less than 15 percent of any one mapped area. Reeder soils contain less clay throughout than the Regent soil. They are in positions on the landscape similar to those of the Regent soil. The sodium affected Rhoades soils are in positions on the landscape similar to those of the Daglum soil.

The content of organic matter is moderate in the Regent and Daglum soils. Fertility is medium in the Regent soil and low in the Daglum soil. The sodium affected subsoil in the Daglum soil restricts the penetration of roots. Tilth is fair in the Regent soil and poor in the Daglum soil. Permeability is slow in both soils. Available water capacity is low in the Regent soil and moderate in the Daglum soil. Runoff is medium on both soils. The shrink-swell potential is high.

Most of the acreage is cropland. These soils are suited to cultivated crops and to tame pasture and hay, but the dense, sodium affected subsoil in the Daglum soil is a limitation. Examples of suitable pasture plants are alfalfa, crested wheatgrass, intermediate wheatgrass, western wheatgrass, and pubescent wheatgrass. Alfalfa, wheat, and oats are the main crops. Measures that control erosion, conserve moisture, and improve tilth are the main management concerns in cultivated areas. Leaving crop residue on the surface, minimizing tillage, and including grasses and legumes in the cropping system are examples. Contour farming and grassed waterways also help to control erosion, but in some areas the slopes are too short or too irregular for contouring. Chiseling or subsoiling improves tilth and increases the rate of water intake.

If these soils are used for range, surface compaction is a problem. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth.

These soils are suited to windbreaks and environmental plantings. The Regent soil takes in water slowly, and the clayey subsoil of this soil can restrict the penetration of plant roots. The sodium affected subsoil in the Daglum soil also is a limitation. Windbreaks can be established, but optimum growth is unlikely. Planting on the contour helps to control erosion and conserves moisture.

The Regent soil is in capability unit IIe-1, Clayey range site, and windbreak suitability group 4C; the Daglum soil is in capability unit IVs-3, Claypan range site, and windbreak suitability group 9.

RnB—Regent-Rhoades complex, 2 to 9 percent slopes. These well drained, gently sloping and moderately sloping soils are on uplands. The moderately deep Regent soil is on the high parts of the landscape. The deep, sodium affected Rhoades soil is in small pits and depressions. Areas are 10 to 750 acres in size and are irregular in shape. They are 50 to 65 percent Regent soil and 20 to 35 percent Rhoades soil. The two soils occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Regent soil is dark grayish brown silty clay loam about 7 inches thick. The subsoil is dark grayish brown and grayish brown, firm silty clay about 21 inches thick. It is calcareous in the lower part. Light brownish gray, calcareous shale is at a depth of about 28 inches. In some areas the depth to bedrock is more than 40 inches.

Typically, the surface layer of the Rhoades soil is grayish brown loam about 2 inches thick. The subsoil is dark grayish brown and grayish brown, very firm and firm silty clay about 41 inches thick. In the lower part it is calcareous and has accumulations of salts. The underlying material is light olive brown, calcareous silty clay loam. It has accumulations of salts throughout. Light olive brown shale is at a depth of about 50 inches. In some areas the depth to bedrock is 20 to 40 inches. In places the surface layer is not so dark.

Included with these soils in mapping are small areas of Daglum, Grail, and Vebar soils. These included soils make up less than 20 percent of any one mapped area. Daglum soils have a surface layer that is thicker than that of the Rhoades soil. They are in positions on the landscape similar to those of the Rhoades soil. Grail soils are dark to a depth of more than 16 inches. They are in swales. Vebar soils contain more sand and less clay throughout than the Regent soil. They are on knolls.

The content of organic matter is moderate in the Regent and Rhoades soils. Fertility is medium in the Regent soil and low in the Rhoades soil. The sodium affected subsoil in the Rhoades soil restricts the penetration of roots. Tilth is fair in the Regent soil and poor in the Rhoades soil. Permeability is slow in both soils. Available water capacity is low in the Regent soil and moderate in the Rhoades soil. Runoff is medium on both soils. The shrink-swell potential is high.

Most of the acreage supports native grasses and is used for grazing or hay. Surface compaction is a problem. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth.

This map unit is poorly suited to cultivated crops and to tame pasture and hay. Crop growth is severely restricted on the Rhoades soil because of the sodium affected subsoil. Intermediate wheatgrass, western wheatgrass, and pubescent wheatgrass are examples of suitable pasture plants. Alfalfa, wheat, and oats are the main crops. Measures that control erosion, conserve moisture, and improve tilth are the main management needs in cultivated areas. Examples are leaving crop residue on the surface, minimizing tillage, and including grasses and legumes in the cropping system. Contour

farming and grassed waterways also help to control erosion, but in some areas the slopes are too short or too irregular for contouring. Chiseling or subsoiling improves tilth and increases the rate of water intake.

This map unit is poorly suited to windbreaks and environmental plantings. The Regent soil takes in water slowly, and the clayey subsoil of this soil can restrict the penetration of plant roots. Windbreaks can be established on this soil, but optimum growth is unlikely. No trees or shrubs grow well on the Rhoades soil because of the sodium affected subsoil. Planting on the contour helps to control erosion and conserves moisture.

The Regent soil is in capability unit IIIe-1, Clayey range site, and windbreak suitability group 4C; the Rhoades soil is in capability unit VIs-1, Thin Claypan range site, and windbreak suitability group 10.

RoA—Reliance silty clay loam, 0 to 2 percent slopes. This deep, well drained, nearly level soil is on uplands. Areas are 10 to 400 acres in size and are irregular in shape.

Typically, the surface layer is dark grayish brown silty clay loam about 8 inches thick. The subsoil is about 32 inches thick. It is dark grayish brown and grayish brown, firm silty clay in the upper part and brown, friable, calcareous silty clay loam in the lower part. The underlying material to a depth of 60 inches is light brownish gray, calcareous silty clay loam.

Included with this soil in mapping are small areas of Promise and Ree soils. These soils make up less than 10 percent of any one mapped area. They are in positions on the landscape similar to those of the Reliance soil. Promise soils contain more clay throughout than the Reliance soil, and Ree soils contain less clay throughout.

The content of organic matter is moderate in the Reliance soil, and fertility is medium. Tilth is good. Permeability is moderately slow. Available water capacity is high. Runoff is slow. The shrink-swell potential is high.

Most of the acreage supports native grasses and is used for grazing or hay. No major hazards or limitations affect the use of this soil for range. Proper stocking rates and timely deferment of grazing or rotation grazing help to maintain maximum productivity.

This soil is suited to cultivated crops and to tame pasture and hay. Examples of suitable pasture plants are alfalfa, crested wheatgrass, and intermediate wheatgrass. Alfalfa, wheat, and oats are the main crops. Measures that conserve moisture are the main management needs in cultivated areas. Leaving crop residue on the surface and minimizing tillage are examples.

This soil is well suited to windbreaks and environmental plantings. All climatically suited trees and shrubs grow well, except for those that require an abundant supply of moisture.

The capability unit is IIc-2; Silty range site; windbreak suitability group 3.

RoB—Reliance silty clay loam, 2 to 6 percent slopes. This deep, well drained, gently sloping soil is on uplands. Areas are 10 to 150 acres in size and are irregular in shape.

Typically, the surface layer is dark grayish brown silty clay loam about 8 inches thick. The subsoil is about 32 inches thick. It is dark grayish brown and grayish brown, firm silty clay in the upper part and brown, friable, calcareous silty clay loam in the lower part. The underlying material to a depth of 60 inches is light brownish gray, calcareous silty clay loam.

Included with this soil in mapping are small areas of Promise, Ree, and Schamber soils. These soils make up less than 15 percent of any one mapped area. Promise and Ree soils are in positions on the landscape similar to those of the Reliance soil. Promise soils contain more clay throughout than the Reliance soil, and Ree soils contain less clay throughout. Schamber soils are 7 to 14 inches deep to gravelly material. They are near the edges of some mapped areas.

The content of organic matter is moderate in the Reliance soil, and fertility is medium. Tilth is good. Permeability is moderately slow. Available water capacity is high. Runoff is medium. The shrink-swell potential is high.

Most of the acreage supports native grasses and is used for grazing or hay. No major hazards or limitations affect the use of this soil for range. Proper stocking rates and timely deferment of grazing or rotation grazing help to maintain maximum productivity.

This soil is suited to cultivated crops and to tame pasture and hay. Examples of suitable pasture plants are alfalfa, crested wheatgrass, and intermediate wheatgrass. Alfalfa, wheat, and oats are the main crops. Measures that control erosion and conserve moisture are the main management needs in cultivated areas. Leaving crop residue on the surface and including grasses and legumes in the cropping system are examples. Contour farming, terraces, and grassed waterways also help to control erosion, but in some areas the slopes are too short or too irregular for contouring and terracing.

This soil is well suited to windbreaks and environmental plantings. All climatically suited trees and shrubs grow well, except for those that require an abundant supply of moisture. Planting on the contour helps to control erosion and conserves moisture.

The capability unit is IIe-2; Silty range site; windbreak suitability group 3.

RrA—Rhoades-Daglum loams, 0 to 2 percent slopes. These deep, well drained, sodium affected, nearly level soils are on terraces. The Rhoades soil is in small pits and depressions. The Daglum soil is on slight

rises. Areas are 20 to 1,000 acres in size and are irregular in shape. They are 50 to 70 percent Rhoades soil and 15 to 35 percent Daglum soil. The two soils occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Rhoades soil is grayish brown loam about 2 inches thick. The subsoil is dark grayish brown and grayish brown, very firm and firm silty clay about 41 inches thick. In the lower part it is calcareous and has accumulations of salts. The underlying material to a depth of 60 inches is light olive brown, calcareous silty clay loam. It has accumulations of salts throughout. In some areas the surface layer is not so dark. In places the soil contains less clay throughout.

Typically, the surface layer of the Daglum soil is dark grayish brown loam about 4 inches thick. The subsurface layer is grayish brown loam about 2 inches thick. The subsoil is dark grayish brown and grayish brown, firm clay about 16 inches thick. It is calcareous in the lower part. The underlying material to a depth of 60 inches is grayish brown, calcareous clay and clay loam. It has accumulations of salts in the upper part. In some areas the surface layer is not so dark. In places the soil contains less clay throughout.

Included with these soils in mapping are small areas of Grail, Regent, and Savage soils and Slickspots. These inclusions make up less than 15 percent of any one mapped area. Grail, Regent, and Savage soils do not have a sodium affected subsoil. Grail soils are in swales. Regent and Savage soils are slightly higher on the landscape than the Rhoades and Daglum soils. Slickspots have a dispersed surface and a high content of salts throughout. They generally do not support vegetation. They are in positions on the landscape similar to those of the Rhoades soil.

The content of organic matter is moderate in the Rhoades and Daglum soils, and fertility is low. Tilth is poor. The sodium affected subsoil restricts the penetration of roots. Permeability is slow. Available water capacity is moderate. Runoff is slow. The shrink-swell potential is high.

Most of the acreage supports native grasses and is used for grazing. Surface compaction is a major problem on the Rhoades soil. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth. Proper stocking rates and timely deferment of grazing or rotation grazing help to maintain maximum productivity.

This map unit generally is unsuited to cultivated crops, to tame pasture and hay, and to windbreaks and environmental plantings because of the sodium affected subsoil. Although the Daglum soil is suited to these uses, the use of this unit is determined by the suitability of the Rhoades soil.

The Rhoades soil is in capability unit VIs-1, Thin Claypan range site, and windbreak suitability group 10; the Daglum soil is in capability unit IVs-2, Claypan range site, and windbreak suitability group 9.

RrB—Rhoades-Daglum loams, 2 to 9 percent slopes. These deep, well drained, sodium affected, undulating and gently rolling soils are on uplands. The Rhoades soil generally is in small pits and shallow depressions. The Daglum soil is on slight rises. Areas are 20 to 1,400 acres in size and are irregular in shape. They are 50 to 70 percent Rhoades soil and 15 to 35 percent Daglum soil. The two soils occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Rhoades soil is grayish brown loam about 2 inches thick. The subsoil is dark grayish brown and grayish brown, very firm and firm silty clay about 41 inches thick. In the lower part it is calcareous and has accumulations of salts. The underlying material to a depth of 60 inches is light olive brown, calcareous silty clay loam. It has accumulations of salts throughout. In some areas the depth to soft bedrock is 20 to 40 inches. In some places the surface layer is not so dark. In other places the soil contains less clay throughout.

Typically, the surface layer of the Daglum soil is dark grayish brown loam about 4 inches thick. The subsurface layer is grayish brown loam about 2 inches thick. The subsoil is dark grayish brown and grayish brown, firm clay about 16 inches thick. It is calcareous in the lower part. The underlying material to a depth of 60 inches is grayish brown, calcareous clay and clay loam. It has accumulations of salts in the upper part. In some areas the depth to bedrock is 20 to 40 inches. In some places the surface layer is not so dark. In other places the soil contains less clay throughout.

Included with these soils in mapping are small areas of Reeder, Regent, Savage, and Vebar soils and Slickspots. These inclusions make up less than 20 percent of any one mapped area. Reeder, Regent, Savage, and Vebar soils do not have a sodium affected subsoil. They are slightly higher on the landscape than the Rhoades and Daglum soils. Slickspots have a dispersed surface and a high content of visible salts at or near the surface. They generally do not support vegetation. They are in positions on the landscape similar to those of the Rhoades soil.

The content of organic matter is moderate in the Rhoades and Daglum soils, and fertility is low. Tilth is poor. The sodium affected subsoil restricts the penetration of roots. Permeability is slow. Available water capacity is moderate. Runoff is medium. The shrink-swell potential is high.

Most of the acreage supports native grasses and is used for grazing. Surface compaction is a major problem on the Rhoades soil. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth. Proper stocking rates and timely deferment of

grazing or rotation grazing help to maintain maximum productivity.

This map unit generally is unsuited to cultivated crops, to tame pasture and hay, and to windbreaks and environmental plantings because of the sodium affected subsoil. Although the Daglum soil is suited to these uses, the use of this unit is determined by the suitability of the Rhoades soil.

The Rhoades soil is in capability unit VIs-1, Thin Claypan range site, and windbreak suitability group 10; the Daglum soil is in capability unit IVs-3, Claypan range site, and windbreak suitability group 9.

RsB—Rhoades-Slickspots complex, 1 to 6 percent slopes. This map unit occurs as areas of a deep, well drained, sodium affected, nearly level and undulating Rhoades soil intermingled with Slickspots. It is on uplands, terraces, and along upland drainageways. The Rhoades soil is on slight rises. Slickspots are in slight depressions. Areas are 20 to 200 acres in size and are irregular in shape. They are 40 to 75 percent Rhoades soil and 15 to 45 percent Slickspots. The Rhoades soil and Slickspots occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Rhoades soil is grayish brown loam about 2 inches thick. The subsoil is dark grayish brown and grayish brown, very firm and firm silty clay about 41 inches thick. In the lower part it is calcareous and has accumulations of salts. The underlying material to a depth of 60 inches is light olive brown, calcareous silty clay loam. It has accumulations of salts throughout. In some areas the depth to bedrock is 20 to 40 inches.

Slickspots occur as slightly depressional, barren areas that have a puddled or slick surface. They support little or no vegetation (fig. 10). Visible accumulations of salts are at or near the surface. The soil material to a depth of 60 inches is dense clay or clay loam. In some areas bedrock is near the surface.

Included with the Rhoades soil and Slickspots in mapping are small areas of Daglum, Lantry, Reeder, Regent, and Vebar soils. These soils make up less than 15 percent of any one mapped area. Daglum soils have a surface layer that is thicker than that of the Rhoades soil and are deeper to visible salts. Also, they are slightly higher on the landscape. Lantry, Reeder, Regent, and Vebar soils do not have a sodium affected subsoil. They are on the high parts of the landscape.

The content of organic matter is moderate in the Rhoades soil, and fertility is low. The sodium affected subsoil restricts the penetration of roots. Permeability is slow. Available water capacity is moderate. Runoff is medium. The shrink-swell potential is high.

Most areas of the Rhoades soil support native grasses and are used for grazing. Surface compaction is a problem. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth. Slickspots generally support little or no vegetation, but they do support a sparse stand of weeds and pricklypear during wet periods.

This map unit generally is unsuited to cultivated crops, to tame pasture and hay, and to windbreaks and environmental plantings. The sodium affected subsoil in the Rhoades soil and the salts in the Slickspots are limitations.

The Rhoades soil is in capability unit VIs-1, Thin Claypan range site, and windbreak suitability group 10; Slickspots are in capability unit VIIIs-3 and are not assigned to a range site or a windbreak suitability group.

RvA—Ridgeview silty clay loam, 0 to 2 percent slopes. This deep, well drained, nearly level soil is on uplands. When dry, it is characterized by cracks, which are 0.5 inch to 2.0 inches wide and several feet long and extend through the subsoil. Areas are 10 to 250 acres in size and are irregular in shape.

Typically, the surface layer is dark grayish brown silty clay loam about 5 inches thick. The subsoil is dark grayish brown and grayish brown, firm and very firm clay about 28 inches thick. In the lower part it is calcareous and has accumulations of carbonate that extend into the underlying material. The underlying material to a depth of 60 inches is light brownish gray, calcareous silty clay. It has accumulations of salts throughout. In places bedrock is at a depth of 20 to 40 inches.

Included with this soil in mapping are small areas of Daglum, Grail, and Rhoades soils. These soils make up less than 15 percent of any one mapped area. Daglum and Rhoades soils have a sodium affected subsoil. They are in small pits and depressions. Grail soils are dark to a depth of more than 16 inches. They are in swales.

The content of organic matter is moderate in the Ridgeview soil, and fertility is medium. Tilth is poor. Permeability is slow. Available water capacity is moderate. Runoff is slow. The shrink-swell potential is high.

Most of the acreage is cropland. This soil is suited to cultivated crops and to tame pasture and hay. Examples of suitable pasture plants are alfalfa, crested wheatgrass, intermediate wheatgrass, and pubescent wheatgrass. Alfalfa, wheat, and oats are the main crops. Measures that improve tilth and conserve moisture are the main management needs in cultivated areas. Leaving crop residue on the surface and including grasses and legumes in the cropping system are examples. Chiseling or subsoiling improves tilth and increases the rate of water intake.

If this soil is used for range, surface compaction is a problem. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth. Proper stocking rates and timely deferment of grazing or rotation grazing help to maintain maximum productivity.

This soil is suited to windbreaks and environmental plantings. It takes in water slowly, however, and the

Figure 10.—An area of Rhoades-Slickspots complex, 1 to 6 percent slopes. The Slickspots do not support grazable vegetation.

clayey subsoil can restrict the penetration of plant roots. Windbreaks can be established, but optimum growth is unlikely.

The capability unit is IIIs-3; Clayey range site; windbreak suitability group 4C.

RvB—Ridgeview silty clay loam, 2 to 6 percent slopes. This deep, well drained, gently sloping soil is on uplands. When dry, it is characterized by cracks, which are 0.5 inch to 2.0 inches wide and several feet long and extend through the subsoil. Areas are 10 to 500 acres in size and are irregular in shape.

Typically, the surface layer is dark grayish brown silty clay loam about 5 inches thick. The subsoil is dark grayish brown and grayish brown, firm and very firm clay about 28 inches thick. In the lower part it is calcareous and has accumulations of carbonate that extend into the underlying material. The underlying material to a depth of 60 inches is light brownish gray, calcareous silty clay. It has accumulations of salts throughout. In places soft bedrock is at a depth of 20 to 40 inches.

Included with this soil in mapping are small areas of Daglum, Grail, Lantry, and Rhoades soils. These soils make up less than 15 percent of any one mapped area. Daglum and Rhoades soils have a sodium affected subsoil. They are in small, shallow depressions on the low parts of the landscape. Grail soils are dark to a depth of more than 16 inches. They are in swales. Lantry soils contain less clay throughout than the Ridgeview soil. They are on ridges.

The content of organic matter is moderate in the Ridgeview soil, and fertility is medium. Tilth is poor. Permeability is slow. Available water capacity is moderate. Runoff is medium. The shrink-swell potential is high.

Most of the acreage is cropland. This soil is suited to cultivated crops and to tame pasture and hay. Examples of suitable pasture plants are alfalfa, crested wheatgrass, and intermediate wheatgrass. Alfalfa, wheat, and oats are the main crops. Measures that control erosion, improve tilth, and conserve moisture are the main management needs in cultivated areas. Leaving crop residue on the surface and including grasses and legumes in the cropping system are examples. Contour farming, terraces, and grassed waterways also help to control erosion, but in some areas the slopes are too short or too irregular for contouring and terracing. Chiseling or subsoiling improves tilth and increases the rate of water intake.

If this soil is used for range, surface compaction is a problem. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth. Proper stocking rates and timely deferment of grazing or rotation grazing help to maintain maximum productivity.

This soil is suited to windbreaks and environmental plantings. It takes in water slowly, however, and the clayey subsoil can restrict the penetration of roots. Windbreaks can be established, but optimum growth and vigor are unlikely. Planting on the contour helps to control erosion and conserves moisture.

The capability unit is IIIe-4; Clayey range site; windbreak suitability group 4C.

Rw—Riverwash. This map unit consists of nearly level, very poorly drained, gravelly and sandy sediments occurring as sandbars along the Cheyenne River. It is flooded when the water level in the river is high. A seasonal high water table is within a depth of 2 feet during most of the year. Areas are 10 to 80 acres in size and are long and narrow.

Most of the acreage is used as habitat for wildlife. Most areas support little or no vegetation, but willows and cottonwood seedlings grow in some areas.

The capability unit is VIIIe-1; no range site or windbreak suitability group is assigned.

SaE—Samsil clay, 15 to 40 percent slopes. This shallow, well drained, moderately steep and steep soil is on uplands. Areas are 20 to more than 1,000 acres in size and are irregular in shape.

Typically, the surface layer is grayish brown, friable, calcareous clay about 3 inches thick. The underlying material is grayish brown, calcareous clay about 9 inches thick. Light brownish gray shale is at a depth of about 12 inches. In some areas the soil contains less clay throughout. In other areas it does not have free carbonates.

Included with this soil in mapping are small areas of Lohmiller, Pierre, and Swanboy soils and areas of Rock outcrop. These inclusions make up less than 15 percent of any one mapped area. Lohmiller soils are stratified. They are along drainageways. The moderately deep Pierre soils are on the low parts of the landscape. Swanboy soils have visible salts at or near the surface. They are on foot slopes. The Rock outcrop commonly is on ridges and the upper side slopes. It supports little or no vegetation.

The content of organic matter and fertility are low in the Samsil soil. Permeability is slow. Available water capacity is low. Runoff is rapid. The shrink-swell potential is very high.

Most of the acreage supports native grasses and is used for grazing. Water erosion is a hazard unless an adequate plant cover is maintained. Gullies form along some cattle trails. Reestablishing vegetation is difficult. Sites for stock water impoundments are available in some of the draws. Seepage from these impoundments could be a problem.

This soil is unsuited to cultivated crops, tame pasture and hay, and windbreaks and environmental plantings. The shallowness to shale and the slope are limitations.

The capability unit is VIIe-8; Shallow Clay range site; windbreak suitability group 10.

ScF—Samsil-Rock outcrop complex, 9 to 60 percent slopes. This map unit occurs as areas of a shallow, well drained, strongly sloping to very steep Samsil soil intermingled with areas of Rock outcrop. The unit is on uplands that generally are cut by deeply entrenched drainageways. Landslides are common on the steeper slopes. Areas are 10 to 400 acres in size and are irregular in shape. They are 40 to 65 percent Samsil soil and 20 to 45 percent Rock outcrop. The Samsil soil and Rock outcrop occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Samsil soil is grayish brown, calcareous clay about 3 inches thick. The underlying material is grayish brown, calcareous clay about 9 inches thick. Light brownish gray shale is at a depth of about 12 inches. In some areas the soil does not have free carbonates.

The Rock outcrop is shale bedrock of the Pierre Formation. It is very steep. It supports no vegetation.

Included with the Samsil soil and Rock outcrop in mapping are small areas of the moderately deep Pierre soils. These soils make up less than 15 percent of any one mapped area. They are on low side slopes.

The content of organic matter and fertility are low in the Samsil soil. Permeability is slow. Available water capacity is low. Runoff is very rapid. The shrink-swell potential is very high.

The Samsil soil supports native grasses and is used for grazing. Water erosion is a problem. Gullies form along some cattle trails. Reestablishing vegetation is difficult.

This map unit generally is too steep and too shallow for cultivated crops, tame pasture and hay, and

windbreaks and environmental plantings. The Rock outcrop is an additional limitation.

The Samsil soil is in capability unit VIIe-8, Shallow Clay range site, and windbreak suitability group 10; the Rock outcrop is in capability unit VIIIs-2 and is not assigned to a range site or a windbreak suitability group.

SgA—Savage silt loam, 0 to 2 percent slopes. This deep, well drained, nearly level soil is on uplands. Areas are 10 to 80 acres in size and are irregular in shape.

Typically, the surface layer is dark grayish brown silt loam about 6 inches thick. The subsoil is about 54 inches thick. The upper part is dark grayish brown and brown, friable silty clay loam, and the lower part is light yellowish brown and light brownish gray, friable and firm, calcareous silty clay loam and clay. In some areas the soil contains more clay throughout.

Included with this soil in mapping are small areas of Daglum, Grail, and Rhoades soils. These soils make up less than 15 percent of any one mapped area. The sodium affected Daglum and Rhoades soils are on the low parts of the landscape. Grail soils are dark to a depth of more than 16 inches. They are in swales.

The content of organic matter is moderate in the Savage soil, and fertility is medium. Tilth is good. Permeability is moderately slow. Available water capacity is high. Runoff is slow. The shrink-swell potential is high.

Most of the acreage is cropland. This soil is suited to cultivated crops and to tame pasture and hay. Examples of suitable pasture plants are alfalfa, crested wheatgrass, intermediate wheatgrass, and pubescent wheatgrass. Alfalfa, oats, and wheat are the main crops. Measures that conserve moisture are the main management needs in cultivated areas. Leaving crop residue on the surface and minimizing tillage are examples.

No major hazards or limitations affect the use of this soil for range. Proper stocking rates and timely deferment of grazing or rotation grazing help to maintain maximum productivity.

This soil is suited to windbreaks and environmental plantings. All climatically suited trees and shrubs grow well, except for those that require an abundant supply of moisture.

The capability unit is IIc-2; Silty range site; windbreak suitability group 3.

SgB—Savage silt loam, 2 to 6 percent slopes. This deep, well drained, gently sloping soil is on uplands. Areas are 10 to 200 acres in size and are irregular in shape.

Typically, the surface layer is dark grayish brown silt loam about 6 inches thick. The subsoil is about 54 inches thick. The upper part is dark grayish brown and brown, friable silty clay loam, and the lower part is light yellowish brown and light brownish gray, friable and firm, calcareous silty clay loam and clay. In places soft bedrock is at a depth of 20 to 40 inches. In some areas the soil contains more clay throughout.

Included with this soil in mapping are small areas of Daglum, Grail, and Rhoades soils. These soils make up less than 15 percent of any one mapped area. The sodium affected Daglum and Rhoades soils are on the low parts of the landscape. Grail soils are dark to a depth of more than 16 inches. They are in swales.

The content of organic matter is moderate in the Savage soil, and fertility is medium. Tilth is good. Permeability is moderately slow. Available water capacity is high. Runoff is medium. The shrink-swell potential is high.

Most of the acreage is cropland. This soil is suited to cultivated crops and to tame pasture and hay. Examples of suitable pasture plants are alfalfa, crested wheatgrass, and intermediate wheatgrass. Alfalfa, wheat, and oats are the main crops. Measures that control erosion and conserve moisture are the main management needs in cultivated areas. Leaving crop residue on the surface and including grasses and legumes in the cropping system are examples. Contour farming, terraces, and grassed waterways also help to control erosion, but in some areas the slopes are too short or too irregular for contouring or terracing.

No major hazards or limitations affect the use of this soil for range. Proper stocking rates and timely deferment of grazing or rotation grazing help to maintain maximum productivity.

This soil is suited to windbreaks and environmental plantings. All climatically suited trees and shrubs grow well, except for those that require an abundant supply of moisture. Planting on the contour helps to control erosion and conserves moisture.

The capability unit is IIe-1; Silty range site; windbreak suitability group 3.

ShE—Schamber-Samsil complex, 9 to 40 percent slopes. These strongly sloping to steep soils are on uplands. They generally are on the sides of high terraces. The somewhat excessively drained Schamber soil is on ridges and the upper parts of the landscape. It is very shallow to very gravelly sand. The shallow, well drained Samsil soil is on mid and low side slopes. Areas are 20 to more than 1,000 acres in size and are irregular in shape. They are 50 to 60 percent Schamber soil and 40 to 50 percent Samsil soil. The two soils occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Schamber soil is dark grayish brown, calcareous gravelly loam about 4 inches thick. The next 5 inches is grayish brown, calcareous very gravelly loam. Multicolored very gravelly sand is at a depth of about 9 inches.

Typically, the surface layer of the Samsil soil is grayish brown, calcareous clay about 3 inches thick. The underlying material is grayish brown, calcareous clay

about 9 inches thick. Light brownish gray shale is at a depth of about 12 inches.

Included with these soils in mapping are small areas of Pierre, Ree, and Reliance soils. These included soils make up less than 10 percent of any one mapped area. The moderately deep Pierre soils are in positions on the landscape similar to those of the Samsil soil. The deep, loamy Ree and deep, silty Reliance soils are on high terraces above the Schamber and Samsil soils.

The content of organic matter and fertility are low in the Schamber and Samsil soils. Permeability is rapid in the Schamber soil and slow in the Samsil soil. Available water capacity is low in both soils. Runoff is rapid. The shrink-swell potential is very high in the Samsil soil and low in the Schamber soil.

Most of the acreage supports native grasses and is used for grazing. Water erosion is a hazard unless an adequate plant cover is maintained. Gullies form along some cattle trails. Fencing and other means of controlling livestock traffic patterns help to prevent gullying.

These soils are unsuited to cultivated crops, tame pasture and hay, and windbreaks and environmental plantings because of the slope of both soils, the shallowness to shale in the Samsil soil, and the shallowness to gravel in the Schamber soil. The Schamber soil is a potential source of sand and gravel.

The Schamber soil is in capability unit VIIs-4, Very Shallow range site; the Samsil soil is in capability unit VIIe-8, Shallow Clay range site; both soils are in windbreak suitability group 10.

SkB—Seroco-Tally complex, 2 to 9 percent slopes. These deep, undulating and gently rolling soils are on uplands and terraces. The excessively drained Seroco soil is on hummocks on the high parts of the landscape. The well drained Tally soil is on the low parts of the landscape. Areas are 10 to 100 acres in size and are irregular in shape. They are 65 to 75 percent Seroco soil and 15 to 25 percent Tally soil. The two soils occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Seroco soil is grayish brown loamy fine sand about 3 inches thick. The underlying material to a depth of 60 inches is grayish brown fine sand. In some areas the surface layer is dark grayish brown.

Typically, the surface layer of the Tally soil is dark grayish brown fine sandy loam about 6 inches thick. The subsoil is about 31 inches thick. It is very friable. It is brown fine sandy loam in the upper part and light brownish gray, calcareous loamy fine sand in the lower part. The underlying material to a depth of 60 inches also is light brownish gray, calcareous loamy fine sand.

Included with these soils in mapping are small areas of Bullock and Parchin soils. These included soils make up less than 10 percent of any one mapped area. They have a sodium affected subsoil. They are in swales on the low parts of the landscape.

The content of organic matter and fertility are low in the Seroco soil. The content of organic matter is moderate and fertility medium in the Tally soil. Tilth is poor in the Seroco soil and good in the Tally soil. Permeability is rapid in the Seroco soil and moderately rapid in the Tally soil. Available water capacity is low in the Seroco soil and moderate in the Tally soil. Runoff is slow on both soils.

Most of the acreage supports native grasses and is used for grazing or hay. Wind erosion is a severe hazard if the range is overgrazed. Reestablishing vegetation is difficult. After continued overuse, bare areas are common and the risk of sand blowouts increases along livestock trails and around watering facilities. Fencing and other means of controlling livestock traffic patterns help to prevent the formation of sand blowouts. Proper stocking rates and timely deferment of grazing or rotation grazing help to control wind erosion and maintain maximum productivity.

This map unit generally is unsuited to cultivated crops and to tame pasture and hay. Although the Tally soil is suited to these uses, the use of this unit is determined by the suitability of the Seroco soil. The severe hazard of wind erosion is the main management concern.

These soils are suited to windbreaks and environmental plantings; however, only evergreens can be successfully established on the Seroco soil. Planting directly in sod helps to control wind erosion.

The Seroco soil is in capability unit VIe-7, Sands range site, and windbreak suitability group 7; the Tally soil is in capability unit IIIe-8, Sandy range site, and windbreak suitability group 5.

So—Shambo loam. This deep, well drained soil is on terraces. Slopes generally are nearly level. On terrace escarpments, however, some short slopes are 15 to 25 percent. Areas are 10 to 500 acres in size and are irregular in shape.

Typically, the surface layer is dark grayish brown loam about 6 inches thick. The subsoil is brown, yellowish brown, and grayish brown, friable loam about 24 inches thick. It is calcareous in the lower part. The underlying material to a depth of 60 inches is grayish brown, calcareous loam. In some areas the subsoil contains more clay.

Included with this soil in mapping are small areas of Stady and Tally soils. These soils make up less than 15 percent of any one mapped area. They are in positions on the landscape similar to those of the Shambo soil. Stady soils are 20 to 40 inches deep to sand and gravel. Tally soils contain more sand throughout than the Shambo soil.

The content of organic matter is moderate in the Shambo soil, and fertility is medium. Tilth is good. Permeability is moderate. Available water capacity is

high. Runoff is slow. The shrink-swell potential is moderate.

Most of the acreage supports native grasses and is used for grazing. No major hazards or limitations affect the use of this soil for range. Proper stocking rates and timely deferment of grazing or rotation grazing help to maintain maximum productivity.

This soil is suited to cultivated crops and to tame pasture and hay. Examples of suitable pasture plants are alfalfa, crested wheatgrass, and intermediate wheatgrass. Alfalfa, oats, and wheat are the main crops. Measures that conserve moisture are the main management needs in cultivated areas. Leaving crop residue on the surface and minimizing tillage are examples.

This soil is suited to windbreaks and environmental plantings. All climatically suited trees and shrubs grow well, except for those that require an abundant supply of moisture.

The capability unit is IIc-2; Silty range site; windbreak suitability group 3.

Sp—Slickspots. This map unit consists of nearly level and slightly depressional areas on terraces and uplands that generally are dissected by steep gullies. In places water ponds after heavy rains and after snowmelt. Areas are 20 to 350 acres in size and are irregular in shape.

Slickspots have a puddled or slick surface. They generally support little or no vegetation, but they do support a sparse stand of weeds and pricklypear during wet periods. Visible accumulations of salts are at or near the surface. The soil material is massive clay or clay loam.

Included with the Slickspots in mapping are small areas of Swanboy and Wendte soils. These soils make up less than 10 percent of any one mapped area. They support grasses. Swanboy soils have a lower content of salts throughout than the Slickspots. They are in positions on the landscape similar to those of the Slickspots. The stratified Wendte soils are along drainageways.

Slickspots are too salty for native grasses, cultivated crops, tame pasture and hay, and windbreaks and environmental plantings.

The capability unit is VIIIs-3; no range site or windbreak suitability group is assigned.

StA—Stady loam, 0 to 3 percent slopes. This well drained, nearly level soil is on terraces. It is moderately deep to gravelly material. Areas are 10 to 150 acres in size and are irregular in shape.

Typically, the surface layer is dark brown loam about 7 inches thick. The subsoil is about 25 inches thick. It is brown, friable loam in the upper part and light yellowish brown, very friable, calcareous gravelly loam in the lower part. Multicolored, calcareous gravelly sand is at a depth of about 32 inches.

Included with this soil in mapping are small areas of Farland, Shambo, Tally, and Wabek soils. These soils make up less than 15 percent of any one mapped area. Farland, Shambo, and Tally soils are in positions on the landscape similar to those of the Stady soil. They do not have gravelly material within a depth of 40 inches. Also, Farland soils contain more clay in the subsoil than the Stady soil. Wabek soils are 7 to 10 inches deep to very gravelly sand. They are on the sides of high terraces.

The content of organic matter is moderate in the Stady soil, and fertility is medium. Tilth is good. Permeability is moderate in the subsoil and very rapid in the underlying material. Available water capacity is moderate. Runoff is slow.

Most of the acreage supports native grasses and is used for grazing. No major hazards or limitations affect the use of this soil for range. Proper stocking rates and timely deferment of grazing or rotation grazing help to maintain maximum productivity.

This soil is suited to cultivated crops and to tame pasture and hay, but it is droughty late in the growing season. The best suited pasture plants are alfalfa, crested wheatgrass, intermediate wheatgrass, and pubescent wheatgrass. Alfalfa, wheat, and oats are the main crops. Measures that conserve moisture are the main management needs in cultivated areas. Leaving crop residue on the surface and minimizing tillage are examples.

This soil is suited to windbreaks and environmental plantings, but the droughtiness is a limitation. Windbreaks can be established, but optimum survival, growth, and vigor are unlikely. The soil is a potential source of sand and gravel.

The capability unit is IIIs-2; Silty range site; windbreak suitability group 6G.

SwB—Swanboy clay, 0 to 6 percent slopes. This deep, well drained, nearly level and gently sloping soil is on fans and terraces. When dry, it is characterized by cracks, which are 0.5 inch to 2.0 inches wide and several feet long and extend through the subsoil. Areas are 20 to 500 acres in size and are irregular in shape.

Typically, the surface layer is light brownish gray clay about 2 inches thick. The subsoil is grayish brown, very firm, calcareous clay about 28 inches thick. It has accumulations of salts in the lower part. The underlying material to a depth of 60 inches is grayish brown, calcareous clay and silty clay. In some areas shale bedrock is at a depth of 20 to 40 inches.

Included with this soil in mapping are small areas of Hisle, Kyle, Lohmiller, Pierre, and Promise soils and Slickspots. These inclusions make up less than 15 percent of any one mapped area. Hisle soils have a sodium affected subsoil. They are in slight depressions. Kyle, Pierre, and Promise soils do not have visible salts at or near the surface. They are slightly higher on the landscape than the Swanboy soil. Lohmiller soils are

stratified. They are on narrow flood plains along drainageways. Slickspots are in slightly depressional areas throughout the map unit. They have a puddled surface and have accumulations of salts at or near the surface. They generally do not support vegetation.

The content of organic matter and fertility are low in the Swanboy soil. Tilth is very poor. Permeability is very slow. Available water capacity is low. Runoff is medium. The shrink-swell potential is very high.

Most of the acreage supports native grasses and is used for grazing. Surface compaction is a problem. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth. Reestablishing vegetation is difficult.

This soil generally is unsuited to cultivated crops, tame pasture and hay, and windbreaks and environmental plantings because of the very poor tilth and a high content of salts in the subsoil.

The capability unit is VIs-5; Dense Clay range site; windbreak suitability group 10.

SxC—Swanboy-Kyle clays, 2 to 15 percent slopes. These deep, well drained, gently sloping to strongly sloping soils are on uplands and foot slopes. When dry, they are characterized by cracks, which are 0.5 inch to 2.0 inches wide and several feet long and extend through the subsoil. The Swanboy soil is on the foot slopes. The Kyle soil is on the upper side slopes. Areas are 20 to 400 acres in size and are irregular in shape. They are 40 to 55 percent Swanboy soil and 30 to 45 percent Kyle soil. The two soils occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Swanboy soil is light brownish gray clay about 2 inches thick. The subsoil is grayish brown, very firm, calcareous clay about 28 inches thick. It has accumulations of salts in the lower part. The underlying material to a depth of 60 inches is grayish brown, calcareous clay and silty clay. In some areas shale bedrock is at a depth of 20 to 40 inches.

Typically, the surface layer of the Kyle soil is grayish brown clay about 3 inches thick. The subsoil is grayish brown, very firm clay about 30 inches thick. It is calcareous in the lower part. The underlying material to a depth of 60 inches is grayish brown, calcareous clay. In some areas shale bedrock is at a depth of 20 to 40 inches. In places the surface layer is dark grayish brown.

Included with these soils in mapping are small areas of Hisle and Samsil soils. These included soils make up less than 20 percent of any one mapped area. Hisle soils have a sodium affected subsoil. They are in small, shallow depressions on the low parts of the landscape. Samsil soils are 10 to 20 inches deep over shale. They are on the steeper side slopes and ridges.

The content of organic matter and fertility are low in the Swanboy and Kyle soils. Tilth is very poor in the Swanboy soil and poor in the Kyle soil. Permeability is very slow in both soils. Available water capacity is low in the Swanboy soil and moderate in the Kyle soil. Runoff is medium on both soils. The shrink-swell potential is very high.

Most of the acreage supports native grasses and is used for grazing. Surface compaction is a problem. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth.

This map unit generally is unsuited to cultivated crops, tame pasture and hay, and windbreaks and environmental plantings. The very poor tilth and high content of salts in the Swanboy soil are limitations. Pasture plants and trees and shrubs can be established in the less sloping areas of the Kyle soil. The best suited pasture species are pubescent wheatgrass and western wheatgrass. Optimum growth of trees and shrubs is unlikely.

The Swanboy soil is in capability unit VIs-5, Dense Clay range site, and windbreak suitability group 10; the Kyle soil is in capability unit VIe-4, Clayey range site, and windbreak suitability group 4C.

SyB—Swanboy-Slickspots complex, 0 to 6 percent slopes. This map unit occurs as areas of a deep, well drained, nearly level and gently sloping Swanboy soil intermingled with Slickspots. The unit is on terraces and fans that generally are dissected by steep gullies. When dry, the Swanboy soil is characterized by cracks, which are 0.5 inch to 2.0 inches wide and several feet long and extend through the subsoil. It is on the higher parts of the landscape. Slickspots are in slight depressions. Areas are 10 to 200 acres in size and are irregular in shape. They are 50 to 60 percent Swanboy soil and 25 to 35 percent Slickspots. The Swanboy soil and Slickspots occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Swanboy soil is light brownish gray clay about 2 inches thick. The subsoil is grayish brown, very firm, calcareous clay about 28 inches thick. It has accumulations of salts in the lower part. The underlying material to a depth of 60 inches is grayish brown, calcareous clay and silty clay. In some areas shale bedrock is at a depth of 20 to 40 inches.

Slickspots occur as slightly depressional, barren areas that have a puddled or slick surface. Accumulations of salts are at or near the surface. The soil material to a depth of about 60 inches is massive clay or clay loam.

Included with the Swanboy soil and Slickspots in mapping are small areas of Dupree, Hisle, Pierre, and Wendte soils. These soils make up less than 15 percent of any one mapped area. Dupree and Pierre soils are on the high parts of the landscape. Dupree soils are 10 to 20 inches deep over shale. Pierre soils are 20 to 40 inches deep over shale. Hisle soils have a sodium affected subsoil. They are in positions on the landscape similar to those of the Slickspots. The stratified Wendte soils are along drainageways.

The content of organic matter and fertility are low in the Swanboy soil. Tilth is very poor. Permeability is very slow. Available water capacity is low. Runoff is medium. The shrink-swell potential is very high.

Most areas of the Swanboy soil support native grasses and are used for grazing. Surface compaction is a problem. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth. Slickspots support little or no vegetation, but they do support a sparse stand of weeds and pricklypear during wet periods.

This map unit generally is unsuited to cultivated crops, tame pasture and hay, and windbreaks and environmental plantings because of the very poor tilth, a high content of salts, and the Slickspots.

The Swanboy soil is in capability unit VIs-5, Dense Clay range site, and windbreak suitability group 10; Slickspots are in capability unit VIIIs-3 and are not assigned to a range site or a windbreak suitability group.

TaA—Tally fine sandy loam, 0 to 2 percent slopes. This deep, well drained, nearly level soil is on terraces. Areas are 10 to 150 acres in size and are irregular in shape.

Typically, the surface layer is dark grayish brown fine sandy loam about 6 inches thick. The subsoil is about 31 inches thick. It is very friable. It is brown fine sandy loam in the upper part and light brownish gray, calcareous loamy fine sand in the lower part. The underlying material to a depth of 60 inches is light brownish gray, calcareous loamy fine sand. In places the dark colors extend to a depth of more than 16 inches.

Included with this soil in mapping are small areas of Farland, Seroco, and Shambo soils and soils on terrace escarpments. Included soils make up less than 15 percent of any one mapped area. Farland and Shambo soils contain more clay and less sand throughout than the Tally soil. They are in positions on the landscape similar to those of the Tally soil. The excessively drained Seroco soils are on small hummocks. They contain more sand and less clay throughout than the Tally soil.

The content of organic matter is moderate in the Tally soil, and fertility is medium. Tilth is good. Permeability is moderately rapid. Available water capacity is moderate. Runoff is slow.

Most of the acreage is cropland. This soil is suited to cultivated crops and to tame pasture and hay. Examples of suitable pasture plants are alfalfa, crested wheatgrass, and intermediate wheatgrass. A mulch of crop residue helps to control wind erosion until the pasture plants are established. Alfalfa, oats, and wheat are the main crops. Measures that control wind erosion and conserve moisture are the main management needs in cultivated areas. Leaving crop residue on the surface, minimizing tillage, and including grasses and legumes in the cropping system are examples. Stripcropping and field windbreaks also help to control wind erosion.

If this soil is used for range, wind erosion is a hazard in overgrazed areas. Proper stocking rates and timely deferment of grazing or rotation grazing help to maintain maximum productivity.

This soil is suited to windbreaks and environmental plantings. All climatically suited trees and shrubs grow well, except for those that require an abundant supply of moisture. Because of the hazard of wind erosion, the site should be prepared for planting in the spring.

The capability unit is IIIe-7; Sandy range site; windbreak suitability group 5.

TaB—Tally fine sandy loam, 2 to 6 percent slopes. This deep, well drained, gently sloping soil is on terraces. Areas are 10 to 40 acres in size and are irregular in shape.

Typically, the surface layer is dark grayish brown fine sandy loam about 6 inches thick. The subsoil is about 31 inches thick. It is very friable. It is brown fine sandy loam in the upper part and light brownish gray, calcareous loamy fine sand in the lower part. The underlying material to a depth of 60 inches is light brownish gray, calcareous loamy fine sand. In some areas sandstone bedrock is at a depth of 20 to 40 inches. In places the dark colors extend to a depth of more than 16 inches.

Included with this soil in mapping are small areas of Farland and Shambo soils. These soils make up less than 15 percent of any one mapped area. They contain more clay throughout than the Tally soil. They are in positions on the landscape similar to those of the Tally soil.

The content of organic matter is moderate in the Tally soil, and fertility is medium. Tilth is good. Permeability is moderately rapid. Available water capacity is moderate. Runoff is medium.

Most of the acreage is cropland. This soil is suited to cultivated crops and to tame pasture and hay. Examples of suitable pasture plants are crested wheatgrass, alfalfa, and intermediate wheatgrass. A mulch of crop residue helps to control wind erosion until the pasture plants are established. Alfalfa, wheat, and oats are the main crops. Measures that control erosion and conserve moisture are the main management needs in cultivated areas. Leaving crop residue on the surface, minimizing tillage, and including grasses and legumes in the cropping system are examples. Contour farming and grassed waterways also help to control erosion, but in some areas the slopes are too short or too irregular for contouring. Stripcropping and field windbreaks help to control wind erosion.

If this soil is used for range, wind erosion is a hazard in overgrazed areas. Proper stocking rates and timely deferment of grazing or rotation grazing help to maintain maximum productivity.

This soil is suited to windbreaks and environmental plantings. All climatically suited trees and shrubs grow well, except for those that require an abundant supply of

moisture. Because of the hazard of wind erosion, the site should be prepared for planting in the spring. Planting on the contour helps to control water erosion and conserves moisture.

The capability unit is IIIe-8; Sandy range site; windbreak suitability group 5.

Tm—Trembles fine sandy loam. This deep, well drained, nearly level soil is on flood plains (fig. 11). It is subject to rare flooding. Areas are 20 to 200 acres in size and are long and narrow.

Typically, the surface layer is grayish brown fine sandy loam about 6 inches thick. The underlying material to a depth of 60 inches is grayish brown, calcareous fine sandy loam and loamy fine sand stratified with thin layers of loam. In some areas the surface layer is dark grayish brown.

Included with this soil in mapping are small areas of Banks, Korchea, Seroco, Shambo, and Tally soils and soils on terrace escarpments. Included soils make up less than 15 percent of any one mapped area. Banks and Korchea soils are in positions on the landscape similar to those of the Trembles soil. The somewhat

Figure 11.—An area of Trembles fine sandy loam on a flood plain. Cabba-Rock outcrop complex, 9 to 60 percent slopes, is on the breaks along the river.

excessively drained Banks soils contain more sand between depths of 10 and 40 inches than the Trembles soil, and Korchea soils contain more clay between depths of 10 and 40 inches. The excessively drained Seroco soils are on small hummocks. Shambo and Tally soils have a surface layer that is darker than that of the Trembles soil and are not stratified. They are on the high parts of the landscape and are not subject to flooding.

The content of organic matter and fertility are low in the Trembles soil. Tilth is good. Permeability is moderately rapid. Available water capacity is moderate. Runoff is slow.

Most of the acreage supports native grasses and is used for grazing or hay. Wind erosion is a hazard if the range is overgrazed. Proper stocking rates and timely deferment of grazing or rotation grazing help to maintain maximum productivity. In some areas scattered clumps of trees and shrubs provide protection for livestock and wildlife.

This soil is suited to cultivated crops and to tame pasture and hay. Alfalfa, crested wheatgrass, and intermediate wheatgrass are examples of suitable pasture plants. Alfalfa, oats, and wheat are the main crops. Measures that control wind erosion, improve fertility, and conserve moisture are the main management needs in cultivated areas. Leaving crop residue on the surface, including grasses and legumes in the cropping system, and minimizing tillage are examples. Stripcropping and field windbreaks also help to control wind erosion. Floodwater delays planting in some years, but in most years the additional moisture is beneficial and the flood damage is minor.

This soil is suited to windbreaks and environmental plantings. All climatically suited trees and shrubs grow well. Those that require an abundant supply of moisture grow especially well.

The capability unit is IIIe-7; Loamy Terrace range site; windbreak suitability group 1.

Tr—Trembles fine sandy loam, channeled. This deep, well drained, nearly level soil is on flood plains that are dissected into many small tracts by narrow channels and partly filled old stream meanders. The channels are 5 to 20 feet wide and 2 to 20 feet deep. The soil is frequently flooded for brief periods. Areas are 10 to 200 acres in size and are long and narrow.

Typically, the surface layer is grayish brown fine sandy loam about 6 inches thick. The underlying material to a depth of 60 inches is grayish brown, calcareous fine sandy loam and loamy fine sand stratified with thin layers of loam. In places the surface layer is dark grayish brown.

Included with this soil in mapping are small areas of Banks, Korchea, and Lohler soils. These soils make up less than 15 percent of any one mapped area. They are in positions on the landscape similar to those of the Trembles soil. The somewhat excessively drained Banks soils contain more sand between depths of 10 and 40 inches than the Trembles soil, and Korchea and Lohler soils contain more clay between depths of 10 and 40 inches.

The content of organic matter and fertility are low in the Trembles soil. Permeability is moderately rapid. Available water capacity is moderate. Runoff is slow.

Most of the acreage supports native grasses and is used for grazing. Wind erosion is a hazard if the range is overgrazed. Some areas near the stream channels support clumps of trees and shrubs, which provide protection for livestock and wildlife. Although the frequent flooding is a hazard, the additional moisture is beneficial. Ponds in some of the channels provide temporary watering sites for livestock and wildlife.

This soil generally is unsuited to cultivated crops because it is dissected into small tracts and is frequently flooded. It is suited to tame pasture and hay, but harvesting hay is difficult because of the meandering channels. Alfalfa, intermediate wheatgrass, and crested wheatgrass are examples of suitable pasture plants.

This soil is suited to windbreaks and environmental plantings. All climatically suited trees and shrubs grow well. Because of the meandering stream channels, hand planting generally is needed.

The capability unit is VIw-1; Loamy Overflow range site; windbreak suitability group 1.

VbB—Vebar fine sandy loam, 2 to 6 percent slopes. This moderately deep, well drained, gently sloping soil is on uplands. Areas are 10 to 400 acres in size and are irregular in shape.

Typically, the surface layer is dark grayish brown fine sandy loam about 4 inches thick. The subsoil is dark grayish brown, yellowish brown, and light yellowish brown, very friable fine sandy loam about 26 inches thick. Light yellowish brown, soft sandstone is at a depth of about 30 inches. In some areas the depth to bedrock is more than 40 inches. In places the surface layer is not so dark.

Included with this soil in mapping are small areas of Bullock, Cohagen, Parchin, and Reeder soils. These soils make up less than 15 percent of any one mapped area. The sodium affected Bullock and Parchin soils are in small pits and depressions throughout the mapped areas. The shallow Cohagen soils are on ridges. Reeder soils contain more clay throughout than the Vebar soil. They are in positions on the landscape similar to those of the Vebar soil.

The content of organic matter is moderate in the Vebar soil, and fertility is medium. Tilth is fair. Permeability is moderately rapid. Available water capacity is low. Runoff is medium.

Most of the acreage is cropland. This soil is suited to cultivated crops and to tame pasture and hay, but it is somewhat droughty. Alfalfa, crested wheatgrass, and intermediate wheatgrass are examples of suitable

pasture plants. A mulch of crop residue helps to control wind erosion until the pasture plants are established. Alfalfa, wheat, and oats are the main crops. Measures that control erosion and conserve moisture are the main management needs. Leaving crop residue on the surface, minimizing tillage, and including grasses and legumes in the cropping system are examples. Contour farming and grassed waterways also help to control erosion, but in some areas the slopes are too short or too irregular for contouring. Stripcropping and field windbreaks help to control wind erosion.

If this soil is used for range, wind erosion is a hazard in overgrazed areas. Proper stocking rates and timely deferment of grazing or rotation grazing help to maintain maximum productivity.

This soil is suited to windbreaks and environmental plantings, but optimum growth is unlikely because of the droughtiness. Because of the hazard of wind erosion, the site should be prepared for planting in the spring. Planting on the contour helps to control water erosion and conserves moisture.

The capability unit is IIIe-10; Sandy range site; windbreak suitability group 6R.

VbC—Vebar fine sandy loam, 6 to 9 percent slopes. This moderately deep, well drained, gently rolling soil is on uplands. Areas are 10 to 200 acres in size and are irregular in shape.

Typically, the surface layer is dark grayish brown fine sandy loam about 4 inches thick. The subsoil is dark grayish brown, yellowish brown, and light yellowish brown, very friable fine sandy loam about 26 inches thick. Light yellowish brown, soft sandstone is at a depth of about 30 inches. In some areas the depth to soft bedrock is more than 40 inches. In places the surface layer is not so dark.

Included with this soil in mapping are small areas of Bullock, Cohagen, Parchin, and Reeder soils. These soils make up less than 15 percent of any one mapped area. The sodium affected Bullock and Parchin soils are in small pits and depressions throughout the mapped areas. The shallow Cohagen soils are on ridges. Reeder soils contain more clay throughout than the Vebar soil. They are in positions on the landscape similar to those of the Vebar soil.

The content of organic matter is moderate in the Vebar soil, and fertility is medium. Tilth is fair. Permeability is moderately rapid. Available water capacity is low. Runoff is medium.

Most of the acreage supports native grasses and is used for grazing or hay. Erosion is a hazard if the range is overgrazed. Gullies form along some cattle trails. Fencing and other means of controlling livestock traffic patterns help to prevent gullying. Proper stocking rates and timely deferment of grazing or rotation grazing help to maintain maximum productivity.

This soil is suited to cultivated crops and to tame pasture and hay, but it is somewhat droughty. Alfalfa and intermediate wheatgrass are examples of suitable pasture plants. A mulch of crop residue helps to control wind erosion until the pasture plants are established. Alfalfa, wheat, and oats are the main crops. Measures that control erosion and conserve moisture are the main management needs in cultivated areas. Examples are leaving crop residue on the surface, including grasses and legumes in the cropping system, and establishing grassed waterways. Contour farming also helps to control erosion, but in some areas the slopes are too short or too irregular for contouring. Stripcropping and field windbreaks help to control wind erosion.

This soil is suited to windbreaks and environmental plantings, but optimum growth is unlikely because of the droughtiness. Because of the hazard of wind erosion, the site should be prepared for planting in the spring. Planting on the contour helps to control water erosion and conserves moisture.

The capability unit is IVe-8; Sandy range site; windbreak suitability group 6R.

VcC—Vebar-Cohagen fine sandy loams, 6 to 15 percent slopes. These well drained, moderately sloping and strongly sloping soils are on uplands. The moderately deep Vebar soil is on side slopes. The shallow Cohagen soil is on ridges. Areas are 20 to 1,000 acres in size and are irregular in shape. They are 45 to 65 percent Vebar soil and 20 to 40 percent Cohagen soil. The two soils occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Vebar soil is dark grayish brown fine sandy loam about 4 inches thick. The subsoil is dark grayish brown, yellowish brown, and light yellowish brown, very friable fine sandy loam about 26 inches thick. Light yellowish brown, soft sandstone is at a depth of about 30 inches. In some areas the depth to soft bedrock is more than 40 inches. In places the surface layer is not so dark.

Typically, the surface layer of the Cohagen soil is grayish brown, calcareous fine sandy loam about 3 inches thick. The underlying material is light yellowish brown, calcareous fine sandy loam. Light brownish gray and light yellowish brown, soft sandstone is at a depth of about 11 inches. In some areas the soil contains more sand throughout. In other areas it contains more clay throughout.

Included with these soils in mapping are small areas of Daglum, Reeder, and Rhoades soils. These included soils make up less than 20 percent of any one mapped area. The sodium affected Daglum and Rhoades soils are in small depressions on the low parts of the landscape. Reeder soils contain more clay throughout than the Vebar soil. They are in positions on the landscape similar to those of the Vebar soil.

The content of organic matter is moderate and fertility medium in the Vebar soil. The content of organic matter and fertility are low in the Cohagen soil. Tilth is fair in the Vebar soil. Permeability is moderately rapid in both soils. Available water capacity is low. Runoff is medium.

Most of the acreage supports native grasses and is used for grazing or hay. Erosion is a hazard if the range is overgrazed. Gullies form along some cattle trails. Fencing and other means of controlling livestock traffic patterns help to prevent gullying. Proper stocking rates and timely deferment of grazing or rotation grazing help to maintain maximum productivity.

This map unit is generally unsuited to cultivated crops and poorly suited to tame pasture and hay because the Vebar soil is droughty and the Cohagen soil is shallow. Alfalfa and intermediate wheatgrass are examples of suitable pasture plants in the less sloping areas of the Vebar soil. A mulch of crop residue helps to control wind erosion until the pasture plants are established.

The Vebar soil is suited to windbreaks and environmental plantings, but the Cohagen soil is generally unsuited. The droughtiness of the Vebar soil and the shallowness to bedrock in the Cohagen soil are limitations. Windbreaks can be established on the Vebar soil, but optimum growth is unlikely. No trees or shrubs grow well on the Cohagen soil. Planting on the contour helps to control water erosion. Because of the hazard of wind erosion, the site should be prepared for planting in the spring.

The Vebar soil is in capability unit IVe-8, Sandy range site, and windbreak suitability group 6R; the Cohagen soil is in capability unit VIe-10, Shallow range site, and windbreak suitability group 10.

VdC—Vebar-Daglum complex, 3 to 9 percent slopes. These well drained, gently sloping and moderately sloping soils are on uplands. The moderately deep Vebar soil is on knolls and ridges. The deep, sodium affected Daglum soil is in shallow depressions on the low parts of the landscape. Areas are 10 to 1,000 acres in size and are irregular in shape. They are 50 to 65 percent Vebar soil and 20 to 35 percent Daglum soil. The two soils occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Vebar soil is dark grayish brown fine sandy loam about 4 inches thick. The subsoil is dark grayish brown, yellowish brown, and light yellowish brown, very friable fine sandy loam about 26 inches thick. Light yellowish brown, soft sandstone is at a depth of about 30 inches. In some areas the depth to soft bedrock is more than 40 inches. In places the surface layer is not so dark.

Typically, the surface layer of the Daglum soil is dark grayish brown loam about 4 inches thick. The subsurface layer is grayish brown loam about 2 inches thick. The subsoil is dark grayish brown and grayish brown, firm clay about 16 inches thick. It is calcareous in the lower part. The underlying material is grayish brown, calcareous clay and clay loam. It has accumulations of salts in the upper part. Grayish brown shale is at a depth of about 50 inches. In some areas sandstone bedrock is at a depth of 20 to 40 inches. In places the surface layer is not so dark.

Included with these soils in mapping are small areas of Bullock, Cohagen, Reeder, and Rhoades soils. These included soils make up less than 20 percent of any one mapped area. The sodium affected Bullock and Rhoades soils are shallower to salts than the Daglum soil. They are in small pits and depressions. The shallow Cohagen soils are on ridges. Reeder soils contain more clay throughout than the Vebar soil. They are in positions on the landscape similar to those of the Vebar soil.

The content of organic matter is moderate in the Vebar and Daglum soils. Fertility is medium in the Vebar soil and is low in the Daglum soil. The sodium affected subsoil in the Daglum soil restricts the penetration of roots. Tilth is fair in the Vebar soil and poor in the Daglum soil. Permeability is moderately rapid in the Vebar soil and slow in the Daglum soil. Available water capacity is low in the Vebar soil and moderate in the Daglum soil. Runoff is medium on both soils. The shrink-swell potential is high in the Daglum soil and low in the Vebar soil.

Most of the acreage supports native grasses and is used for grazing or hay. Generally, no major hazards or limitations affect the use of the Vebar soil for range; however, wind erosion is a problem if the range is overgrazed. Surface compaction is a problem on the Daglum soil. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth.

These soils are poorly suited to cultivated crops and to tame pasture and hay. The Vebar soil is droughty and is subject to wind erosion. The sodium affected subsoil of the Daglum soil also is a limitation. Alfalfa, crested wheatgrass, western wheatgrass, and pubescent wheatgrass are examples of suitable pasture plants. A mulch of crop residue helps to control wind erosion until the pasture plants are established. Alfalfa, wheat, and oats are the main crops. Measures that control erosion on the Vebar soil, conserve moisture in both soils, and improve tilth in the Daglum soil are the main management needs in cultivated areas. Examples are leaving crop residue on the surface, minimizing tillage, and including grasses and legumes in the cropping system. Contour farming and grassed waterways also help to control erosion, but in some areas the slopes are too short or too irregular for contouring. Stripcropping and field windbreaks help to control wind erosion. Chiseling or subsoiling improves tilth and increases the rate of water intake.

These soils are suited to windbreaks and environmental plantings, but the droughtiness of the Vebar soil and the sodium affected subsoil of the Daglum soil are limitations. Trees and shrubs can be

established, but optimum survival, growth, and vigor are unlikely. Planting on the contour helps to control water erosion and conserves moisture. Because of the hazard of wind erosion, the site should be prepared for planting in the spring.

The Vebar soil is in capability unit IVe-8, Sandy range site, and windbreak suitability group 6R; the Daglum soil is in capability unit IVs-3, Claypan range site, and windbreak suitability group 9.

WcE—Wabek-Cabba complex, 9 to 40 percent slopes. These strongly sloping to steep soils are on uplands. The excessively drained Wabek soil is very shallow to gravelly material. It is on ridges. The shallow, well drained Cabba soil is on side slopes. Areas are 10 to 50 acres in size and are irregular in shape. They are about 50 to 60 percent Wabek soil and 30 to 40 percent Cabba soil. The two soils occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Wabek soil is dark grayish brown gravelly loam about 4 inches thick. The upper 3 inches of the underlying material is brown, calcareous gravelly sandy loam. The lower part to a depth of 60 inches is multicolored, calcareous very gravelly sand. In some areas the surface layer is not so dark.

Typically, the surface layer of the Cabba soil is grayish brown, calcareous loam about 4 inches thick. The next 5 inches is light brownish gray, calcareous loam. The underlying material is grayish brown and light yellowish brown, calcareous clay loam. Light brownish gray and light yellowish brown, soft bedrock is at a depth of about 16 inches. In some areas the soil contains more sand throughout. In places soft bedrock is at a depth of 20 to 40 inches.

Included with these soils in mapping are small areas of Stady and Wayden soils. These included soils make up less than 10 percent of any one mapped area. Stady soils are 20 to 40 inches deep to gravelly material. They are nearly level and are on terraces. Wayden soils contain more clay throughout than the Cabba soil. They are in positions on the landscape similar to those of the Cabba soil.

The content of organic matter and fertility are low in the Wabek and Cabba soils. Permeability is very rapid in the Wabek soil and moderate in the Cabba soil. Available water capacity is low in both soils. Runoff is medium on the Wabek soil and rapid on the Cabba soil. The shrink-swell potential is moderate in the Cabba soil and low in the Wabek soil.

Most of the acreage supports native grasses and is used for grazing. Water erosion is a hazard if the range is overgrazed. Gullies form along some cattle trails. Fencing and other means of controlling livestock traffic patterns help to prevent gullying. Proper stocking rates and timely deferment of grazing or rotation grazing help to maintain maximum productivity.

These soils generally are unsuited to cultivated crops, tame pasture and hay, and windbreaks and environmental plantings because of the slope of both soils and the shallowness to very gravelly sand in the Wabek soil. This soil is a potential source of sand and gravel.

The Wabek soil is in capability unit VIIs-4, Very Shallow range site; the Cabba soil is in capability unit VIIe-7, Shallow range site; both soils are in windbreak suitability group 10.

WdE—Wayden silty clay loam, 15 to 40 percent slopes. This shallow, well drained, moderately steep and steep soil is on uplands. Areas are 40 to 450 acres in size and are irregular in shape.

Typically, the surface layer is grayish brown, calcareous silty clay loam about 4 inches thick. The underlying material is grayish brown, friable, calcareous silty clay loam about 7 inches thick. Light brownish gray and light olive brown, calcareous shale is at a depth of about 11 inches.

Included with this soil in mapping are small areas of Cabba, Lohler, Regent, and Rhoades soils. These soils make up less than 15 percent of any one mapped area. Cabba soils contain less clay throughout than the Wayden soil. They are in positions on the landscape similar to those of the Wayden soil. The stratified Lohler soils are on flood plains. Regent soils are 20 to 40 inches deep over shale. They are on side slopes. The sodium affected Rhoades soils are in small pits and depressions on the low parts of the landscape.

The content of organic matter and fertility are low in the Wayden soil. Permeability is slow. Available water capacity is low. Runoff is rapid. The shrink-swell potential is high.

Most of the acreage supports native grasses and is used for grazing. Water erosion is a hazard unless an adequate plant cover is maintained. Gullies form along some cattle trails. Reestablishing vegetation is difficult. Sites for stock water impoundments are available in some of the draws. Seepage from these impoundments could be a problem.

This soil is generally unsuited to cultivated crops, tame pasture and hay, and windbreaks and environmental plantings because of the slope and the shallowness to bedrock.

The capability unit is VIIe-8; Shallow range site; windbreak suitability group 10.

We—Wendte silty clay. This deep, moderately well drained, nearly level soil is on flood plains. It is subject to rare flooding. Areas are 10 to 300 acres in size and are irregular in shape.

Typically, the surface layer is grayish brown silty clay about 5 inches thick. The underlying material to a depth

of 60 inches is grayish brown, calcareous silty clay stratified with thin layers of silty clay loam. In some areas the soil contains less clay throughout.

Included with this soil in mapping are small areas of Haverson, Hisle, Kyle, and Swanboy soils and soils on terrace escarpments. Included soils make up less than 10 percent of any one mapped area. Haverson soils contain less clay between depths of 10 and 40 inches than the Wendte soil. They are in positions on the landscape similar to those of the Wendte soil. The sodium affected Hisle soils are in small pits and depressions near the edges of the mapped areas. Kyle and Swanboy soils are not stratified. They are on fans above the Wendte soil.

The content of organic matter is moderate in the Wendte soil, and fertility is medium. Tilth is poor. Permeability is slow. Available water capacity is moderate. Runoff is slow. The shrink-swell potential is high.

Most of the acreage supports native grasses and is used for grazing or hay. Surface compaction is a problem. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth.

This soil is suited to cultivated crops, tame pasture and hay, and windbreaks and environmental plantings. It takes in water slowly, however, and the clayey subsoil can restrict the penetration of plant roots. Examples of suitable pasture plants are alfalfa, crested wheatgrass, intermediate wheatgrass, pubescent wheatgrass, and western wheatgrass. Alfalfa, oats, and wheat are the main crops. Measures that improve tilth and conserve moisture are the main management needs in cultivated areas. Leaving crop residue on the surface and including grasses and legumes in the cropping system are examples. Chiseling or subsoiling improves tilth and increases the rate of water intake. Windbreaks can be established, but optimum growth is unlikely.

The capability unit is IIIs-3; Clayey Overflow range site; windbreak suitability group 4C.

Wn—Wendte silty clay, channeled. This deep, moderately well drained, nearly level soil is on flood plains that are dissected into many small tracts by narrow channels and partly filled old stream meanders. The channels are 5 to 20 feet wide and 2 to 20 feet deep. The soil is frequently flooded for brief periods. Areas are 40 to 200 acres in size and are long and narrow.

Typically, the surface layer is grayish brown silty clay about 5 inches thick. The underlying material to a depth of 60 inches is grayish brown, calcareous silty clay stratified with thin layers of silty clay loam. In some areas the soil contains less clay throughout.

Included with this soil in mapping are small areas of Haverson soils. These soils make up less than 15 percent of any one mapped area. They contain less clay between depths of 10 and 40 inches than the Wendte soil. They are in positions on the landscape similar to those of the Wendte soil.

The content of organic matter is moderate in the Wendte soil, and fertility is medium. Permeability is slow. Available water capacity is moderate. Runoff is slow. The shrink-swell potential is high.

Most of the acreage supports native grasses and is used for grazing. Surface compaction is a problem. Restricted grazing during wet periods helps to prevent compaction and deterioration of tilth. In some areas scattered clumps of trees and shrubs provide protection for livestock and wildlife. Although the frequent flooding is a hazard, the additional moisture is beneficial. Ponds in some areas of the channels provide temporary watering sites for livestock and wildlife.

This soil generally is unsuited to cultivated crops because it is dissected into many small tracts and is subject to flooding in the spring. It is suited to tame pasture and hay, but harvesting hay is difficult because of the meandering channels. Alfalfa, intermediate wheatgrass, and smooth bromegrass are examples of suitable pasture plants.

This soil is suited to windbreaks and environmental plantings. All climatically suited trees and shrubs grow well. Because of the meandering stream channels, hand planting generally is needed.

The capability unit is VIw-1; Clayey Overflow range site; windbreak suitability group 4C.

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 avoid 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 behavior 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; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for 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.

The soils in the county are assigned to various interpretive groups at the end of each map unit description. The groups for each map unit also are shown in the section "Interpretive Groups," which follows the tables at the back of this survey.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

About 17 percent of the acreage in Ziebach County is used for cultivated crops or for tame pasture and hay (*10*). The major crops are winter wheat, spring wheat, and alfalfa. Grain sorghum and oats also are grown. Winter wheat, spring wheat, and grain sorghum are grown as cash crops; oats is grown as a cash crop and as livestock feed; and alfalfa is harvested mainly for hay. Alfalfa, crested wheatgrass, and intermediate wheatgrass are the chief tame pasture plants.

The potential of the soils in the county for increased crop production is good. Food production could be increased considerably by extending the latest crop production technology to all of the cropland in the county. This soil survey can greatly facilitate the application of such technology. The paragraphs that follow describe the management needed on the cropland in the county.

Water erosion reduces productivity and results in sedimentation. It is a hazard on Pierre, Reeder, Regent, and other soils if the slope is more than 2 percent. Productivity is reduced when the more fertile surface layer is lost and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging on soils that have a thin surface layer, such as Kyle, Pierre, and Lantry soils. Erosion also reduces the productivity of soils that tend to be droughty, such as Stady and Vebar soils. When erosion occurs, sediment rich in nutrients enters streams, lakes, and reservoirs. Measures that control erosion minimize this pollution and preserve water quality for fish and wildlife and for recreational uses. They also reduce the amount of fertilizer needed in cropped areas by helping to prevent the removal of plant nutrients.

A cropping system that keeps a plant cover on the surface for extended periods holds soil losses to an amount that does not reduce the productive capacity of the soils. If a plant cover cannot protect the soil, careful

management of crop residue is essential. Minimizing tillage and leaving crop residue on the surface increase the infiltration rate, reduce the runoff rate, and help to control erosion. Conservation tillage is a form of noninversion tillage that retains protective amounts of crop residue on the surface throughout the year. It is effective in reducing soil losses. It includes no-till, strip-till, stubble mulching, and chemical fallow systems that provide for a minimum number of tillage operations. Stubble is left standing throughout the winter. It traps and holds snow and thus increases the moisture supply.

Terraces and diversions help to control erosion by reducing the length of slopes and the runoff rate. They are most practical on deep, well drained soils that have long, smooth slopes. Many of the soils in Ziebach County are poorly suited to terraces and diversions because of short, irregular slopes or an unfavorable subsoil, which would be exposed in terrace channels. Grassed waterways are effective in controlling gully erosion.

Wind erosion is a slight to severe hazard on many of the soils in the county. The hazard is especially severe on those soils having a fine sandy loam or loamy fine sand surface layer, such as Evridge, Tally, and Veber soils. The soils that have a high content of clay in the surface layer, such as Kyle, Pierre, and Promise soils, also are highly susceptible. Wind erosion can damage these soils in a few hours if winds are strong and the soils are dry and are not protected by a plant cover or surface mulch. It can be controlled by an adequate plant cover, a cover of crop residue, stripcropping, and tillage methods that keep the surface rough. Establishing windbreaks of suitable trees and shrubs and leaving strips of unharvested crops also are effective in controlling wind erosion.

Information about the measures that control erosion on each kind of soil is contained in the Technical Guide, available in the local office of the Soil Conservation Service.

Soil fertility helps to determine the yields that can be obtained from the soil. It can be improved by applying fertilizer and by including grasses and legumes in the cropping system. The kinds and amounts of fertilizer needed on Lantry and other soils that have a high content of lime in the surface layer generally differ from the kinds and amounts needed on soils that do not have lime in the surface layer. On all soils, additions of fertilizer should be based on the results of soil tests, on the needs of the crop, and on the expected level of yields. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer needed.

Soil tilth is an important factor affecting the germination of seeds and the infiltration of water into the soil. Soils with good tilth are granular and porous. In Pierre, Kyle, and Ridgeview soils, tilth generally is poor. Tilth also is poor in claypan soils, such as Daglum and Parchin. These soils dry out slowly in the spring and cannot be easily tilled when dry. If farmed when wet, they tend to be cloddy when dry. As a result of the cloddiness, preparing a seedbed is difficult. Timely tillage, inclusion of grasses and legumes in the cropping system, and incorporation of crop residue into the soil improve tilth and increase the rate of water intake.

Field crops suited to the soils and climate of the county include small grain and row crops. Winter wheat, spring wheat, and oats are the main small grain crops. Grain sorghum is the main row crop. Corn is grown for silage on a small acreage.

Grail, Farland, Savage, and other deep, well drained soils are suited to all of the crops commonly grown in the county. Because of a low available water capacity, moderately deep soils, such as Pierre and Regent soils, are better suited to early maturing small grain than to deeper rooted crops, such as sorghum and alfalfa. The erosive Tally and Vebar soils also are better suited to small grain, which provides better protection against wind erosion than row crops.

Pasture plants best suited to the climate and most of the soils in the county include alfalfa, crested wheatgrass, and intermediate wheatgrass. Because of the hazard of erosion, bunch grasses, such as crested wheatgrass, should not be planted in areas where the slope is more than 6 percent. On the poorly drained Heil soils, western wheatgrass is the best suited species, but other desirable species include Garrison creeping foxtail and reed canarygrass. Pubescent wheatgrass is suited to Daglum and other soils that have a claypan subsoil.

If the pasture is overgrazed, the grasses lose vigor and die and usually are replaced by annual grasses and by weeds. Proper stocking rates, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

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 5. 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 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 are also 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.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. 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 5 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 Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

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 woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit (*8*). These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

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, IIe. The letter *e* shows that the main limitation is 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 I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, woodland, 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, IIe-1 or IIIe-4.

The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in the section "Interpretive Groups."

Rangeland

Maurice R. Davis, range conservationist, Soil Conservation Service, helped prepare this section.

Range is land on which the native vegetation consists mainly of grasses, grasslike plants, forbs, or shrubs suitable for grazing. It includes areas where the native vegetation has been reestablished. The amount and kind of native vegetation grown in any one area are determined by the soil, topography, climate, past use, and management.

All of the county was range before the first permanent settlers arrived. Approximately 83 percent of the county currently supports native vegetation. Range supplies a major portion of the forage for livestock in the county.

Approximately 76 percent of the farm and ranch income in the survey area is derived from the sale of livestock and livestock products. Most of the ranches are cow-calf enterprises, but some are yearling enterprises. Also, some ranches include both cow herds and yearlings. The range generally is grazed from May through October. The forage provided by range generally is supplemented by crop aftermath and by tame pasture plants, such as crested wheatgrass and intermediate wheatgrass. In winter, it is supplemented by protein concentrate and hay.

Ziebach County is part of a mixed-grass prairie. The native vegetation is dominated by mid and short grasses

and forbs, but some tall grasses are also mixed in with these plants. The mixed-grass prairie is made up of cool- and warm-season plants that provide good-quality forage throughout the growing season. The cool-season plants grow mainly during April, May, and June and the warm-season plants during June, July, and August. The cool-season grasses may start growing again in September and October if fall rains are adequate.

The native vegetation in some parts of the county is producing below its potential because of past misuse. Many of the tall grasses and some of the mid grasses have been replaced by short grasses. As a result, the total amount of available forage has been reduced. In most areas the original high-quality plants can be reestablished if good grazing management is applied.

Range Sites and Condition Classes

Different kinds of soil vary in their capacity to produce native vegetation. Soil properties that affect the moisture supply and plant nutrients have the greatest influence on the productivity of range plants. Soil reaction, salt content, and a seasonal high water table are also important. Soils that produce approximately the same kinds, amounts, and proportions of native vegetation make up a range site. The potential native vegetation on a range site is the stabilized plant community that the site is capable of producing. It consists of the plants that were growing when the region was settled. This plant community maintains itself and changes very little as long as the environment remains unchanged. The relationship between soils and vegetation was ascertained during this survey; thus range sites generally can be determined directly from the soil map.

The plants within the native plant community are sometimes grouped as decreasers, increasers, or invaders, depending on their response to grazing pressure. *Decreasers* are plants that respond to overgrazing by decreasing in production. They generally are the most productive plants and the ones most preferred by the grazing animals. *Increasers* are plants that respond to grazing pressure, at least initially, by increasing in amount as the more desirable decreaser plants become less productive. Increasers generally are less productive and less preferred by the grazing animals. *Invaders* are plants that are not part of the original plant community but invade the plant community because of some kind of disturbance or continued overgrazing. Most invader plants have little value as forage plants. Because plants do not respond in the same manner to different influences, a plant may be a decreaser on some range sites but an increaser on others.

Table 6 shows, for nearly every soil, the range site and the potential annual production of vegetation in favorable, average, and unfavorable years. *Potential annual production* is the amount of vegetation that can be expected to grow annually on well managed range 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, average, and unfavorable years. In a favorable year, the amount and distribution of precipitation and the temperatures made growing conditions substantially better than 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. The relationship of green weight to air-dry weight varies according to such factors as exposure, amount of shade, recent rains, and unseasonable dry periods.

Range management helps to maintain forage production and provides wildlife habitat, water, and watershed protection. The primary objective of range management is to keep the range in excellent or good condition. The main management concern is responding to important changes in the plant community on a range site.

Range condition is determined by comparing the present vegetation on a range site with the potential native plant community for that site. Four range condition classes are recognized. The range site is in *excellent* condition if 76 to 100 percent of the present vegetation is the same kind as the potential native vegetation; in *good* condition if the percentage is 51 to 75 percent; in *fair* condition if the percentage is 26 to 50 percent; and in *poor* condition if the percentage is 25 percent or less. Range productivity depends on the range site, the range condition, and the amount of moisture available to plants during the growing season.

Measures that maintain or improve the range condition are needed on all of the range in the county. These include proper stocking rates and a rotation grazing or deferred grazing program in which the proper sequence of grazing and rest periods helps to maintain or improve the vigor of the key plants. Other measures are range seeding, fencing, watering facilities, and mechanical treatment, such as contour furrowing, pitting, and deep chiseling.

A total of 17 range sites are recognized in the county. They are Clayey, Clayey Overflow, Claypan, Closed Depression, Dense Clay, Loamy Overflow, Loamy Terrace, Saline Lowland, Sands, Sandy, Shallow, Shallow Clay, Shallow to Gravel, Silty, Thin Claypan, Thin Upland, and Very Shallow. The paragraphs that follow describe these range sites.

Clayey range site. The potential native vegetation on this site is mid and short prairie grasses interspersed with a variety of forbs and shrubs. Green needlegrass

and western wheatgrass make up about 70 percent of the vegetation. Warm-season grasses, including blue grama, buffalograss, and sideoats grama, make up about 25 percent. Forbs, such as heath aster, prairie coneflower, yarrow, sagewort, false-boneset, and scarlet globemallow, make up about 5 percent.

The major management concern on this site is maintaining the extent of the most productive grasses. Green needlegrass and western wheatgrass lose their productive capacity after continued overgrazing because the livestock prefer these plants. If overgrazing continues, these species are replaced by blue grama and buffalograss. The extent of the most productive grasses can be maintained by proper stocking rates. Other management includes rotation or deferred grazing. Mechanical treatment is needed in some areas.

Clayey Overflow range site. The potential native vegetation on this site is a stand of mid and tall grasses. Cool-season grasses make up about 80 percent of the vegetation. They are mainly western wheatgrass and lesser amounts of green needlegrass. Short grasses, such as blue grama and buffalograss, are in the understory. Forbs and woody species are not of major importance when this site is in excellent condition.

The major management concern on this site is maintaining the extent of the most productive grasses. If the site is overgrazed, western wheatgrass is replaced by buffalograss, blue grama, and weeds. The extent of the most productive grasses can be increased or maintained by proper stocking rates in combination with timely deferment of grazing or rotation grazing.

Claypan range site. The potential native vegetation on this site is a mixture of mid and short grasses. Western wheatgrass and green needlegrass make up about 65 percent of the vegetation. Western wheatgrass is the dominant cool-season grass, but needleandthread is dominant in some areas where the surface layer is fine sandy loam. Warm-season grasses, such as blue grama, buffalograss, and sideoats grama, make up about 25 percent of the vegetation. Sedges and forbs make up about 10 percent.

The major management concern on this site is maintaining the extent of the most productive grasses. After continued overgrazing, needlegrass, western wheatgrass, needleandthread, and sideoats grama decrease in extent and blue grama, buffalograss, and forbs increase. The result is low forage production. If overgrazing continues, much of the surface is bare, especially during droughty periods. The extent of the most productive grasses can be maintained by proper stocking rates in combination with a rotation or deferred grazing program that provides periodic rest periods during the key growing season of these plants. Restricted grazing during wet periods helps to prevent surface compaction and deterioration of tilth.

Closed Depression range site. The potential native vegetation on this site is mid grasses. Western wheatgrass makes up about 85 percent of the vegetation. Sedges, rushes, and inland saltgrass make up the rest.

This site is excessively wet or ponded during wet periods and is droughty during abnormally dry periods. The major management concern is maintaining the extent of western wheatgrass. After continued overgrazing, this grass is replaced by rushes and weeds. The extent of western wheatgrass can be maintained by proper stocking rates in combination with timely deferment of grazing or rotation grazing.

Dense Clay range site. The potential native vegetation on this site is mid prairie grasses interspersed with forbs. Western wheatgrass and green needlegrass, which are cool-season grasses, make up about 90 percent of the vegetation. Forbs, such as wild onion, make up about 10 percent. This site generally does not have an understory of short grasses.

The major management concern on this site is maintaining the extent of green needlegrass and western wheatgrass. After continued overgrazing, these grasses thin out and are replaced by unapalatable plants or the surface is bare. Erosion is a serious problem in the bare areas. The extent of green needlegrass and western wheatgrass can be maintained by proper stocking rates in combination with timely deferment of grazing or rotation grazing. Restricted grazing during wet periods helps to prevent surface compaction and deterioration of tilth.

Loamy Overflow range site. The potential native vegetation on this site is mixed prairie grasses. Big bluestem, a tall, warm-season grass, makes up about 45 percent of the vegetation. Other warm-season grasses, such as switchgrass, prairie sandreed, little bluestem, and sideoats grama, make up about 20 percent. Cool-season grasses, such as green needlegrass and western wheatgrass, make up about 30 percent. Leadplant and sedges make up about 5 percent.

The major management concern on this site is maintaining the extent of the most productive grasses. After continuous overgrazing, big bluestem, switchgrass, green needlegrass, and little bluestem rapidly thin out and the extent of western wheatgrass and sideoats grama increases. If overgrazing continues, Kentucky bluegrass, a short, cool-season grass, becomes the dominant species. The result is low forage production. The extent of the most productive grasses can be maintained by proper stocking rates in combination with timely deferment of grazing or rotation grazing.

Loamy Terrace range site. The potential native vegetation on this site is mixed prairie grasses. Western wheatgrass, green needlegrass, and needleandthread,

which are cool-season grasses, make up about 50 percent of the vegetation. Sedges and warm-season grasses, such as big bluestem, blue grama, prairie sandreed, sideoats grama, and little bluestem, make up about 15 percent. Heath aster, yarrow, scurfpea, sagewort, rose, western snowberry, leadplant, buffaloberry, and chokecherry make up about 35 percent.

The major management concern on this site is maintaining the extent of the most productive grasses. After continuous overgrazing, the extent of the bluestems and of green needlegrass decreases and the extent of prairie sandreed, western wheatgrass, needleandthread, and sideoats grama increases. If overgrazing continues, these grasses thin out and are replaced by blue grama and Kentucky bluegrass. The result is low forage production. The extent of the most productive grasses can be maintained by proper stocking rates in combination with timely deferment of grazing or rotation grazing.

Saline Lowland range site. The potential native vegetation on this site is salt-tolerant grasses. Western wheatgrass and Nuttall alkaligrass generally make up about 60 percent of the vegetation. Prairie cordgrass, alkali cordgrass, inland saltgrass, and blue grama generally make up about 25 percent. Sedges and forbs make up about 15 percent. In some areas prairie cordgrass and alkali cordgrass make up as much as 60 percent of the vegetation.

The major management concern on this site is maintaining the extent of the most productive grasses. After continued overgrazing, the extent of western wheatgrass and prairie cordgrass decreases and inland saltgrass becomes the dominant grass. The extent of the most productive grasses can be maintained by proper stocking rates and by rotation grazing or deferred grazing.

Sands range site. The potential native vegetation on this site is warm-season, tall and mid grasses. Warm-season grasses, such as prairie sandreed, little bluestem, and sand bluestem, make up about 60 percent of the vegetation. Needleandthread, switchgrass, sand dropseed, and blue grama make up about 25 percent. Forbs and woody shrubs, such as leadplant, rose, and sandcherry, make up about 15 percent.

The main management concern on this site is maintaining the extent of the most productive grasses. After continuous overuse, the bluestems, prairie sandreed, and switchgrass are replaced by sand dropseed and blue grama. If overuse continues, green sagewort and scurfpea increase in extent or invade. In some areas, the surface is bare and the formation of blowouts is a severe hazard. The extent of the most productive grasses can be increased or maintained by proper stocking rates and by timely deferment of grazing or rotation grazing.

Sandy range site. The potential native vegetation on this site is mixed prairie grasses, chiefly mid and tall grasses. Warm-season grasses, such as big bluestem, sand bluestem, and prairie sandreed, make up about 35 percent of the vegetation. Cool-season grasses, such as needleandthread and western wheatgrass, make up about 35 percent. Blue grama and sedges make up about 25 percent. Forbs, such as scurfpea and sagewort, make up about 5 percent.

The major management concern on this site is maintaining the extent of the most productive grasses. After continuous overgrazing, the extent of the bluestems decreases and the extent of prairie sandreed and needleandthread increases. If overgrazing continues, these grasses thin out and are replaced by sand dropseed, blue grama, threadleaf sedge, sagewort, and Kentucky bluegrass. Low forage production is the result. The extent of the most productive grasses can be increased or maintained by proper stocking rates and by timely deferment of grazing or rotation grazing.

Shallow range site. The potential native vegetation on this site is mixed prairie grasses. Warm-season grasses, such as little bluestem, sideoats grama, and big bluestem, make up about 70 percent of the vegetation. Cool-season grasses, such as western wheatgrass and needleandthread, make up about 25 percent. Sedges, forbs, and shrubs make up about 5 percent.

The major management concern on this site is maintaining the extent of the most productive grasses. After continued overgrazing, the extent of little bluestem and big bluestem decreases and the extent of western wheatgrass and sideoats grama increases. If overgrazing continues, sideoats grama and needleandthread are replaced by a sparse cover of sedges, blue grama, and weeds. Low forage production is the result. The extent of the most productive grasses can be maintained or increased by proper stocking rates and by rotation grazing or timely deferment of grazing.

Shallow Clay range site. The potential native vegetation on this site is mixed prairie grasses. Western wheatgrass and green needlegrass make up about 45 percent of the vegetation. Warm-season grasses, such as little bluestem, sideoats grama, and blue grama, make up about 45 percent. Forbs, such as scurfpea, sagewort, and blacksamson, make up about 5 percent. Shrubs, particularly skunkbush sumac, also make up about 5 percent.

The major management concern on this site is maintaining the extent of the most productive grasses. If the range is overgrazed, the extent of green needlegrass decreases because the livestock prefer these plants. If overgrazing continues, western wheatgrass and sideoats

grama decrease in extent. If the extent of blue grama and unpalatable forbs increases, forage production is significantly reduced. The extent of the most productive plants can be maintained by proper stocking rates in combination with timely deferment of grazing or rotation grazing.

Shallow to Gravel range site. The potential native vegetation on this site is mixed prairie grasses. Warm-season grasses, such as blue grama, hairy grama, little bluestem, and sideoats grama, make up about 35 percent of the vegetation. Needleandthread, green needlegrass, and western wheatgrass make up about 25 percent. Threadleaf sedge makes up about 20 percent. Forbs, such as prairie clover, blacksamson, dotted gayfeather, and heath aster, also make up about 20 percent.

The major management concern on this site is maintaining the extent of the most productive grasses. After continued overgrazing, needleandthread, little bluestem, sideoats grama, green needlegrass, and western wheatgrass decrease in extent and threadleaf sedge, blue grama, hairy grama, and forbs increase. If overgrazing continues, bare areas are common. The extent of the most productive grasses can be maintained by proper stocking rates in combination with timely deferment of grazing or rotation grazing.

Silty range site. Cool-season grasses make up about 55 percent of the potential vegetation on this site. Green needlegrass, western wheatgrass, and lesser amounts of needleandthread are the major grasses. Warm-season grasses, such as little bluestem, sideoats grama, buffalograss, and blue grama, make up about 25 percent of the vegetation. Shrubs and forbs, such as sagewort, heath aster, yarrow, false-boneset, leadplant, rose, goldenrod, and western snowberry, make up about 20 percent.

The major management concern on this site is maintaining the extent of the most productive grasses. After continued overgrazing, the bluestems, sideoats grama, western wheatgrass, green needlegrass, and needleandthread are replaced by blue grama, Kentucky bluegrass, and threadleaf sedge. The result is low forage production. The extent of the most productive grasses can be increased or maintained by proper stocking rates in combination with timely deferment of grazing or rotation grazing.

Thin Claypan range site. The potential native vegetation on this site is a mixture of mid and short grasses. Short, warm-season grasses dominate the site. Blue grama makes up about 40 percent of the vegetation and buffalograss about 15 percent. Needleandthread and mid, cool-season grasses, such as western wheatgrass, make up about 30 percent. Pricklypear, sagebrush, and forbs, such as sagewort and brome snakeweed, make up about 15 percent.

The major management concern on this site is maintaining the extent of western wheatgrass and needleandthread. After continued overgrazing, these grasses thin out and are replaced by blue grama, buffalograss, pricklypear, and inland saltgrass. If overgrazing continues, much of the surface is bare, especially during dry periods. Weeds increase in extent during wet periods. The extent of the desirable grasses can be maintained or increased by proper stocking rates in combination with timely deferment of grazing or rotation grazing. Restricted grazing during wet periods helps to prevent surface compaction and deterioration of tilth.

Thin Upland range site. The potential native vegetation on this site is mixed prairie grasses. Cool-season grasses, such as green needlegrass, western wheatgrass, and needleandthread, make up about 40 percent of the vegetation. Warm-season grasses, such as little bluestem and sideoats grama, make up about 20 percent. Blue grama and threadleaf sedge, the major understory plants, make up about 30 percent. Woody plants and forbs, such as sagewort, make up about 10 percent.

The major management concern on this site is maintaining the extent of the most productive grasses. If the range is overgrazed, little bluestem, needleandthread, and western wheatgrass decrease in extent. If overgrazing continues, sedges and blue grama dominate the site. The result is low forage production. The extent of the most productive grasses can be increased or maintained by proper stocking rates in combination with timely deferment of grazing or rotation grazing.

Very Shallow range site. The potential native vegetation on this site is mid and short grasses. Needleandthread, the dominant mid grass, makes up about 30 percent of the vegetation. Short grasses, such as blue grama and hairy grama, make up about 30 percent. Sedges, such as threadleaf sedge, make up about 20 percent. Forbs, such as dotted gayfeather and sagewort, and shrubs, such as small soapweed and pricklypear, also make up about 20 percent.

The main management concern on this site is maintaining the extent of the most productive grasses. If overgrazed, the site rapidly deteriorates to a stand of grama grasses, threadleaf sedge, and a few unpalatable forbs. If overgrazing continues, the short grasses thin out and much of the surface is bare. The bare areas are subject to erosion. The extent of the most productive grasses can be increased or maintained by proper stocking rates and by timely deferment of grazing or rotation grazing.

Native Woods, Windbreaks, and Environmental Plantings

Sheridan I. Dronen, forester, Soil Conservation Service, helped prepare this section.

Native trees and shrubs grow on about 7,000 acres in Ziebach County. They generally grow on the flood plains along the Moreau and Cheyenne Rivers and along small creeks and drainageways. The soils that support trees are not classified as woodland soils. Nearly all the wooded areas provide habitat for wildlife and protection for livestock.

Scattered individual plants or clumps of green ash, American elm, boxelder, chokecherry, American plum, buffaloberry, snowberry, and wild rose are common on the Lantry and Cabba soils in draws. Plains cottonwood, peachleaf willow, and sandbar willow grow on the Craft soils on the flood plains along the Cheyenne River. Green ash, American elm, boxelder, chokecherry, and plum grow on the narrow flood plains along the other major drainageways.

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect and furnish habitat for wildlife. Several rows of broadleaf and coniferous trees and shrubs provide the most protection.

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. Field windbreaks protect cropland and crops from wind, help to keep snow on the fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings. 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 7 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in table 7 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.

Establishing windbreaks is difficult in Ziebach County because the amount of rainfall is low. Fallowing a year before planting helps to provide a reserve supply of moisture, which is needed before seedlings can be established. Cultivation and applications of herbicide are effective in controlling weeds.

Grazing is extremely damaging to windbreaks and environmental plantings because the livestock compact the soil and remove the lower branches of the trees and shrubs. Removal of the lower branches reduces the effectiveness of the windbreaks.

At the end of each description under the heading "Detailed Soil Map Units," the soils have been assigned to windbreak suitability groups. These groups are based primarily on the suitability of the soil for locally adapted species, as is indicated by their growth and vigor. Detailed interpretations for each windbreak suitability group in the county are provided in the Technical Guide, which is available in the local office of the Soil Conservation Service.

Additional information about planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service or from a commercial nursery.

Wildlife Habitat

Connie M. Vicuna, biologist, Soil Conservation Service, helped write this section.

Soils affect the kind and amount of vegetation that is available to wildlife for food and cover. They also affect the construction of water impoundments. 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.

Most of Ziebach County is used as range. Only about 17 percent of the acreage is used as cropland. Much of the original character of the wildlife habitat has been maintained. Consequently, many of the original wildlife species still inhabit the county, though in less abundance. These species include antelope, mule deer, sharp-tailed grouse, jackrabbit, lark bunting, and other grassland songbirds. Prairie dogs are throughout the county. Common predators include coyote, fox, badger, raccoon, skunks, golden eagles, hawks, and bobcats. Rattlesnakes are common. Other species, such as white-tailed deer and gray partridge, have benefited from the effects of human activities on the environment.

Woody habitat is on flood plains, along drainageways, and in draws. While not abundant, these scattered areas of shrubs and trees are very important to many rangeland species, either as a food source or as cover during some part of the year.

Wetland habitat includes small areas in drainageways and some large shallow basins with very brackish water. Stock water dams also provide some wetland habitat. They generally maintain small populations of breeding ducks and geese. Waterfowl are abundant only during migration periods. Fish inhabit Lake Oahe and the Cheyenne and Moreau Rivers. Some livestock dams have been stocked for public fishing.

Soil associations provide some indication of the actual and potential distribution and density of wildlife and their habitat. The 14 associations in Ziebach County are described under the heading "General Soil Map Units." Antelope, mule deer, and sharp-tailed grouse inhabit all of the associations. Antelope are most abundant in the open areas and the areas of scattered sagebrush in the

Regent-Rhoades, Bullock-Vebar-Parchin, and Vebar-Daglum associations. Mule deer are most abundant on the river breaks in areas of the Samsil-Pierre association and in the rougher areas between the smaller drainageways in other associations. Sharp-tailed grouse populations vary but tend to be highest in the areas of grassland intermingled with wooded draws.

White-tailed deer frequent the cropland and woody cover on Thunder Butte, along Worthless, Red Coat, and Bear Creeks, and along the Cheyenne and Moreau Rivers. The areas of cropland and wetland in the Reeder-Lantry association also support a high population of white-tailed deer. Turkeys are common along Thunder Butte and Cottonwood Creeks and near Dupree. Their abundance is influenced by the extent of woody cover and human activities.

Individual soils have different potentials for the development and maintenance of wildlife habitat elements. In table 8, the soils in Ziebach County are rated according to their potential for providing specific elements of wildlife habitat. This information can be used in planning parks, wildlife areas, 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 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 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. The element can be established, 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 are very severe and that unsatisfactory results can be expected. Establishing, improving, or maintaining the element 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 flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are winter wheat, oats, and spring wheat.

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, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are intermediate wheatgrass, pubescent wheatgrass, and alfalfa.

Native herbaceous plants are 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 flood hazard. Soil temperature and soil moisture are also considerations. Examples of these plants are big bluestem, goldenrod, beggarweed, western wheatgrass, and grama.

Planted trees and shrubs require cultivation before and during establishment. They can provide fruit, buds, twigs, bark, and foliage. Soil properties that affect the growth of trees and shrubs are depth of the root zone, available water capacity, salinity, and wetness. Examples of these trees and shrubs are green ash, Russian-olive, plum, chokecherry, Rocky Mountain juniper, and eastern redcedar.

Native deciduous trees and woody understory produce nuts or other fruit, buds, 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 elm, cottonwood, ash, willow, plum, and chokecherry.

Native coniferous trees furnish browse and seeds. Soil properties and features that affect the growth of these trees are depth of the root zone, available water capacity, and wetness. Examples of these plants are pine, spruce, cedar, and juniper.

Native shrubs are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of these plants are depth of the root zone, available water capacity, salinity, and soil moisture. Examples of shrubs are skunkbush sumac, gooseberry, 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, 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.

Information concerning the habitat elements needed to maintain and manage specific wildlife species can be obtained from the local office of the Soil Conservation Service or from the South Dakota Department of Game, Fish and Parks.

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. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 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 need to 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 grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, 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 kind 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 (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) 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

Table 9 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, and local roads and streets. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and 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 increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to hard bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to hard bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require

cuts and fills of more than 5 to 6 feet are not considered.

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 stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to hard bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

Sanitary Facilities

Table 10 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and 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 increases in construction costs, and possibly increased maintenance are required.

Table 10 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

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 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons (aerobic) 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. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 10 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive 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.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the 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.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 10 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated

slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to wind erosion.

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 final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 11 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

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 soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high 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 engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 11, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

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.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to

40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

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.

Water Management

Table 12 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 and for embankments, dikes, and levees. 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.

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.

Table 12 also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

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, to a cemented pan, or to 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 potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to 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, or 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 to 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 reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind 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 to 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 or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined 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 grain-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 characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

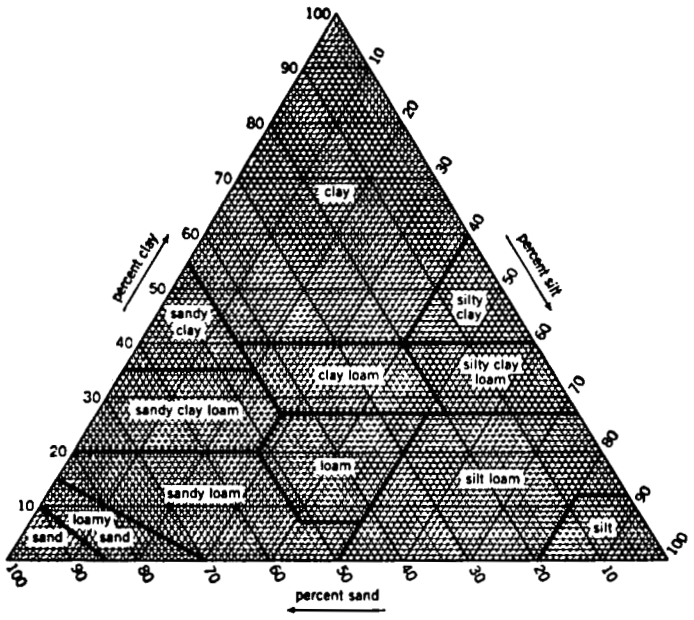

Figure 12.—Percentages of clay, silt, and sand in the basic USDA soil textural classes.

Engineering Index Properties

Table 13 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter (fig. 12). "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*1*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, 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

grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. 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 3 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 grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 14 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major 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 greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major 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. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water 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, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

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 major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. 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.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

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.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) 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 (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

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 resistance to wind erosion in cultivated areas. The groups indicate the susceptibility of soil to wind erosion. Soils are grouped according to the following distinctions:

1. Sands, coarse sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.
2. Loamy sands, loamy fine sands, and loamy very fine sands. These soils are very highly erodible. Crops can be grown if intensive measures to control wind erosion are used.
3. Sandy loams, coarse sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

4L. Calcareous loamy soils that are less than 35 percent clay and more than 5 percent finely divided calcium carbonate. These soils are erodible. Crops can be grown if intensive measures to control wind erosion are used.

4. Clays, silty clays, clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control wind erosion are used.
5. Loamy soils that are less than 20 percent clay and less than 5 percent finely divided calcium carbonate and sandy clay loams and sandy clays that are less than 5 percent finely divided calcium carbonate. These soils are slightly erodible. Crops can be grown if measures to control wind erosion are used.
6. Loamy soils that are 20 to 35 percent clay and less than 5 percent finely divided calcium carbonate, except silty clay loams. These soils are very slightly erodible. Crops can easily be grown.
7. Silty clay loams that are less than 35 percent clay and less than 5 percent finely divided calcium carbonate. These soils are very slightly erodible. Crops can easily be grown.
8. Stony or gravelly soils and other soils not subject to wind erosion.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 14, 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 of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 15 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils 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 permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams or by runoff from adjacent slopes. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 15 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *occasional* that it occurs, on the average, once or less in 2 years; and *frequent* that it occurs, on the average, more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

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 absence of distinctive horizons that form in soils that are not subject to flooding.

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.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 15 are the depth to the seasonal high water table, the kind of water table, and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 15.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, 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 mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*9*). 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 16 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten 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 Boroll (*Bor*, meaning cool, plus *oll*, from Mollisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Argiborolls (*Argi*, meaning argillic horizon, plus *boroll*, the suborder of the Mollisols that has a frigid temperature regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Argiborolls.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed Typic Argiborolls.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the underlying material can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual* (*7*). Many of the technical terms used in the descriptions are defined in *Soil Taxonomy* (*9*). Unless otherwise stated, matrix colors in the descriptions are for dry soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Amor Series

The Amor series consists of moderately deep, well drained soils formed in loamy sandstone residuum on uplands. Permeability is moderate. Slopes range from 9 to 15 percent.

Typical pedon of Amor loam, in an area of Amor-Cabba loams, 9 to 15 percent slopes; 1,155 feet east and 140 feet south of the northwest corner of sec. 10, T. 11 N., R. 20 E.

A—0 to 5 inches; dark brown (10YR 4/3) loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; slightly hard, very friable; many roots; neutral; clear wavy boundary.

Bw—5 to 15 inches; brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2) moist; weak medium prismatic structure parting to weak medium and fine subangular blocky; hard, friable, slightly sticky and slightly plastic; common roots; neutral; clear wavy boundary.

Bk1—15 to 20 inches; brown (10YR 5/3) loam, dark brown (10YR 4/3) moist; weak coarse prismatic structure parting to weak medium subangular blocky; hard, friable, slightly sticky and slightly plastic; common roots; common medium accumulations of carbonate; strong effervescence; mildly alkaline; clear wavy boundary.

Bk2—20 to 27 inches; light yellowish brown (2.5Y 6/4) loam, olive brown (2.5Y 4/4) moist; weak coarse prismatic structure parting to weak medium subangular blocky; hard, friable, slightly sticky and slightly plastic; common roots; common medium accumulations of carbonate; strong effervescence; mildly alkaline; clear wavy boundary.

Bk3—27 to 36 inches; light yellowish brown (2.5Y 6/4) loam, olive brown (2.5Y 4/4) moist; weak coarse subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few roots; common fine accumulations of carbonate; slight effervescence; mildly alkaline; gradual wavy boundary.

Cr—36 to 60 inches; light brownish gray (2.5Y 6/2) and light yellowish brown (2.5Y 6/4), soft sandstone, grayish brown (2.5Y 5/2) and light olive brown (2.5Y 5/4) moist; mildly alkaline.

The mollic epipedon is 7 to 16 inches thick. The depth to soft sandstone ranges from 20 to 40 inches. The depth to free carbonates ranges from 10 to 25 inches.

The A horizon has value of 3 to 5 (2 or 3 moist) and chroma of 2 or 3. It dominantly is loam but in some pedons is silt loam or clay loam. The Bw horizon has hue of 10YR or 2.5Y, value of 5 (3 or 4 moist), and chroma of 2 or 3. It is loam or clay loam. The Cr horizon is soft sandstone or siltstone.

Bankard Series

The Bankard series consists of deep, somewhat excessively drained soils formed in sandy alluvium on flood plains along the Cheyenne River. Permeability is very rapid. Slopes range from 0 to 2 percent.

Typical pedon of Bankard loamy fine sand, 2,540 feet south and 1,120 feet east of the northwest corner of sec. 31, T. 7 N., R. 18 E.

A—0 to 4 inches; pale brown (10YR 6/3) loamy fine sand, dark grayish brown (10YR 4/2) moist; weak fine granular structure parting to single grain; soft, very friable; thin strata of recently deposited material; many roots; strong effervescence; moderately alkaline; clear smooth boundary.

C1—4 to 11 inches; light brownish gray (2.5Y 6/2) loamy fine sand stratified with thin layers of sandy loam and loam; dark grayish brown (2.5Y 4/2) moist; soft, very friable; common roots; strong effervescence; moderately alkaline; clear smooth boundary.

C2—11 to 60 inches; light brownish gray (2.5Y 6/2) fine sand, grayish brown (2.5Y 5/2) moist; single grain; loose; few roots to a depth of about 20 inches; slight effervescence; moderately alkaline.

Free carbonates typically are throughout the profile, but in some pedons they are not evident in the surface layer. The A horizon has hue of 10YR or 2.5Y, value of 5 or 6 (3 to 5 moist), and chroma of 2 or 3. It dominantly is loamy fine sand but in some pedons is fine sand or fine sandy loam. The C horizon has hue of 10YR or 2.5Y, value of 5 or 6 (4 to 6 moist), and chroma of 2 or 3. It is stratified loamy fine sand, fine sand, sand, or fine sandy loam.

Bankard Variant

The Bankard Variant consists of excessively drained soils formed in sandy alluvium on flood plains along the Cheyenne River. These soils are shallow over sand and gravel. Permeability is rapid in the upper part of the profile and very rapid in the lower part. Slopes range from 0 to 2 percent.

Typical pedon of Bankard Variant loamy fine sand, 810 feet south and 1,220 feet west of the northeast corner of sec. 32, T. 7 N., R. 18 E.

A—0 to 4 inches; grayish brown (10YR 5/2) loamy fine sand, dark grayish brown (10YR 4/2) moist; weak fine granular structure parting to single grain; loose; thin strata of recently deposited material; common roots; strong effervescence; moderately alkaline; clear wavy boundary.

C—4 to 13 inches; grayish brown (10YR 5/2) sand stratified with thin layers of fine sandy loam; dark grayish brown (10YR 4/2) moist; single grain; loose; few roots; strong effervescence; moderately alkaline; gradual wavy boundary.

2C—13 to 60 inches; multicolored very gravelly sand; single grain; loose; strong effervescence; moderately alkaline.

The depth to gravelly material ranges from 4 to 15 inches. Free carbonates typically are throughout the profile, but in some pedons they are not evident in the surface layer. These soils have hue of 10YR or 2.5Y, value of 5 or 6 (4 to 6 moist), and chroma of 2 or 3 throughout.

The A horizon dominantly is loamy fine sand but in some pedons is fine sandy loam. The C horizon dominantly is loamy fine sand, fine sand, or sand, but it has thin layers of fine sandy loam throughout.

Banks Series

The Banks series consists of deep, somewhat excessively drained soils formed in sandy alluvium on flood plains along the Moreau River. Permeability is rapid. Slopes range from 0 to 2 percent.

Typical pedon of Banks loamy fine sand, 1,760 feet south and 130 feet east of the northwest corner of sec. 35, T. 15 N., R. 20 E.

A—0 to 3 inches; grayish brown (10YR 5/2) loamy fine sand, very dark grayish brown (10YR 3/2) moist; weak fine granular structure parting to single grain; loose; thin strata of recently deposited material; many roots; slight effervescence; mildly alkaline; clear wavy boundary.

C1—3 to 16 inches; light brownish gray (2.5Y 6/2) fine sand stratified with thin layers of sandy loam; dark grayish brown (2.5Y 4/2) moist; single grain; loose; common roots; slight effervescence; mildly alkaline; clear wavy boundary.

C2—16 to 20 inches; light brownish gray (2.5Y 6/2), stratified fine sandy loam, dark grayish brown (2.5Y 4/2) moist; soft, very friable; few roots; slight effervescence; mildly alkaline; gradual wavy boundary.

C3—20 to 60 inches; light brownish gray (2.5Y 6/2) loamy fine sand, dark grayish brown (2.5Y 4/2) moist; single grain; loose; few roots to a depth of about 30 inches; slight effervescence; mildly alkaline.

Free carbonates typically are throughout the profile, but in some pedons they are not evident in the surface layer. The A horizon has hue of 10YR or 2.5Y, value of 5 to 7 (3 to 5 moist), and chroma of 2 or 3. It dominantly is loamy fine sand but in some pedons is fine sand or fine sandy loam. The C horizon has hue of 10YR or 2.5Y, value of 5 to 7 (4 to 6 moist), and chroma of 2 or 3. It is stratified loamy fine sand, fine sand, fine sandy loam, or sand.

Bullock Series

The Bullock series consists of moderately deep, well drained soils formed in loamy residuum on uplands. Permeability is very slow. Slopes range from 0 to 25 percent.

Typical pedon of Bullock fine sandy loam, in an area of Bullock-Parchin fine sandy loams, 0 to 9 percent slopes; 2,200 feet west and 960 feet north of the southeast corner of sec. 19, T. 16 N., R. 20 E.

E—0 to 3 inches; light brownish gray (10YR 6/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, very friable; common roots; slightly acid; clear smooth boundary.

Bt—3 to 9 inches; brown (10YR 5/3) clay loam, dark brown (10YR 4/3) moist; moderate medium columnar structure parting to moderate medium subangular blocky; light brownish gray (10YR 6/2) coatings on the tops of columns; hard, firm, sticky and plastic; shiny surfaces on peds; common roots; mildly alkaline; gradual wavy boundary.

Btkz—9 to 15 inches; light olive brown (2.5Y 5/4) clay loam, olive brown (2.5Y 4/4) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, firm, sticky and plastic; shiny surfaces on peds; few roots; few medium accumulations of salts; few medium accumulations of carbonate; slight effervescence; mildly alkaline; gradual wavy boundary.

Bkz—15 to 23 inches; light olive brown (2.5Y 5/4) clay loam, grayish brown (2.5Y 5/2) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few fine accumulations of salts; few fine accumulations of carbonate; slight effervescence; strongly alkaline; gradual wavy boundary.

Cr—23 to 60 inches; grayish brown (2.5Y 5/2), soft bedrock, dark grayish brown (2.5Y 4/2) moist; slight effervescence.

The depth to soft bedrock ranges from 20 to 40 inches. The depth to visible salts is 6 to 15 inches. Free carbonates are leached to a depth of 7 to 11 inches.

The E horizon has hue of 10YR or 2.5Y, value of 5 to 7 (3 or 4 moist), and chroma of 1 or 2. It dominantly is fine sandy loam but in some pedons is loamy fine sand. The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6 (4 or 5 moist), and chroma of 2 to 4. It is sandy clay loam, clay loam, or loam. The Cr horizon is soft sandstone, siltstone, or shale.

Cabba Series

The Cabba series consists of shallow, well drained soils formed in loamy residuum on uplands. Permeability is moderate. Slopes range from 6 to 60 percent.

Typical pedon of Cabba loam, in an area of Lantry-Cabba complex, 9 to 30 percent slopes; 385 feet south and 190 feet east of the northwest corner of sec. 18, T. 11 N., R. 21 E.

A—0 to 4 inches; grayish brown (2.5Y 5/2) loam, dark grayish brown (2.5Y 4/2) moist; weak medium subangular blocky structure parting to weak fine granular; slightly hard, friable; many roots; slight effervescence; mildly alkaline; clear smooth boundary.

AC—4 to 9 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; weak medium subangular blocky structure parting to weak fine granular; hard, friable; many roots; slight

effervescence; mildly alkaline; clear smooth boundary.
C—9 to 16 inches; grayish brown (2.5Y 5/2) and light yellowish brown (2.5Y 6/4) clay loam, dark grayish brown (2.5Y 4/2) and light olive brown (2.5Y 5/4) moist; massive; hard, friable, slightly sticky and plastic; few roots; about 10 percent fragments of bedrock; few fine accumulations of carbonate; slight effervescence; mildly alkaline; clear smooth boundary.
Cr—16 to 60 inches; light brownish gray (2.5Y 6/2) and light yellowish brown (2.5Y 6/4), soft bedrock, dark grayish brown (2.5Y 4/2) and light olive brown (2.5Y 5/4) moist; mildly alkaline.

The depth to soft bedrock ranges from 10 to 20 inches. Free carbonates typically are throughout the profile, but in some pedons they are not evident in the surface layer.

The A horizon has hue of 10YR or 2.5Y, value of 5 or 6 (3 or 4 moist), and chroma of 2 or 3. It dominantly is loam but in some pedons is silt loam or clay loam. The C horizon has hue of 10YR or 2.5Y, value of 5 to 7 (4 to 6 moist), and chroma of 2 to 4. It is loam or clay loam. The Cr horizon is soft sandstone or siltstone.

Cohagen Series

The Cohagen series consists of shallow, well drained soils formed in loamy sandstone residuum on uplands. Permeability is moderately rapid. Slopes range from 6 to 50 percent.

Typical pedon of Cohagen fine sandy loam, in an area of Vebar-Cohagen fine sandy loams, 6 to 15 percent slopes; 1,300 feet east and 52 feet south of the northwest corner of sec. 17, T. 13 N., R. 18 E.

A—0 to 3 inches; grayish brown (2.5Y 5/2) fine sandy loam, dark grayish brown (2.5Y 4/2) moist; weak fine granular structure; soft, very friable; many roots; slight effervescence; mildly alkaline; clear wavy boundary.
C—3 to 11 inches; light yellowish brown (2.5Y 6/4) fine sandy loam, light olive brown (2.5Y 5/4) moist; massive; soft, very friable; common roots; strong effervescence; mildly alkaline; gradual wavy boundary.
Cr—11 to 60 inches; light brownish gray (2.5Y 6/2) and light yellowish brown (2.5Y 6/4), soft sandstone, grayish brown (2.5Y 5/2) and light olive brown (2.5Y 5/4) moist; strong effervescence; mildly alkaline.

The depth to soft sandstone ranges from 10 to 20 inches. Free carbonates typically are throughout the profile, but in some pedons they are not evident in the surface layer.

The A horizon has hue of 2.5Y or 10YR, value of 5 or 6 (3 or 4 moist), and chroma of 2 or 3. It dominantly is fine sandy loam but in some pedons is loamy fine sand. The C horizon has hue of 2.5Y or 10YR, value of 5 or 6 (4 or 5 moist), and chroma of 2 to 4. It is fine sandy loam or sandy loam.

Craft Series

The Craft series consists of deep, well drained soils formed in alluvium on flood plains along the Cheyenne River. Permeability is moderate. Slopes range from 0 to 2 percent.

Typical pedon of Craft very fine sandy loam, 510 feet west and 100 feet south of the northeast corner of sec. 12, T. 7 N., R. 20 E.

A—0 to 6 inches; pale brown (10YR 6/3) very fine sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure parting to weak medium and fine granular; soft, very friable; thin strata of recently deposited material; common roots; slight effervescence; mildly alkaline; clear smooth boundary.
C1—6 to 36 inches; light brownish gray (2.5Y 6/2) very fine sandy loam stratified with thin layers of loamy fine sand and silt; dark grayish brown (2.5Y 4/2) moist; loose, very friable; few roots; slight effervescence; moderately alkaline; gradual wavy boundary.
C2—36 to 60 inches; light brownish gray (2.5Y 6/2) loamy very fine sand, dark grayish brown (2.5Y 4/2) moist; single grain; loose, very friable; slight effervescence; moderately alkaline.

Free carbonates typically are throughout the profile, but in some pedons they are not evident in the surface layer. The A horizon has value of 5 or 6 (3 to 5 moist) and chroma of 2 or 3. It dominantly is very fine sandy loam but in some pedons is loamy very fine sand. The C horizon has hue of 10YR or 2.5Y, value of 6 or 7 (4 or 5 moist), and chroma of 2 or 3. It is stratified very fine sandy loam, silt loam, or loamy very fine sand.

Daglum Series

The Daglum series consists of deep, well drained soils formed in clayey and loamy material on uplands and terraces. Permeability is slow. Slopes range from 0 to 9 percent.

Typical pedon of Daglum loam, in an area of Daglum-Rhoades loams, 2 to 6 percent slopes; 2,380 feet north and 1,655 feet east of the southwest corner of sec. 8, T. 13 N., R. 18 E.

A—0 to 4 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, friable; many roots; slightly acid; clear smooth boundary.

E—4 to 6 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure parting to weak fine granular; hard, friable; common roots; neutral; abrupt wavy boundary.
Bt—6 to 12 inches; dark grayish brown (10YR 4/2) clay, dark brown (10YR 3/3) moist; strong medium columnar structure parting to moderate medium subangular blocky; very hard, firm, sticky and plastic; shiny surfaces on peds; common roots; mildly alkaline; clear wavy boundary.
Btk—12 to 17 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; moderate medium subangular blocky structure; very hard, firm, sticky and plastic; shiny surfaces on peds; few roots; few fine accumulations of carbonate; slight effervescence; moderately alkaline; clear wavy boundary.
Bk—17 to 22 inches; grayish brown (10YR 5/2) clay, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; very hard, firm, sticky and plastic; few roots; few medium accumulations of carbonate; strong effervescence; strongly alkaline; clear wavy boundary.
Cz—22 to 50 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; massive; very hard, firm, sticky and plastic; common fine accumulations of salts; strong effervescence; moderately alkaline; gradual wavy boundary.
C—50 to 60 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, firm, sticky and plastic; slight effervescence; moderately alkaline.

The depth to free carbonates ranges from 12 to 25 inches. In some pedons soft bedrock is at a depth of 40 to 60 inches.

The A horizon has value of 4 or 5 (2 or 3 moist). It dominantly is loam but in some pedons is fine sandy loam or silt loam. The E horizon has hue of 10YR or 2.5Y, value of 4 to 6 (3 to 5 moist), and chroma of 1 or 2. It is very fine sandy loam, loam, or silt loam. The Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5 (3 or 4 moist), and chroma of 2 or 3. It is clay, silty clay, or clay loam. The C horizon has hue of 2.5Y or 5Y, value of 5 to 7 (4 to 6 moist), and chroma of 2 or 3. It is clay, clay loam, or silty clay loam.

Dupree Series

The Dupree series consists of shallow, well drained soils formed in clayey residuum on uplands. When dry, these soils are characterized by cracks, which are 0.5 inch to 2.0 inches wide and several feet long and extend through the subsoil. Permeability is very slow. Slopes range from 3 to 15 percent.

Typical pedon of Dupree clay, 3 to 15 percent slopes, 1,800 feet west and 1,825 feet south of the northeast corner of sec. 27, T. 12 N., R. 24 E.

A—0 to 2 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; moderate fine subangular blocky structure; very hard, very firm, very sticky and very plastic; common roots; neutral; clear wavy boundary.
Bw1—2 to 12 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; moderate coarse subangular blocky structure parting to strong medium subangular blocky; very hard, very firm, very sticky and very plastic; common roots; about 5 percent fragments of shale; mildly alkaline; clear wavy boundary.
Bw2—12 to 16 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; moderate medium and fine subangular blocky structure; very hard, very firm, very sticky and very plastic; common roots; about 20 percent fragments of shale; few fine distinct strong brown (7.5YR 5/6) iron stains; mildly alkaline; clear wavy boundary.
Cr—16 to 60 inches; light brownish gray (2.5Y 6/2), bedded shale, light olive brown (2.5Y 5/4) moist; few nests of gypsum between shale plates.

The depth to shale ranges from 10 to 20 inches. Most pedons have no free carbonates, but some are calcareous.

The A horizon has hue of 2.5Y or 10YR, value of 4 or 5 (3 or 4 moist), and chroma of 1 or 2. It dominantly is clay but in some pedons is silty clay. The Bw horizon has hue of 2.5Y or 5Y and value of 5 or 6 (4 or 5 moist). The content of shale fragments in this horizon ranges from 5 to 25 percent.

Evridge Series

The Evridge series consists of moderately deep, well drained soils formed in sandy and loamy residuum on uplands. Permeability is moderately rapid in the upper part of the profile and slow in the lower part. Slopes range from 0 to 6 percent.

Typical pedon of Evridge loamy fine sand, 0 to 6 percent slopes, 875 feet north and 70 feet west of the southeast corner of sec. 36, T. 17 N., R. 19 E.

A1—0 to 5 inches; brown (10YR 5/3) loamy fine sand, dark brown (10YR 3/3) moist; weak medium subangular blocky structure parting to weak fine granular; soft, very friable; many roots; slightly acid; clear wavy boundary.
A2—5 to 15 inches; brown (10YR 5/3) loamy fine sand, dark brown (10YR 3/3) moist; weak coarse subangular blocky structure parting to weak fine

subangular blocky; soft, very friable; common roots; slightly acid; clear wavy boundary.

E1—15 to 19 inches; light brownish gray (10YR 6/2) loamy fine sand, brown (10YR 4/3) moist; weak medium subangular blocky structure parting to weak fine subangular blocky; soft, very friable; few roots; neutral; clear wavy boundary.

E2—19 to 24 inches; light brownish gray (10YR 6/2) loamy fine sand, grayish brown (10YR 5/2) moist; weak coarse subangular blocky structure parting to weak fine subangular blocky; soft, very friable; few roots; mildly alkaline; clear smooth boundary.

Bt—24 to 30 inches; grayish brown (2.5Y 5/2) fine sandy loam, dark grayish brown (2.5Y 4/2) moist; strong coarse columnar structure parting to strong medium subangular blocky; slightly hard, friable; shiny surfaces on peds; few roots; strongly alkaline; clear wavy boundary.

Bk—30 to 35 inches; light brownish gray (2.5Y 6/2) fine sandy loam, grayish brown (2.5Y 5/2) moist; weak coarse subangular blocky structure; hard, friable; few roots; common medium and fine accumulations of carbonate; strong effervescence; strongly alkaline; clear wavy boundary.

Cr—35 to 60 inches; light brownish gray (2.5Y 6/2), soft sandstone, grayish brown (2.5Y 5/2) moist; slight effervescence; moderately alkaline.

The mollic epipedon is 7 to 16 inches thick. The depth to soft bedrock ranges from 24 to 40 inches. The depth to free carbonates ranges from 24 to 35 inches.

The A horizon has value of 4 or 5 (2 or 3 moist) and chroma of 2 or 3. It dominantly is loamy fine sand but in some pedons is fine sandy loam. The E horizon has hue of 10YR or 2.5Y, value of 5 to 7 (4 or 5 moist), and chroma of 2 or 3. It is loamy fine sand or fine sandy loam. The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6 (4 or 5 moist), and chroma of 2 or 3. It is fine sandy loam or loam. The Cr horizon is soft sandstone or siltstone.

Farland Series

The Farland series consists of deep, well drained soils formed in silty and loamy alluvium on terraces and uplands. Permeability is moderate. Slopes range from 0 to 6 percent.

Typical pedon of Farland silt loam, 0 to 2 percent slopes, 2,110 feet east and 970 feet south of the northwest corner of sec. 34, T. 15 N., R. 20 E.

A—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak medium and fine subangular blocky structure parting to moderate medium granular; slightly hard, friable; many roots; neutral; clear wavy boundary.

Bt1—8 to 13 inches; brown (10YR 4/3) silty clay loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to moderate fine subangular blocky; hard, friable, sticky and slightly plastic; shiny surfaces on peds; common roots; neutral; clear wavy boundary.

Bt2—13 to 20 inches; brown (10YR 5/3) silty clay loam, brown (10YR 4/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, friable, sticky and slightly plastic; shiny surfaces on peds; common roots; neutral; clear wavy boundary.

Bk1—20 to 26 inches; pale brown (10YR 6/3) silt loam, brown (10YR 5/3) moist; moderate coarse subangular blocky structure; slightly hard, friable; few roots; few fine accumulations of carbonate; strong effervescence; moderately alkaline; gradual wavy boundary.

Bk2—26 to 38 inches; pale brown (10YR 6/3) silt loam, brown (10YR 5/3) moist; weak coarse subangular blocky structure; slightly hard, friable; few roots; few fine accumulations of carbonate; strong effervescence; moderately alkaline; gradual wavy boundary.

C—38 to 60 inches; brown (10YR 5/3) loam, dark brown (10YR 4/3) moist; massive; slightly hard, friable; slight effervescence; moderately alkaline.

The mollic epipedon is 8 to 15 inches thick. The depth to free carbonates ranges from 10 to 25 inches.

The A horizon has value of 4 or 5 (2 or 3 moist) and chroma of 2 or 3. It dominantly is silt loam but in some pedons is loam. The Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5 (3 or 4 moist), and chroma of 2 to 4. It is clay loam or silty clay loam. The content of clay in this horizon is as low as 27 percent in some pedons and as high as 35 percent in others. The C horizon has hue of 10YR or 2.5Y, value of 5 to 7 (4 to 6 moist), and chroma of 2 to 4. It is loam or silt loam. In some pedons sand and gravel are below a depth of 40 inches.

Glenross Series

The Glenross series consists of deep, poorly drained soils formed in loamy alluvium on flood plains. Permeability is slow. Slopes are less than 1 percent.

Typical pedon of Glenross fine sandy loam, 240 feet north and 480 feet west of the southeast corner of sec. 21, T. 17 N., R. 20 E.

E—0 to 1 inch; grayish brown (10YR 5/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; weak thin platy structure; soft, very friable; common roots; slight effervescence; strongly alkaline; abrupt smooth boundary.

Btg—1 to 8 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; few medium faint light olive brown (2.5Y 5/4) mottles; moderate medium columnar structure parting to weak medium

subangular blocky; slightly hard, friable, slightly sticky and plastic; common roots; few fine accumulations of salts; slight effervescence; strongly alkaline; clear wavy boundary.

Bzg—8 to 19 inches; light brownish gray (2.5Y 6/2) sandy clay loam, grayish brown (2.5Y 5/2) moist; few fine distinct light olive brown (2.5Y 5/6) mottles; weak coarse subangular blocky structure parting to weak medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common roots; few fine accumulations of salts; slight effervescence; very strongly alkaline; gradual wavy boundary.

Czg—19 to 41 inches; light brownish gray (2.5Y 6/2) fine sandy loam, grayish brown (2.5Y 5/2) moist; few fine distinct yellowish brown (10YR 5/6) mottles; massive; soft, very friable; few roots; few fine accumulations of salts; slight effervescence; very strongly alkaline; gradual wavy boundary.

Cg—41 to 60 inches; light brownish gray (2.5Y 6/2) fine sandy loam, grayish brown (2.5Y 5/2) moist; few fine distinct yellowish brown (10YR 5/6) mottles; massive; soft, very friable; few fine accumulations of salts; slight effervescence; strongly alkaline.

The E horizon has hue of 10YR or 2.5Y, value of 5 or 6 (3 or 4 moist), and chroma of 1 or 2. It dominantly is fine sandy loam but in some pedons is loamy fine sand. The Btg horizon has hue of 10YR or 2.5Y, value of 5 or 6 (4 or 5 moist), and chroma of 1 or 2. It is clay loam or sandy clay loam. The Bzg and C horizons are fine sandy loam, sandy clay loam, or loam. The Bzg horizon has hue of 2.5Y or 5Y, value of 5 or 6 (5 or 6 moist), and chroma of 2 to 4. The C horizon has hue of 2.5Y or 5Y, value of 6 or 7 (5 or 6 moist), and chroma of 2 to 4.

Grail Series

The Grail series consists of deep, well drained soils formed in silty and clayey local alluvium in swales and on broad flats in the uplands. Permeability is moderately slow. Slopes range from 0 to 3 percent.

Typical pedon of Grail silt loam, 585 feet north and 195 feet east of the southwest corner of sec. 35, T. 13 N., R. 21 E.

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to weak fine granular; slightly hard, friable; slightly acid; clear smooth boundary.

A—5 to 9 inches; dark gray (10YR 4/1) silt loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to weak fine granular; slightly hard, friable; slightly acid; clear wavy boundary.

Bt1—9 to 21 inches; dark grayish brown (2.5Y 4/2) silty clay, very dark grayish brown (2.5Y 3/2) moist; moderate medium subangular blocky structure parting to weak fine subangular blocky; very hard, firm, sticky and plastic; shiny surfaces on peds; neutral; gradual wavy boundary.

Bt2—21 to 28 inches; dark grayish brown (2.5Y 4/2) silty clay, very dark grayish brown (2.5Y 3/2) moist; weak medium subangular blocky structure parting to moderate fine granular; very hard, firm, sticky and plastic; shiny surfaces on peds; few fine accumulations of carbonate; slight effervescence; mildly alkaline; gradual wavy boundary.

Bk—28 to 36 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; weak medium subangular blocky structure; hard, firm, sticky and plastic; few fine accumulations of carbonate; strong effervescence; moderately alkaline; gradual wavy boundary.

C1—36 to 42 inches; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, firm, sticky and plastic; strong effervescence; moderately alkaline; gradual wavy boundary.

C2—42 to 60 inches; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, firm, sticky and plastic; few fine accumulations of salts; strong effervescence; mildly alkaline.

The depth to free carbonates ranges from 20 to 35 inches. The mollic epipedon is more than 16 inches thick.

The A horizon has value of 3 or 4 (2 or 3 moist) and chroma of 1 or 2. It dominantly is silt loam but in some pedons is silty clay loam. The Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5 (2 or 3 moist), and chroma of 1 to 3. It is silty clay loam, clay loam, or silty clay. The content of clay in this horizon is as low as 35 percent in some pedons and as high as 45 percent in others. The C horizon has value of 5 or 6 (4 or 5 moist) and chroma of 2 or 3. It is silty clay loam, silt loam, clay loam, or silty clay.

Haverson Series

The Haverson series consists of deep, well drained soils formed in silty and loamy alluvium on flood plains. Permeability is moderate. Slopes range from 0 to 2 percent.

The Haverson soils in this county have more silt and less sand throughout than is definitive for the series. This difference, however, does not significantly alter the usefulness or behavior of the soils.

Typical pedon of Haverson silt loam, channeled, 2,490 feet north and 550 feet west of the southeast corner of sec. 17, T. 9 N., R. 19 E.

A—0 to 4 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable; thin strata of

recently deposited material; common roots; slight effervescence; mildly alkaline; clear smooth boundary.

C1—4 to 16 inches; grayish brown (10YR 5/2) silty clay loam stratified with thin layers of silt loam; dark grayish brown (10YR 4/2) moist; slightly hard, friable, slightly sticky and slightly plastic; common roots; strong effervescence; mildly alkaline; gradual wavy boundary.

C2—16 to 47 inches; grayish brown (10YR 5/2) silt loam stratified with thin layers of silty clay loam; dark grayish brown (10YR 4/2) moist; massive; soft, friable; few roots; strong effervescence; mildly alkaline; gradual wavy boundary.

C3—47 to 60 inches; grayish brown (10YR 5/2) loam stratified with thin layers of fine sandy loam and silt loam; dark grayish brown (10YR 4/2) moist; massive; soft, very friable; violent effervescence; mildly alkaline.

Free carbonates typically are throughout the profile, but in some pedons they are not evident in the surface layer. The A horizon has hue of 10YR or 2.5Y, value of 5 or 6 (3 or 4 moist), and chroma of 2 or 3. It dominantly is silt loam but in some pedons is clay loam or very fine sandy loam. The C horizon has hue of 10YR or 2.5Y, value of 5 to 7 (3 to 5 moist), and chroma of 2 or 3. It is stratified silt loam, silty clay loam, loam, fine sandy loam, or loam.

Heil Series

The Heil series consists of deep, poorly drained, sodic soils formed in clayey local alluvium in depressions on uplands. Permeability is very slow. Slopes are less than 1 percent.

Typical pedon of Heil silt loam, 2,410 feet south and 1,825 feet east of the northwest corner of sec. 2, T. 11 N., R. 22 E.

E—0 to 2 inches; gray (10YR 5/1) silt loam, very dark gray (10YR 3/1) moist; common fine distinct dark brown (10YR 4/3) mottles; weak fine granular structure; soft, very friable; many roots; medium acid; abrupt smooth boundary.

Bt1—2 to 10 inches; dark gray (5Y 4/1) clay, dark olive gray (5Y 3/2) moist; weak medium columnar structure parting to moderate medium subangular blocky; very hard, very firm, very sticky and very plastic; shiny surfaces on peds; common roots; neutral; clear wavy boundary.

Bt2—10 to 29 inches; dark gray (5Y 4/1) clay, dark olive gray (5Y 3/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; very hard, extremely firm, very sticky and very plastic; shiny surfaces on peds; common roots; mildly alkaline; gradual wavy boundary.

Bkg—29 to 60 inches; olive gray (5Y 5/2) silty clay, olive gray (5Y 4/2) moist; moderate coarse subangular blocky structure; very hard, very firm, very sticky and very plastic; common medium accumulations of carbonate; strong effervescence; moderately alkaline.

The depth to free carbonates ranges from 20 to 35 inches. Visible salts are in the lower parts of some pedons.

The E horizon has hue of 10YR or 2.5Y and value of 4 or 5 (3 or 4 moist). It dominantly is silt loam but in some pedons is silty clay loam. The Bt and Bkg horizons are silty clay or clay. The Bt horizon has hue of 2.5Y or 5Y, value of 4 or 5 (3 or 4 moist), and chroma of 1 or 2. The Bkg horizon has hue of 5Y or 2.5Y, value of 4 to 6 (3 or 4 moist), and chroma of 1 to 3. Some pedons have a C horizon.

Heil Variant

The Heil Variant consists of deep, very poorly drained soils formed in clayey local alluvium in depressions on uplands. Permeability is very slow. Slopes are less than 1 percent.

Typical pedon of Heil Variant silty clay loam, ponded, 1,305 feet north and 250 feet west of the southeast corner of sec. 27, T. 12 N., R. 22 E.

A—0 to 3 inches; gray (5Y 5/1) silty clay loam, dark gray (5Y 4/1) moist; moderate medium granular structure; slightly hard, very friable, sticky and plastic; few roots; moderately alkaline; clear wavy boundary.

Cg1—3 to 16 inches; gray (5Y 5/1) silty clay loam, dark gray (5Y 4/1) moist; weak coarse subangular blocky structure parting to weak medium subangular blocky; very hard, friable, sticky and plastic; few roots; slight effervescence; moderately alkaline; clear wavy boundary.

Cg2—16 to 29 inches; olive gray (5Y 5/2) clay, olive gray (5Y 4/2) moist; massive; very hard, firm, sticky and plastic; slight effervescence; moderately alkaline; gradual wavy boundary.

Cg3—29 to 55 inches; light olive gray (5Y 6/2) clay, olive (5Y 5/3) moist; massive; very hard, firm, sticky and plastic; slight effervescence; strongly alkaline; gradual wavy boundary.

Cg4—55 to 60 inches; pale olive (5Y 6/3) clay, olive (5Y 5/3) moist; common medium distinct light olive brown (2.5Y 5/6) mottles; very hard, firm, sticky and very plastic; slight effervescence; strongly alkaline.

The A horizon has hue of 2.5Y or 5Y, value of 4 to 6 (4 or 5 moist), and chroma of 1 or 2. It dominantly is silty clay loam but in some pedons is silty clay or silt loam. The C horizon has value of 5 to 7 (4 to 6 moist) and

chroma of 1 to 3. In some pedons it has accumulations of salts in the lower part.

Hisle Series

The Hisle series consists of moderately deep, well drained, sodic soils formed in clayey residuum on uplands. Permeability is very slow. Slopes range from 2 to 9 percent.

Typical pedon of Hisle silt loam, in an area of Hisle-Pierre complex, 2 to 9 percent slopes; 870 feet north and 1,480 feet west of the southeast corner of sec. 1, T. 9 N., R. 20 E.

E—0 to 1 inch; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure; slightly hard, friable; common roots; mildly alkaline; abrupt smooth boundary.

Bt1—1 to 4 inches; grayish brown (10YR 5/2) clay, dark grayish brown (10YR 4/2) moist; weak coarse columnar structure parting to moderate medium subangular blocky; hard, firm, sticky and plastic; shiny surfaces on peds; common roots; slight effervescence; strongly alkaline; clear wavy boundary.

Bt2—4 to 15 inches; grayish brown (10YR 5/2) clay, dark grayish brown (10YR 4/2) moist; weak very coarse subangular blocky structure parting to weak medium subangular blocky; hard, firm, sticky and plastic; shiny surfaces on peds; few roots; slight effervescence; strongly alkaline; gradual wavy boundary.

Bkz1—15 to 26 inches; grayish brown (10YR 5/2) clay, dark grayish brown (10YR 4/2) moist; weak coarse subangular blocky structure parting to weak medium subangular blocky; hard, firm, sticky and plastic; common fine accumulations of salts; few fine accumulations of carbonate; slight effervescence; strongly alkaline; gradual wavy boundary.

Bkz2—26 to 35 inches; light brownish gray (2.5Y 6/2) silty clay, dark grayish brown (2.5Y 4/2) moist; weak medium subangular blocky structure; hard, firm, sticky and plastic; common fine accumulations of salts; few fine accumulations of carbonate; slight effervescence; moderately alkaline; gradual wavy boundary.

Cr—35 to 60 inches; light brownish gray (2.5Y 6/2) clayey shale, grayish brown (2.5Y 5/2) moist.

The depth to shale bedrock ranges from 20 to 40 inches. The E horizon has hue of 10YR or 2.5Y, value of 5 or 6 (4 or 5 moist), and chroma of 1 or 2. It dominantly is silt loam but in some pedons is loam. The Bt and Bkz horizons are silty clay or clay. The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6 (4 or 5 moist), and chroma of 1 to 3. The Bkz horizon has hue of 10YR or 2.5Y, value of 5 to 7 (4 or 5 moist), and chroma of 1 to 3. Some pedons have a C horizon.

Korchea Series

The Korchea series consists of deep, well drained soils formed in loamy alluvium on terraces and flood plains. Permeability is moderate. Slopes range from 0 to 2 percent.

Typical pedon of Korchea loam, channeled, 715 feet north and 2,350 feet west of the southeast corner of sec. 30, T. 15 N., R. 20 E.

A—0 to 6 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; slightly hard, very friable; thin strata of recently deposited material; many roots; slight effervescence; mildly alkaline; clear wavy boundary.

C1—6 to 15 inches; grayish brown (10YR 5/2) loam stratified with thin layers of fine sandy loam; very dark grayish brown (10YR 3/2) moist; massive; hard, friable; common roots; slight effervescence; mildly alkaline; gradual wavy boundary.

C2—15 to 34 inches; light brownish gray (10YR 6/2) loam stratified with thin layers of silty clay loam and silt loam; dark brown (10YR 3/3) moist; massive; hard, friable; common roots; slight effervescence; mildly alkaline; gradual wavy boundary.

C3—34 to 44 inches; light brownish gray (10YR 6/2) loam stratified with thin layers of fine sandy loam; dark grayish brown (10YR 4/2) moist; massive; soft, very friable; few roots; slight effervescence; mildly alkaline; gradual wavy boundary.

C4—44 to 60 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, friable; strong effervescence; mildly alkaline.

Free carbonates typically are throughout the profile, but in some pedons they are not evident in the surface layer. The A horizon has hue of 2.5Y or 10YR, value of 4 or 5 (2 or 3 moist), and chroma of 2 or 3. It dominantly is loam but in some pedons is fine sandy loam or silt loam. The C horizon has hue of 10YR or 2.5Y, value of 4 to 6 (3 to 5 moist), and chroma of 2 to 4. It is stratified loam, silty clay loam, fine sandy loam, or silt loam.

Kyle Series

The Kyle series consists of deep, well drained soils formed in clayey material on uplands. When dry, these soils are characterized by cracks, which are 0.5 inch to 2.0 inches wide and several feet long and extend through the subsoil. The landscape is characterized by gilgai relief. Permeability is very slow. Slopes range from 2 to 15 percent.

Typical pedon of the Kyle clay, 2 to 6 percent slopes, 1,090 feet north and 2,640 feet east of the southwest corner of sec. 21, T. 9 N., R. 21 E.

A—0 to 3 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; weak fine subangular blocky structure; hard, firm, sticky and plastic; many roots; few cracks 0.5 to 1.0 inch wide; neutral; clear wavy boundary.

Bw1—3 to 6 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; moderate medium subangular blocky structure; very hard, very firm, sticky and plastic; few intersecting slickensides; common roots; few cracks 0.5 to 1.0 inch wide; mildly alkaline; clear wavy boundary.

Bw2—6 to 23 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; strong medium subangular blocky structure; very hard, very firm, sticky and plastic; few intersecting slickensides; common roots; few cracks 0.5 to 1.0 inch wide; slight effervescence; mildly alkaline; gradual wavy boundary.

Bk—23 to 33 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; weak coarse subangular blocky structure parting to weak medium subangular blocky; very hard, very firm, sticky and plastic; few cracks 0.5 to 1.0 inch wide; few roots; common fine accumulations of carbonate; slight effervescence; mildly alkaline; gradual wavy boundary.

C—33 to 60 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; massive; hard, firm, sticky and plastic; few fine accumulations of carbonate; slight effervescence; mildly alkaline.

Free carbonates are within a depth of 8 inches. The A horizon has value of 5 or 6 (3 or 4 moist) and chroma of 2 or 3. It dominantly is clay but in some pedons is silty clay. The Bw horizon has hue of 2.5Y or 5Y, value of 5 or 6 (4 or 5 moist), and chroma of 2 or 3. The C horizon has colors similar to those of the Bw horizon. In some pedons shale bedrock is at a depth of 40 to 60 inches.

Lantry Series

The Lantry series consists of moderately deep, well drained soils formed in silty residuum on uplands. Permeability is moderate. Slopes range from 2 to 30 percent.

Typical pedon of Lantry silt loam, in an area of Reeder-Lantry complex, 2 to 9 percent slopes; 150 feet south and 1,680 feet west of the northeast corner of sec. 24, T. 12 N., R. 22 E.

Ap—0 to 4 inches; brown (10YR 5/3) silt loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure parting to weak fine granular; slightly hard, friable; mildly alkaline; clear smooth boundary.

Bw—4 to 10 inches; light yellowish brown (2.5Y 6/4) silt loam, dark grayish brown (2.5Y 4/2) moist; weak medium prismatic structure parting to moderate medium and fine subangular blocky; slightly hard, friable; slight effervescence; mildly alkaline; gradual wavy boundary.

Bk1—10 to 19 inches; light yellowish brown (2.5Y 6/4) silt loam, olive brown (2.5Y 4/4) moist; weak coarse prismatic structure parting to weak medium subangular blocky; hard, friable; few medium accumulations of carbonate; strong effervescence; mildly alkaline; gradual wavy boundary.

Bk2—19 to 33 inches; light yellowish brown (2.5Y 6/4) silt loam, olive brown (2.5Y 4/4) moist; weak coarse subangular blocky structure parting to weak medium subangular blocky; hard, friable; few medium accumulations of carbonate; strong effervescence; mildly alkaline; gradual wavy boundary.

Cr—33 to 60 inches; light yellowish brown (2.5Y 6/4) and light brownish gray (2.5Y 6/2), soft, fine grained sandstone, olive brown (2.5Y 4/4) and dark grayish brown (2.5Y 4/2) moist; weak bedding plains; slight effervescence; mildly alkaline.

The depth to bedrock ranges from 20 to 40 inches. The depth to free carbonates is 0 to 10 inches.

The A horizon has hue of 10YR or 2.5Y, value of 5 or 6 (3 or 4 moist), and chroma of 2 or 3. It dominantly is silt loam but in some pedons is loam or very fine sandy loam. The Bw horizon has hue of 10YR or 2.5Y, value of 5 or 6 (4 or 5 moist), and chroma of 2 to 4. It is silt loam or loam. The Cr horizon is soft, fine grained sandstone, siltstone, or loamy shale.

Lohler Series

The Lohler series consists of deep, well drained soils formed in silty and loamy alluvium on flood plains. Permeability is slow. Slopes range from 0 to 2 percent.

Typical pedon of Lohler silty clay loam, 1,680 feet south and 325 feet west of the northeast corner of sec. 1, T. 14 N., R. 21 E.

A—0 to 4 inches; grayish brown (10YR 5/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure parting to weak fine granular; hard, friable, slightly sticky and slightly plastic; thin strata of recently deposited material; many roots; mildly alkaline; clear smooth boundary.

C1—4 to 11 inches; grayish brown (2.5Y 5/2) silty clay loam stratified with thin layers of loam; dark grayish brown (2.5Y 4/2) moist; massive; very hard, friable, slightly sticky and slightly plastic; common roots;

slight effervescence; mildly alkaline; clear wavy boundary.
C2—11 to 26 inches; grayish brown (2.5Y 5/2) silty clay loam stratified with thin layers of loam; dark grayish brown (2.5Y 4/2) moist; massive; hard, friable, slightly sticky and plastic; common roots; slight effervescence; mildly alkaline; gradual wavy boundary.
C3—26 to 60 inches; grayish brown (2.5Y 5/2) stratified silty clay loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, friable, slightly sticky and plastic; few roots; few fine accumulations of carbonate; slight effervescence; moderately alkaline.

Free carbonates are within a depth of 8 inches. The A horizon has hue of 10YR or 2.5Y, value of 5 or 6 (3 to 5 moist), and chroma of 1 or 2. It dominantly is silty clay loam but in some pedons is silty clay or silt loam. The C horizon has value of 5 to 7 (4 to 6 moist) and chroma of 2 to 4. It dominantly is silty clay loam or silty clay but is stratified with loamy or sandy material.

Lohmiller Series

The Lohmiller series consists of deep, well drained soils formed in clayey, silty, and loamy alluvium on flood plains. Permeability is slow. Slopes range from 0 to 2 percent.

Typical pedon of Lohmiller silty clay loam, channeled, 1,885 feet south and 1,190 feet west of the northeast corner of sec. 34, T. 9 N., R. 20 E.

A—0 to 5 inches; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; weak medium subangular blocky structure parting to weak medium granular; hard, friable, sticky and plastic; thin strata of recently deposited material; many roots; slight effervescence; mildly alkaline; clear wavy boundary.
C1—5 to 13 inches; grayish brown (2.5Y 5/2) silty clay loam stratified with thin layers of loam and silt loam; dark grayish brown (2.5Y 4/2) moist; massive; hard, friable, sticky and plastic; common roots; strong effervescence; moderately alkaline; gradual wavy boundary.
C2—13 to 60 inches; grayish brown (2.5Y 5/2) silty clay loam stratified with thin layers of silty clay; dark grayish brown (2.5Y 4/2) moist; massive; hard, friable, sticky and plastic; few roots to a depth of about 34 inches; strong effervescence; mildly alkaline.

Free carbonates typically are throughout the profile, but in some pedons they are not evident in the surface layer. The A horizon has hue of 10YR or 2.5Y, value of 5 or 6 (3 to 5 moist), and chroma of 2 or 3. It dominantly is silty clay loam but in some pedons is silty clay or clay loam. The C horizon has hue of 10YR or 2.5Y, value of 5 to 7 (4 to 6 moist), and chroma of 2 to 4. It dominantly is silty clay loam, silty clay, or clay loam, but it has thin strata of loam, silt loam, or fine sandy loam throughout.

Parchin Series

The Parchin series consists of moderately deep, well drained soils formed in loamy sandstone residuum on uplands. Permeability is slow. Slopes range from 0 to 25 percent.

Typical pedon of Parchin fine sandy loam, in an area of Bullock-Slickspots-Parchin complex, 2 to 25 percent slopes; 1,530 feet north and 310 feet east of the southwest corner of sec. 16, T. 6 N., R. 19 E.

A—0 to 4 inches; grayish brown (10YR 5/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; loose, very friable; many roots; strongly acid; clear smooth boundary.
E—4 to 9 inches; light brownish gray (10YR 6/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure parting to weak fine granular; soft, very friable; many roots; neutral; clear smooth boundary.
Bt1—9 to 12 inches; grayish brown (10YR 5/2) sandy clay loam, dark grayish brown (10YR 4/2) moist; moderate medium columnar structure parting to moderate medium subangular blocky; extremely hard, firm, sticky and plastic; common roots; moderately alkaline; clear wavy boundary.
Bt2—12 to 17 inches; grayish brown (10YR 5/2) sandy clay loam, dark grayish brown (10YR 4/2) moist; moderate coarse subangular blocky structure parting to moderate medium subangular blocky; extremely hard, firm, sticky and plastic; few roots; moderately alkaline; gradual wavy boundary.
Bkz—17 to 24 inches; light brownish gray (2.5Y 6/2) sandy clay loam, grayish brown (2.5Y 5/2) moist; massive; extremely hard, firm, sticky and plastic; few roots; common fine accumulations of salts; common fine accumulations of carbonate; slight effervescence; mildly alkaline; gradual wavy boundary.
Cr—24 to 60 inches; light brownish gray (2.5Y 6/2), soft sandstone, grayish brown (2.5Y 5/2) moist; slight effervescence; moderately alkaline.

The depth to bedrock ranges from 20 to 40 inches. The depth to free carbonates ranges from 10 to 25 inches.

The A horizon has value of 5 or 6 (3 or 4 moist) and chroma of 2 or 3. It dominantly is fine sandy loam but in some pedons is loamy fine sand. The E horizon has hue of 10YR or 2.5Y, value of 5 to 7 (4 to 6 moist), and chroma of 2 or 3. It is loamy fine sand or fine sandy loam. The Bt horizon has hue of 2.5Y or 10YR, value of

5 or 6 (4 or 5 moist), and chroma of 2 or 3. It is sandy clay loam, loam, or clay loam.

Pierre Series

The Pierre series consists of moderately deep, well drained soils formed in clayey residuum on uplands. When dry, these soils are characterized by cracks, which are 0.5 inch to 2.0 inches wide and several feet long and extend through the subsoil. The landscape is characterized by gilgai relief. Permeability is very slow. Slopes range from 2 to 30 percent.

Typical pedon of Pierre clay, 6 to 9 percent slopes, 1,565 feet north and 590 feet west of the southeast corner of sec. 24, T. 9 N., R. 20 E.

A—0 to 5 inches; dark grayish brown (10YR 4/2) clay, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure parting to weak fine granular; slightly hard, firm, sticky and plastic; common roots; few cracks 0.5 to 1.0 inch wide; mildly alkaline; clear wavy boundary.

Bw1—5 to 12 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; moderate medium and fine subangular blocky structure; very hard, very firm, sticky and plastic; few intersecting slickensides; common roots; few cracks 0.5 to 1.0 inch wide; slight effervescence; mildly alkaline; gradual wavy boundary.

Bw2—12 to 22 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; moderate medium subangular blocky structure; very hard, very firm, sticky and plastic; few intersecting slickensides; few roots; few cracks 0.5 to 1.0 inch wide; slight effervescence; mildly alkaline; gradual wavy boundary.

Bk—22 to 26 inches; light brownish gray (2.5Y 6/2) clay, dark grayish brown (2.5Y 4/2) moist; moderate medium subangular blocky structure; very hard, firm, sticky and plastic; few roots; few cracks 0.5 to 1.0 inch wide; moderate medium accumulations of carbonate; slight effervescence; mildly alkaline; clear wavy boundary.

Cz—26 to 32 inches; light brownish gray (2.5Y 6/2) clay, dark grayish brown (2.5Y 4/2) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few roots; about 15 percent fragments of shale; common fine nests of gypsum; few medium accumulations of carbonate; slight effervescence; mildly alkaline; gradual wavy boundary.

Cr—32 to 60 inches; light brownish gray (2.5Y 6/2) clayey shale, grayish brown (2.5Y 5/2) moist; few medium nests of gypsum between shale plates; mildly alkaline.

Free carbonates are within a depth of 6 inches. The depth to shale ranges from 20 to 40 inches.

The A horizon has hue of 10YR or 2.5Y, value of 4 to 6 (3 to 5 moist), and chroma of 1 to 3. It dominantly is clay but in some pedons is silty clay. The Bw horizon has hue of 2.5Y or 5Y, value of 5 or 6 (4 or 5 moist), and chroma of 1 to 3. The C horizon has value of 5 or 6 (4 or 5 moist) and chroma of 2 or 3.

Promise Series

The Promise series consists of deep, well drained soils formed in clayey material on uplands. When dry, these soils are characterized by cracks, which are 0.5 inch to 2.0 inches wide and several feet long and extend through the subsoil. Permeability is very slow. Slopes range from 0 to 2 percent.

Typical pedon of Promise clay, silty substratum, 0 to 2 percent slopes, 110 feet north and 90 feet east of the southwest corner of sec. 9, T. 10 N., R. 23 E.

A—0 to 4 inches; grayish brown (2.5Y 5/2) clay, very dark grayish brown (2.5Y 3/2) moist; moderate medium subangular blocky structure parting to moderate medium granular; hard, firm, sticky and plastic; many roots; few cracks 0.5 to 1.0 inch wide; mildly alkaline; clear smooth boundary.

Bw1—4 to 15 inches; grayish brown (2.5Y 5/2) clay, very dark grayish brown (2.5Y 3/2) moist; strong coarse subangular blocky structure; very hard, very firm, very sticky and very plastic; few intersecting slickensides; common roots; few cracks 0.5 to 1.0 inch wide; strong effervescence; mildly alkaline; clear wavy boundary.

Bw2—15 to 24 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; moderate coarse subangular blocky structure; very hard, very firm, very sticky and very plastic; few intersecting slickensides; few roots; few cracks 0.5 to 1.0 inch wide; strong effervescence; mildly alkaline; clear wavy boundary.

Bkz—24 to 46 inches; light brownish gray (2.5Y 6/2) clay, dark grayish brown (2.5Y 4/2) moist; moderate medium subangular blocky structure; very hard, firm, sticky and plastic; few cracks 0.5 to 1.0 inch wide; common medium and fine accumulations of carbonate and salts; strong effervescence; mildly alkaline; clear wavy boundary.

2C—46 to 60 inches; light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, friable, sticky and plastic; few fine accumulations of carbonate and salts; strong effervescence; strongly alkaline.

The mollic epipedon is 7 to 15 inches thick. Free carbonates are within a depth of 8 inches. In some pedons shale bedrock is at a depth of 40 to 60 inches.

The A horizon has hue of 10YR or 2.5Y, values of 4 of 5 (2 or 3 moist), and chroma of 1 or 2. It dominantly is clay

but in some pedons is silty clay. The Bw horizon has hue of 2.5Y or 5Y, value of 4 or 5 (3 or 4 moist), and chroma of 2 to 4. The C horizon has hue of 2.5Y or 5Y, value of 5 or 6 (4 or 5 moist), and chroma of 2 or 3. It is silty clay loam or loam.

Ree Series

The Ree series consists of deep, well drained soils formed in loamy sediments on terraces. Permeability is moderate. Slopes range from 0 to 6 percent.

Typical pedon of Ree loam, 0 to 2 percent slopes, 610 feet north and 2,130 feet west of the southeast corner of sec. 9, T. 9 N., R. 19 E.

A—0 to 7 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to weak medium granular; hard, friable; many roots; neutral; clear smooth boundary.

Bt1—7 to 12 inches; grayish brown (10YR 5/2) clay loam, dark brown (10YR 3/3) moist; weak medium prismatic structure parting to moderate medium subangular blocky; hard, friable, sticky and plastic; shiny surfaces on peds; common roots; neutral; gradual smooth boundary.

Bt2—12 to 18 inches; brown (10YR 5/3) clay loam, dark grayish brown (10YR 4/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, friable, sticky and plastic; shiny surfaces on peds; common roots; neutral; clear wavy boundary.

Bt3—18 to 28 inches; brown (10YR 5/3) clay loam, dark grayish brown (10YR 4/2) moist; weak medium prismatic structure parting to weak medium subangular blocky; hard, friable, slightly sticky and slightly plastic; shiny surfaces on peds; few roots; mildly alkaline; gradual wavy boundary.

Bk—28 to 40 inches; light brownish gray (2.5Y 6/2) loam, grayish brown (2.5Y 5/2) moist; weak medium subangular blocky structure; hard, very friable; few roots; few medium accumulations of carbonate; violent effervescence; moderately alkaline; gradual wavy boundary.

C—40 to 60 inches; light brownish gray (2.5Y 6/2) fine sandy loam, grayish brown (2.5Y 5/2) moist; massive; hard, very friable; strong effervescence; moderately alkaline.

The depth to free carbonates is 25 to 34 inches. The mollic epipedon is 8 to 16 inches thick.

The A horizon has value of 4 or 5 (2 or 3 moist) and chroma of 1 or 2. It dominantly is loam but in some pedons is silt loam. The Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5 (3 or 4 moist), and chroma of 2 to 4. It is clay loam or sandy clay loam. The C horizon has hue of 10YR or 2.5Y, value of 6 or 7 (5 or 6 moist), and chroma of 2 to 4. It is loam, clay loam, fine sandy loam, or sandy clay loam.

Reeder Series

The Reeder series consists of moderately deep, well drained soils formed in loamy residuum on uplands. Permeability is moderate. Slopes range from 2 to 9 percent.

Typical pedon of Reeder loam, in an area of Reeder-Lantry complex, 2 to 9 percent slopes; 140 feet south and 2,340 feet west of the northeast corner of sec. 26, T. 12 N., R. 23 E.

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to moderate medium granular; hard, friable; slightly acid; clear smooth boundary.

Bt1—5 to 12 inches; brown (10YR 4/3) clay loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, friable, slightly sticky and plastic; shiny surfaces on peds; neutral; gradual wavy boundary.

Bt2—12 to 20 inches; light olive brown (2.5Y 5/4) clay loam, olive brown (2.5Y 4/4) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; very hard, friable, slightly sticky and plastic; shiny surfaces on peds; neutral; gradual wavy boundary.

Bk—20 to 35 inches; light yellowish brown (2.5Y 6/4) loam, olive brown (2.5Y 4/4) moist; weak coarse subangular blocky structure; hard, friable; few medium accumulations of carbonate; strong effervescence; mildly alkaline; gradual wavy boundary.

Cr—35 to 60 inches; light yellowish brown (2.5Y 6/4), soft bedrock, olive brown (2.5Y 4/4) moist; weak bedding planes; few fine accumulations of carbonate; strong effervescence; mildly alkaline.

The depth to bedrock ranges from 20 to 40 inches. The depth to free carbonates ranges from 10 to 26 inches. The mollic epipedon is 7 to 16 inches thick.

The A horizon has value of 4 or 5 (2 or 3 moist) and chroma of 2 or 3. It dominantly is loam but in some pedons is silt loam or clay loam. The Bt horizon has hue of has 10YR or 2.5Y, value of 4 or 5 (3 to 5 moist), and chroma of 2 to 4. It is clay loam or loam. The Cr horizon is soft sandstone, siltstone, or loamy shale.

Regent Series

The Regent series consists of moderately deep, well drained soils formed in clayey shale residuum on uplands. Permeability is slow. Slopes range from 2 to 15 percent.

Typical pedon of Regent silty clay loam, 2 to 6 percent slopes, 210 feet south and 540 feet east of the northwest corner of sec. 1, T. 12 N., R. 21 E.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to moderate medium granular; hard, friable, slightly sticky and plastic; neutral; clear smooth boundary.

Bt1—7 to 13 inches; dark grayish brown (10YR 4/2) silty clay, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; very hard, firm, sticky and very plastic; shiny surfaces on peds; mildly alkaline; clear wavy boundary.

Bt2—13 to 23 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; weak medium prismatic structure parting to moderate medium subangular blocky; very hard, firm, sticky and very plastic; shiny surfaces on peds; strong effervescence; moderately alkaline; clear wavy boundary.

Bk—23 to 28 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few fine accumulations of carbonate; strong effervescence; moderately alkaline; clear wavy boundary.

Cr—28 to 60 inches; light brownish gray (2.5Y 6/2) shale, light olive brown (2.5Y 5/4) moist; strong effervescence; moderately alkaline.

The depth to shale ranges from 20 to 40 inches. The mollic epipedon is 7 to l6 inches thick.

The A horizon has hue of l0YR or 2.5Y, value of 4 or 5 (2 or 3 moist), and chroma of 2 or 3. It dominantly is silty clay loam but in some pedons is silty clay. The Bt horizon has hue of l0YR or 2.5Y, value of 4 or 5 (2 to 4 moist), and chroma of 2 or 3. It is silty clay or silty clay loam. The Cr horizon is clayey shale that is stratified with siltstone in some pedons.

Reliance Series

The Reliance series consists of deep, well drained soils formed in silty and clayey material on uplands. Permeability is moderately slow. Slopes range from 0 to 6 percent.

Typical pedon of Reliance silty clay loam, 0 to 2 percent slopes, 725 feet east and 330 feet south of the northwest corner of sec. 29, T. 7 N., R. 19 E.

A—0 to 8 inches; dark grayish brown (10YR 4/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure parting to moderate fine granular; hard, friable, slightly sticky and plastic; many roots; neutral; clear smooth boundary.

Bt1—8 to 15 inches; dark grayish brown (10YR 4/2) silty clay, very dark grayish brown (10YR 3/2) moist; moderate coarse prismatic structure parting to moderate medium subangular blocky; very hard, firm, sticky and plastic; shiny surfaces on peds; common roots; neutral; clear wavy boundary.

Bt2—15 to 26 inches; grayish brown (10YR 5/2) silty clay, dark grayish brown (10YR 4/2) moist; moderate coarse prismatic structure parting to moderate medium subangular blocky; very hard, firm, sticky and plastic; shiny surfaces on peds; common roots; neutral; clear wavy boundary.

Bk1—26 to 33 inches; brown (10YR 5/3) silty clay loam, dark grayish brown (10YR 4/2) moist; moderate coarse subangular blocky structure parting to moderate medium subangular blocky; very hard, friable, sticky and plastic; few roots; strong effervescence; moderately alkaline; gradual wavy boundary.

Bk2—33 to 40 inches; brown (10YR 5/3) silty clay loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; very hard, friable, sticky and plastic; few roots; common medium accumulations of carbonate; violent effervescence; moderately alkaline; gradual wavy boundary.

C—40 to 60 inches; light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; massive; very hard, friable, sticky and plastic; few fine accumulations of carbonate; strong effervescence; moderately alkaline.

The depth to free carbonates ranges from 18 to 30 inches. The mollic epipedon is 10 to 18 inches thick.

The A horizon has value of 4 or 5 (2 or 3 moist). It dominantly is silty clay loam but in some pedons is silt loam. The Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5 (3 or 4 moist), and chroma of 2 or 3. It is silty clay or silty clay loam. The content of clay in this horizon is as low as 35 percent in some pedons and as high as 45 percent in others. The C horizon has hue of 10YR or 2.5Y, value of 5 to 7 (4 to 6 moist), and chroma of 2 to 4. It is silty clay loam or silt loam.

Rhoades Series

The Rhoades series consists of deep, well drained soils formed in silty, loamy, and clayey material on uplands and terraces. Permeability is slow. Slopes range from 0 to 15 percent.

Typical pedon of Rhoades loam, in an area of Rhoades-Daglum loams, 2 to 9 percent slopes; 2,330 feet north and 140 feet west of the southeast corner of sec. 33, T. 13 N., R. 19 E.

E—0 to 2 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; slightly hard, very friable; common roots; slightly acid; clear smooth boundary.
Bt—2 to 10 inches; dark grayish brown (2.5Y 4/2) silty clay, very dark grayish brown (2.5Y 3/2) moist; moderate medium columnar structure parting to moderate medium subangular blocky; very hard, very firm, sticky and plastic; shiny surfaces on peds; common roots; moderately alkaline; clear wavy boundary.
Btz—10 to 21 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; moderate coarse subangular blocky structure; very hard, firm, sticky and plastic; shiny surfaces on peds; few roots; common fine accumulations of salts; strong effervescence; moderately alkaline; gradual wavy boundary.
BCz—21 to 43 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; moderate coarse subangular blocky structure; very hard, firm, sticky and plastic; common medium accumulations of salts; strong effervescence; moderately alkaline; gradual wavy boundary.
Cz—43 to 60 inches; light olive brown (2.5Y 5/4) silty clay loam, olive brown (2.5Y 4/4) moist; massive; very hard, firm, sticky and plastic; few fine accumulations of salts; slight effervescence; moderately alkaline.

The depth to salts is 8 to 15 inches. In some pedons soft bedrock is at a depth of 40 to 60 inches. Some pedons have a thin A horizon.

The E horizon has value of 4 to 6 (3 to 5 moist). It dominantly is loam but in some pedons is silt loam or very fine sandy loam. The Bt horizon has hue of 10YR or 2.5Y and value of 3 to 5 (2 or 3 moist). It is silty clay, silty clay loam, clay loam, or clay. The content of clay in this horizon is as low as 35 percent in some pedons and as high as 50 percent in others. The C horizon has value of 5 to 7 (4 or 5 moist) and chroma of 2 to 4. It is silty clay loam, silty clay, clay loam, or loam.

Ridgeview Series

The Ridgeview series consists of deep, well drained soils formed in silty and clayey material on uplands. When dry, these soils are characterized by cracks, which are 0.5 inch to 2.0 inches wide and several feet long and extend through the subsoil. Permeability is slow. Slopes range from 0 to 6 percent.

Typical pedon of Ridgeview silty clay loam, 2 to 6 percent slopes, 1,280 feet north and 150 feet east of the southwest corner of sec. 28, T. 12 N., R. 22 E.

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to weak medium granular; hard, friable, slightly sticky and slightly plastic; slightly acid; clear wavy boundary.
Bt1—5 to 12 inches; dark grayish brown (10YR 4/2) clay, very dark grayish brown (10YR 3/2) moist; moderate coarse prismatic structure parting to moderate medium subangular blocky; very hard, firm, sticky and plastic; shiny surfaces on peds; neutral; clear wavy boundary.
Bt2—12 to 24 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; moderate coarse prismatic structure parting to moderate medium subangular blocky; very hard, very firm, sticky and plastic; shiny surfaces on peds; slight effervescence; mildly alkaline; gradual wavy boundary.
Bk—24 to 33 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; weak coarse subangular blocky structure parting to weak medium subangular blocky; very hard, firm, sticky and plastic; common medium accumulations of carbonate; slight effervescence; mildly alkaline; gradual wavy boundary.
Cz—33 to 60 inches; light brownish gray (2.5Y 6/2) silty clay, grayish brown (2.5Y 5/2) moist; massive; hard, friable, sticky and plastic; few fine accumulations of carbonate; common fine accumulations of salts; slight effervescence; mildly alkaline.

The depth to free carbonates is 8 to 12 inches. The mollic epipedon is 8 to 14 inches thick.

The A horizon has hue of 10YR or 2.5Y, value of 4 or 5 (2 or 3 moist), and chroma of 1 or 2. It dominantly is silty clay loam but in some pedons is silty clay. The Bt and C horizons are clay or silty clay. The Bt horizon has hue of 10YR or 2.5Y and value of 4 or 5 (3 or 4 moist). The C horizon has hue of 2.5Y or 5Y, value of 5 to 7 (3 to 5 moist), and chroma of 2 or 3. In some pedons soft bedrock is at a depth of 40 to 60 inches.

Samsil Series

The Samsil series consists of shallow, well drained soils formed in clayey shale residuum on uplands. Permeability is slow. Slopes range from 9 to 60 percent.

Typical pedon of Samsil clay, 15 to 40 percent slopes, 1,670 feet north and 1,230 feet west of the southeast corner of sec. 34, T. 9 N., R. 20 E.

A—0 to 3 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; weak medium subangular blocky structure parting to moderate fine granular; slightly hard, friable, sticky and plastic; many roots; slight effervescence; mildly alkaline; clear wavy boundary.
C—3 to 12 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; weak coarse

subangular blocky structure; hard, firm, sticky and plastic; common roots; about 35 percent fragments of shale; strong effervescence; moderately alkaline; gradual wavy boundary.

Cr—12 to 60 inches; light brownish gray (2.5Y 6/2) shale, dark grayish brown (2.5Y 4/2) moist; few roots to a depth of about 15 inches; moderately alkaline.

The depth to shale is 10 to 20 inches. Free carbonates typically are throughout the profile, but in some pedons they are not evident in the surface layer.

The A horizon has hue of 10YR or 2.5Y, value of 5 or 6 (4 or 5 moist), and chroma of 2 to 4. It dominantly is clay but in some pedons is silty clay. The C horizon has hue of 2.5Y or 5Y, value of 5 to 7 (3 to 5 moist), and chroma of 2 to 4. The content of shale fragments in this horizon is 35 to 45 percent.

Savage Series

The Savage series consists of deep, well drained soils formed in silty and clayey material on uplands. Permeability is moderately slow. Slopes range from 0 to 6 percent.

Typical pedon of Savage silt loam, 2 to 6 percent slopes, 1,680 feet north and 2,120 feet west of the southeast corner of sec. 7, T. 17 N., R. 18 E.

A—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to weak fine granular; hard, friable; many roots; slightly acid; clear wavy boundary.

Bt1—6 to 13 inches; dark grayish brown (10YR 4/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; weak medium prismatic structure parting to weak medium and fine subangular blocky; very hard, friable, sticky and plastic; shiny surfaces on peds; common roots; neutral; gradual wavy boundary.

Bt2—13 to 19 inches; brown (10YR 5/3) silty clay loam, dark grayish brown (10YR 4/2) moist; weak medium prismatic structure parting to weak medium subangular blocky; very hard, friable, sticky and plastic; shiny surfaces on peds; few roots; neutral; gradual wavy boundary.

Bk1—19 to 28 inches; light yellowish brown (2.5Y 6/4) silty clay loam, olive brown (2.5Y 4/4) moist; weak coarse subangular blocky structure parting to weak medium subangular blocky; very hard, friable, slightly sticky and plastic; few roots; few fine accumulations of carbonate; strong effervescence; mildly alkaline; gradual wavy boundary.

Bk2—28 to 60 inches; light brownish gray (2.5Y 6/2) clay, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; very hard, firm, sticky and plastic; few roots to a depth of about 35 inches; many fine accumulations of carbonate; strong effervescence; moderately alkaline.

The depth to free carbonates ranges from 10 to 22 inches. The mollic epipedon is 8 to 16 inches thick.

The A horizon has value of 4 or 5 (2 or 3 moist) and chroma of 2 or 3. It dominantly is silt loam but in some pedons is silty clay loam. The Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5 (3 or 4 moist), and chroma of 2 or 3. It is clay, silty clay, or silty clay loam. The content of clay in this horizon is as low as 35 percent in some pedons and as high as 45 percent in others. Some pedons are underlain by fine grained sandstone at a depth of 40 to 60 inches.

Schamber Series

The Schamber series consists of somewhat excessively drained soils formed in sandy and gravelly material on terrace scarps. These soils are very shallow over gravelly material. Permeability is rapid. Slopes range from 9 to 40 percent.

Typical pedon of Schamber gravelly loam, in an area of Schamber-Samsil complex, 9 to 40 percent slopes; 2,640 feet south and 2,280 feet east of the northwest corner of sec. 19, T. 9 N., R. 20 E.

A1—0 to 4 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to weak fine granular; soft, very friable; many roots; moderately alkaline; clear wavy boundary.

A2—4 to 9 inches; grayish brown (10YR 5/2) very gravelly loam, dark grayish brown (10YR 4/2) moist; single grain; loose; common roots; strong effervescence; moderately alkaline; gradual wavy boundary.

2C—9 to 60 inches; multicolored very gravelly sand; strong effervescence; moderately alkaline.

The depth to very gravelly sand is 4 to 10 inches. Some pedons are underlain by shale at a depth of 40 to 60 inches.

The A horizon has value of 4 or 5 (3 or 4 moist) and chroma of 2 or 3. It dominantly is gravelly loam but in some pedons is loam, gravelly sandy loam, very gravelly sandy loam, or very gravelly loam. The C horizon has hue of 10YR or 2.5Y, value of 5 to 7 (4 to 6 moist), and chroma of 2 to 4. It is very gravelly sand or very gravelly loamy sand.

Seroco Series

The Seroco series consists of deep, excessively drained soils formed in sandy material on terraces and uplands. Permeability is rapid. Slopes range from 2 to 9 percent.

Typical pedon of Seroco loamy fine sand, in an area of Seroco-Tally complex, 2 to 9 percent slopes; 1,500 feet north and 150 feet west of the southeast corner of sec. 34, T. 15 N., R. 20 E.

Ap—0 to 3 inches; grayish brown (10YR 5/2) loamy fine sand, very dark grayish brown (10YR 3/2) moist; weak fine granular structure parting to single grain; soft, very friable; neutral; clear wavy boundary.
C—3 to 60 inches; grayish brown (2.5Y 5/2) fine sand, dark grayish brown (2.5Y 4/2) moist; single grain; loose; mildly alkaline.

The depth to free carbonates ranges from 30 to more than 60 inches. Some pedons are underlain by coarse grained sandstone at a depth of 50 to 60 inches.

The A horizon has value of 4 or 5 (3 or 4 moist) and chroma of 2 or 3. It dominantly is loamy fine sand but in some pedons is fine sand. The C horizon has hue of 10YR or 2.5Y, value of 5 to 7 (4 to 6 moist), and chroma of 2 or 3. It is fine sand or loamy fine sand.

Shambo Series

The Shambo series consists of deep, well drained soils formed in loamy alluvium on terraces. Permeability is moderate. Slopes range from 0 to 3 percent.

Typical pedon of Shambo loam, 2,030 feet south and 1,220 feet east of the northwest corner of sec. 4, T. 14 N., R. 21 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure parting to weak fine granular; slightly hard, very friable; slightly acid; clear smooth boundary.
Bw1—6 to 14 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; neutral; clear wavy boundary.
Bw2—14 to 20 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 4/4) moist; moderate medium prismatic structure parting to moderate medium and fine subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; moderately alkaline; gradual wavy boundary.
Bk—20 to 30 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; weak coarse subangular blocky structure parting to weak medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common fine accumulations of carbonate; strong effervescence; moderately alkaline; gradual wavy boundary.
C—30 to 60 inches; grayish brown (2.5Y 5/2) loam, dark grayish brown (2.5Y 4/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine accumulations of carbonate; strong effervescence; moderately alkaline.

The depth to free carbonates ranges from 18 to 30 inches. The mollic epipedon is 7 to 16 inches thick.

The A horizon has value of 4 or 5 (2 or 3 moist) and chroma of 2 or 3. It dominantly is loam but in some pedons is silt loam. The Bw horizon has value of 4 or 5 (3 or 4 moist) and chroma of 2 to 4. It is loam or silt loam. The C horizon has value of 5 to 7 (4 to 6 moist) and chroma of 2 to 4. It is loam, clay loam, or silt loam.

Stady Series

The Stady series consists of well drained soils formed in alluvial sediments on terraces. These soils are moderately deep over gravelly material. Permeability is moderate above the gravelly material and very rapid in the gravelly material. Slopes range from 0 to 3 percent.

Typical pedon of Stady loam, 0 to 3 percent slopes, 305 feet south and 1,120 feet east of the northwest corner of sec. 24, T. 16 N., R. 20 E.

Ap—0 to 7 inches; dark brown (10YR 4/3) loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to weak fine granular; soft, friable; neutral; clear wavy boundary.
Bw1—7 to 10 inches; brown (10YR 5/3) loam, dark brown (10YR 4/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable; neutral; clear wavy boundary.
Bw2—10 to 20 inches; brown (10YR 5/3) loam, dark grayish brown (10YR 4/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable; neutral; gradual wavy boundary.
Bk—20 to 32 inches; light yellowish brown (10YR 6/4) gravelly loam, yellowish brown (10YR 5/4) moist; weak fine subangular blocky structure parting to weak fine granular; soft, very friable; few fine accumulations of carbonate; slight effervescence; mildly alkaline; gradual wavy boundary.
2C—32 to 60 inches; multicolored gravelly sand; single grain; strong effervescence; moderately alkaline.

The depth to gravelly material ranges from 20 to 40 inches. The depth to free carbonates is 15 to 25 inches.

The A horizon has value of 4 or 5 (2 or 3 moist) and chroma of 2 or 3. The Bw horizon has value of 4 to 6 (3 or 4 moist) and chroma of 2 or 3. It is loam or clay loam. The 2C horizon is gravelly sand or very gravelly sand.

Swanboy Series

The Swanboy series consists of deep, well drained soils formed in clayey material on foot slopes, fans, and terraces. When dry, these soils are characterized by

cracks, which are 0.5 inch to 2.0 inches wide and several feet long and extend through the subsoil. Permeability is very slow. Slopes range from 0 to 15 percent.

Typical pedon of Swanboy clay, 0 to 6 percent slopes, 1,560 feet north and 1,420 feet east of the southwest corner of sec. 9, T. 8 N., R. 21 E.

A—0 to 2 inches; light brownish gray (2.5Y 6/2) clay, dark grayish brown (2.5Y 4/2) moist; moderate fine subangular blocky structure parting to moderate medium granular; very hard, friable, sticky and very plastic; common roots; few cracks 0.5 to 1.0 inch wide; moderately alkaline; abrupt smooth boundary.

Bw—2 to 6 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; weak medium subangular blocky structure; very hard, very firm, very sticky and very plastic; few intersecting slickensides; common roots; few cracks 0.5 to 1.0 inch wide; slight effervescence; moderately alkaline; clear smooth boundary.

Bz1—6 to 16 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; weak coarse subangular blocky structure parting to moderate fine subangular blocky; very hard, very firm, very sticky and very plastic; few intersecting slickensides; few roots; few cracks 0.5 to 1.0 inch wide; many fine accumulations of salts; slight effervescence; moderately alkaline; clear wavy boundary.

Bz2—16 to 30 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; moderate coarse subangular blocky structure; very hard, very firm, very sticky and very plastic; few intersecting slickensides; few cracks 0.5 to 1.0 inch wide; few fine accumulations of salts; slight effervescence; moderately alkaline; clear wavy boundary.

C1—30 to 52 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; massive; very hard, very firm, very sticky and very plastic; slight effervescence; moderately alkaline; clear wavy boundary.

C2—52 to 60 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; massive; hard, firm, sticky and plastic; strong effervescence; moderately alkaline.

The depth to visible salts is less than 10 inches. The A horizon has hue of 2.5Y or 10YR, value of 5 to 7 (3 to 5 moist), and chroma of 1 or 2. It dominantly is clay but in some pedons is silty clay. The Bw horizon has hue of 2.5Y or 5Y, value of 5 or 6 (4 or 5 moist), and chroma of 2 to 4. The Bz horizon has hue of 2.5Y or 5Y, value of 5 to 7 (4 to 6 moist), and chroma of 2 to 4. The C horizon has colors similar to those of the Bz horizon.

Tally Series

The Tally series consists of deep, well drained soils formed in loamy sediments on terraces. Permeability is moderately rapid. Slopes range from 0 to 9 percent.

Typical pedon of Tally fine sandy loam, 0 to 2 percent slopes, 510 feet south and 2,550 feet east of the northwest corner of sec. 17, T. 14 N., R. 20 E.

A—0 to 6 inches; dark grayish brown (10YR 4/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure parting to weak fine granular; hard, friable; common roots; slightly acid; clear wavy boundary.

Bw1—6 to 13 inches; brown (10YR 4/3) fine sandy loam, dark brown (10YR 3/3) moist; weak medium prismatic structure parting to weak fine subangular blocky; hard, very friable; common roots; neutral; gradual wavy boundary.

Bw2—13 to 26 inches; brown (10YR 5/3) fine sandy loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; slightly hard, very friable; few roots; neutral; gradual wavy boundary.

Bk—26 to 37 inches; light brownish gray (2.5Y 6/2) loamy fine sand, grayish brown (2.5Y 5/2) moist; weak medium and fine subangular blocky structure; slightly hard, very friable; few roots; few fine accumulations of carbonate; strong effervescence; mildly alkaline; gradual wavy boundary.

C—37 to 60 inches; light brownish gray (2.5Y 6/2) loamy fine sand, grayish brown (2.5Y 5/2) moist; massive; soft, very friable; slight effervescence; mildly alkaline.

The depth to free carbonates ranges from 18 to 30 inches. The mollic epipedon is 10 to 15 inches thick.

The A horizon has value of 3 or 4 (2 or 3 moist) and chroma of 2 or 3. It dominantly is fine sandy loam but in some pedons is sandy loam. The Bw horizon has hue of 10YR or 2.5Y, value of 4 or 5 (3 or 4 moist), and chroma of 2 or 3. It is fine sandy loam or sandy loam. The Bk and C horizons are fine sandy loam, loamy fine sand, or fine sand. The Bk horizon has hue of 10YR or 2.5Y, value of 5 or 6 (4 or 5 moist), and chroma of 2 or 3. The C horizon has value of 6 or 7 (5 or 6 moist) and chroma of 2 to 4.

Trembles Series

The Trembles series consists of deep, well drained soils formed in loamy and sandy alluvium on flood plains. Permeability is moderately rapid. Slopes range from 0 to 2 percent.

Typical pedon of Trembles fine sandy loam, 1,240 feet south and 1,300 feet east of the northwest corner of sec. 35, T. 15 N., R. 20 E.

A—0 to 6 inches; grayish brown (2.5Y 5/2) fine sandy loam, dark grayish brown (2.5Y 4/2) moist; weak fine granular structure; soft, very friable; thin strata of recently deposited material; common roots; neutral; clear smooth boundary.
C1—6 to 17 inches; grayish brown (2.5Y 5/2) fine sandy loam stratified with thin layers of loam; dark grayish brown (2.5Y 4/2) moist; soft, very friable; few roots; slight effervescence; mildly alkaline; gradual wavy boundary.
C2—17 to 38 inches; grayish brown (2.5Y 5/2) fine sandy loam stratified with thin layers of loam; dark grayish brown (2.5Y 4/2) moist; massive; soft; few roots; slight effervescence; mildly alkaline; gradual wavy boundary.
C3—38 to 60 inches; grayish brown (2.5Y 5/2) loamy fine sand, dark grayish brown (2.5Y 4/2) moist; single grain; loose; slight effervescence; mildly alkaline.

Free carbonates are within a depth of 8 inches. The A horizon has hue of 2.5Y or 10YR, value of 5 or 6 (3 or 4 moist), and chroma of 2 or 3. It dominantly is fine sandy loam but in some pedons is loamy fine sand. The C horizon has hue of 2.5Y or 10YR, value of 5 or 6 (4 or 5 moist), and chroma of 2 or 3.

Vebar Series

The Vebar series consists of moderately deep, well drained soils formed in loamy sandstone residuum on uplands. Permeability is moderately rapid. Slopes range from 2 to 40 percent.

Typical pedon of Vebar fine sandy loam, 2 to 6 percent slopes, 600 feet south and 2,470 feet east of the northwest corner of sec. 26, T. 17 N., R. 19 E.

A—0 to 4 inches; dark grayish brown (10YR 4/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium and fine granular structure; soft, very friable; slightly acid; clear wavy boundary.
Bw1—4 to 11 inches; dark grayish brown (10YR 4/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium prismatic structure parting to weak medium subangular blocky; soft, very friable; neutral; gradual wavy boundary.
Bw2—11 to 18 inches; yellowish brown (10YR 5/4) fine sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure parting to weak medium and fine granular; soft, very friable; mildly alkaline; gradual wavy boundary.
BC—18 to 30 inches; light yellowish brown (2.5Y 6/4) fine sandy loam, olive brown (2.5Y 4/4) moist; weak medium subangular blocky structure parting to weak fine subangular blocky; soft, very friable; few roots; neutral; gradual wavy boundary.
Cr—30 to 60 inches; light yellowish brown (2.5Y 6/4), soft sandstone, olive brown (2.5Y 4/4) moist; appears massive but has weak bedding planes; neutral.

The depth to sandstone ranges from 20 to 40 inches. The mollic epipedon is 7 to 16 inches thick.

The A horizon has value of 3 to 5 (2 or 3 moist) and chroma of 2 or 3. It dominantly is fine sandy loam but in some pedons is sandy loam. The Bw horizon has hue of 10YR or 2.5Y, value of 4 or 5 (3 or 4 moist), and chroma of 2 to 4. It is fine sandy loam or sandy loam. In some pedons the Cr horizon is calcareous.

Wabek Series

The Wabek series consists of excessively drained soils formed in sandy and gravelly material on terrace scarps. These soils are very shallow over very gravelly material. Permeability is very rapid. Slopes range from 9 to 40 percent.

Typical pedon of Wabek gravelly loam, in an area of Wabek-Cabba complex, 9 to 40 percent slopes; 1,170 feet south and 2,030 feet west of the northeast corner of sec. 30, T. 15 N., R. 20 E.

A—0 to 4 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure parting to weak fine granular; soft, very friable; many roots; mildly alkaline; clear wavy boundary.
C—4 to 7 inches; brown (10YR 4/3) gravelly sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable; common roots; slight effervescence; mildly alkaline; clear wavy boundary.
2C—7 to 60 inches; multicolored very gravelly sand; single grain; loose; strong effervescence; mildly alkaline.

The depth to very gravelly sand is 7 to 10 inches. The depth to free carbonates is 4 to 9 inches. The mollic epipedon is 7 to 10 inches thick.

The A horizon has value of 4 or 5 (2 or 3 moist) and chroma of 2 or 3. It dominantly is gravelly loam but in some pedons is gravelly sandy loam or loamy sand. The 2C horizon is very gravelly sand or very gravelly loamy sand.

Wayden Series

The Wayden series consists of shallow, well drained soils formed in silty shale residuum on uplands. Permeability is slow. Slopes range from 15 to 40 percent.

Typical pedon of Wayden silty clay loam, 15 to 40 percent slopes, 1,015 feet south and 1,225 feet west of the northeast corner of sec. 34, T. 15 N., R. 20 E.

A—0 to 4 inches; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; weak fine granular structure; soft, friable, slightly sticky and slightly plastic; many roots; slight effervescence; mildly alkaline; clear wavy boundary.
C—4 to 11 inches; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; weak medium subangular blocky structure parting to weak fine granular; soft, friable, slightly sticky and slightly plastic; common roots; common medium distinct light olive brown (2.5Y 5/6) stains; slight effervescence; mildly alkaline; clear wavy boundary.
Cr—11 to 60 inches; light brownish gray (2.5Y 6/2) and light olive brown (2.5Y 5/4) shale, grayish brown (2.5Y 5/2) and olive brown (2.5Y 4/4) moist; slight effervescence; mildly alkaline.

The depth to shale is 10 to 20 inches. The A horizon has value of 5 or 6 (3 to 5 moist) and chroma of 2 or 3. It dominantly is silty clay loam but in some pedons is silty clay or clay. The C horizon has value of 5 to 7 (4 to 6 moist) and chroma of 2 to 4. It is silty clay, silty clay loam, or clay. Some pedons have a few salt crystals in the Cr horizon.

Wendte Series

The Wendte series consists of deep, moderately well drained soils formed in clayey alluvium on flood plains. Permeability is slow. Slopes range from 0 to 2 percent.

Typical pedon of Wendte silty clay, 840 feet south and 980 feet west of the northeast corner of sec. 15, T. 9 N., R. 24 E.

A—0 to 5 inches; grayish brown (2.5Y 5/2) silty clay, very dark grayish brown (2.5Y 3/2) moist; weak fine subangular blocky structure parting to weak fine granular; slightly hard, friable, sticky and plastic; thin strata of recently deposited material; many roots; mildly alkaline; clear wavy boundary.
C1—5 to 24 inches; grayish brown (2.5Y 5/2) silty clay stratified with thin layers of silty clay loam; very dark grayish brown (2.5Y 3/2) moist; weak coarse subangular blocky structure; hard, firm, very sticky and very plastic; common roots; slight effervescence; moderately alkaline; gradual wavy boundary.
C2—24 to 32 inches; grayish brown (2.5Y 5/2) silty clay stratified with thin layers of silty clay loam; dark grayish brown (2.5Y 4/2) moist; massive; hard, firm, sticky and plastic; few roots; slight effervescence; mildly alkaline; gradual wavy boundary.
C3—32 to 60 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; massive; hard, firm, sticky and plastic; slight effervescence; mildly alkaline.

Free carbonates are within a depth of 8 inches. The A horizon has hue of 10YR or 2.5Y, value of 4 or 5 (2 or 3 moist), and chroma of 1 or 2. It dominantly is silty clay but in some pedons is silty clay loam or clay. The C horizon has hue of 2.5Y or 5Y, value of 5 to 7 (3 to 6 moist), and chroma of 2 to 4. It is stratified silty clay, clay, or silty clay loam.

Formation of the soils

Soil forms when chemical and physical processes act on geologically deposited or accumulated 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 accumulated and has existed since accumulation, the plant and animal life on and in the soil, the relief, and the length of time that the forces of soil formation have acted on the soil material.

Climate and plant and animal life are active factors of soil formation. They act on the 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 modified by relief. The parent material affects the kind of soil profile that forms and, in extreme cases, determines it almost entirely. Finally, time is needed for the transformation of the parent material into a soil having genetically related horizons. Usually, a long time is required for 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. The following paragraphs relate the factors of soil formation to the soils in Ziebach County.

Climate

Climate directly influences the rate of chemical and physical weathering. Ziebach County has a continental climate marked by cold winters and hot summers. This climate favors the growth of grasses and the resulting accumulation of organic matter in the upper part of the soil. It also favors a moderately slow rate of weathering or soil formation. The climate in the northern part of the county is somewhat cooler than that in the southern part. The cooler temperatures differentiate some of the soils within the county. Detailed information about the climate is given under the heading "General Nature of the County."

Plant and Animal Life

Plants, animals, insects, earthworms, bacteria, and fungi have an important effect on soil formation. They cause gains in organic matter, gains or losses in plant nutrients, and changes in soil structure and porosity. In Ziebach County the prairie grasses have had more influence than other living organisms on soil formation. As a result of these grasses, the surface layer of many soils has a moderate content of organic matter. The gently sloping Reeder soils contain more organic matter than the more sloping Cabba soils because they have a more extensive grass cover.

Earthworms, insects, and burrowing animals help to keep the soil open and porous. Bacteria and fungi decompose plant residue, thus releasing plant nutrients.

Parent Material

Parent material is the unconsolidated organic and mineral material in which a soil forms. It determines many of the chemical and physical characteristics of the soil, such as color, texture, reaction, and consistence. The rate of soil formation is more rapid in the more friable, loamy and silty parent material than in other kinds of parent material. Also, more changes take place, and the horizons are more distinct.

Most of the soils in Ziebach County formed in material weathered from the underlying bedrock. The rest formed in old alluvial deposits on high terraces or in recent alluvial deposits on flood plains, in swales, and in depressions on uplands.

The county has three major geological formations. These are the Pierre, Fox Hills, and Hell Creek Formations. The bedrock in the southern part of the county is dominantly clayey shale of the Pierre Formation. It underlies the entire county but is exposed only in the southern part. It is gray to light olive gray and has beds of bentonite and seams of limestone, iron, and manganese concretions. Dupree, Kyle, Pierre, Promise, Samsil, and Swanboy are examples of soils that formed in material weathered from the Pierre Formation.

The bedrock in the north-central and central parts of the county consists of interbedded shale and sandstone of the Fox Hills Formation. This formation overlies the Pierre Formation and underlies the Hell Creek Formation. Cohagen and Vebar are examples of soils that formed in the more sandy material in the Fox Hills Formation. Cabba, Lantry, and Reeder soils formed in material weathered from the loamy and silty beds of this formation. Regent and Ridgeview soils formed in material weathered from the clayey beds.

The bedrock in the northern and west-central parts of the county generally consists of strongly alkaline

siltstone and fine grained sandstone of the Hell Creek Formation. Many of the soils that formed in material weathered from this formation have a sodium affected subsoil. They have a "scabby" appearance because of extreme microrelief. Bullock, Daglum, Evridge, Parchin, and Rhoades soils are examples.

Alluvium occurs as recent deposits of sandy to clayey material on flood plains and as older deposits of loamy and silty material on high terraces, mainly along the Cheyenne and Moreau Rivers. Ree and Reliance are examples of soils that formed in old alluvium on high terraces along the Cheyenne River. Farland and Stady are examples of soils that formed in old alluvium on high terraces along the Moreau River. Bankard, Craft, and Lohmiller soils formed in recent alluvium on the flood plains along the Cheyenne River. Banks, Korchea, and Trembles soils formed in recent alluvium on the flood plains along the Moreau River. Heil soils are examples of soils that formed in alluvium in depressions on uplands. Grail soils, which are in swales, are examples of soils that formed in local alluvium washed in from the adjacent uplands.

Relief

Relief affects soil formation through its effect on drainage, runoff, erosion, plant cover, and soil temperature. On the more sloping soils, such as Cabba soils, much of the rainfall is lost through runoff. As a result of the excessive runoff, a limited amount of moisture penetrates the surface and much of the soil material is lost through erosion. These soils have a thin surface layer and a low content of organic matter. Runoff is slower on Reeder, Regent, and other less sloping soils, and more moisture penetrates the surface. These soils are calcareous at a greater depth than the Cabba soils. Also, the horizons in which organic matter accumulates are thicker.

Heil soils are in depressions where water ponds. They have the colors characteristic of poorly drained soils. Grail soils, which are in swales, receive extra moisture in the form of runoff from the adjacent soils. The layers in which organic matter accumulates are thicker than those in the adjacent Reeder and Regent soils. Glenross and other soils in low areas where drainage is impeded have a fluctuating water table that favors the concentration of salts.

Time

The length of time that soil material has been exposed to the other four factors of soil formation is reflected in the kinds of soil that form. Generally, the degree of profile development reflects the age of a soil. The oldest soils are on the parts of the landscape that have been stable for the longest time. These are the Farland, Ree, and Reliance soils, which have distinct horizons. The youngest soils either are those in which natural erosion removes nearly as much soil material as is formed through the weathering of parent material or are alluvial soils, which receive new material each time they are flooded. Cabba and Samsil are examples of young soils that are subject to natural erosion. Craft and Lohmiller are examples of young soils that formed in alluvium.

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Glossary

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Association, soil. A group of soils 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—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

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.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Blowout. A shallow depression from which all or most of the soil material has been removed by 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.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

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.

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.

Complex, soil. A map unit of two or more kinds of soil 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 are somewhat similar in all areas.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to puil free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour farming. 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.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed native 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.

Depth, soil. The thickness of weathered soil material over bedrock. The depth classes recognized in this survey are—

	Inches
Deep	more than 40
Moderately deep	20 to 40
Shallow	less than 20

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

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 the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Excess salts (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grains are grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

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 Vertisols—clayey soils having a high coefficient of expansion and contraction with changes in moisture content.

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 up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

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.

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. The major horizons 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, any plowed or disturbed surface layer.

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 O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon 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) granular, 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 horizon. 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.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Increasers. Species that respond to continued overgrazing, at least initially, by increasing in relation to other plants in the community.

Invaders. On range, plants that are not a part of the original plant community that encroach into an area and grow after the native vegetation has been reduced by grazing. Generally, invader plants follow disturbance of the surface soil.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

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.
Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.
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.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

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.

Low strength. The soil is not strong enough to support loads.

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.

Mollic epipedon. A thick, dark, humus-rich surface horizon or (horizons) that has high base saturation and pedogenic soil structure. It may include part of the subsoil.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

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.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 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

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

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.

Range condition. The present composition of the plant community on a range site in relation to the potential natural plant community for that site. Range condition is expressed as excellent, good,

fair, or poor, on the basis of how much the present plant community has departed from the potential.

Range site. An area of rangeland where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. A range 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 range sites in kind or proportion of species or total production.

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 degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly 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

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.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts 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.

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-size particles.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. 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.

Shrink-swell. 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.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slickspot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil is generally 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. The slope classes recognized in this survey area are as follows:

	Percent
Level	0 to 1
Nearly level	0 to 2
Gently sloping	2 to 6
Moderately sloping	6 to 9
Strongly sloping	9 to 15
Moderately steep	15 to 25
Steep	25 to 40
Very steep	more than 40

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind 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 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. Breaking up a compact subsoil by pulling a special chisel through the soil.

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.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from about 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. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

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.

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 too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Too arid (in tables). The soil is dry most of the time, and vegetation is difficult to establish.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1951-81 at Dupree, South Dakota)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- 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-----	26.2	3.6	14.9	58	-31	21	0.26	0.09	0.39	1	5.0
February----	32.3	9.9	21.1	64	-24	27	.41	.13	.63	1	6.7
March-------	41.8	18.9	30.4	75	-15	80	.72	.15	1.16	2	6.1
April-------	58.2	32.1	45.2	86	10	210	1.68	.51	2.63	4	4.2
May---------	70.3	43.1	56.7	91	23	518	2.85	1.33	4.15	6	.5
June--------	79.7	52.9	66.3	100	36	789	3.19	2.00	4.25	7	.4
July--------	89.1	58.4	73.8	107	43	1,048	1.99	1.05	2.80	5	.0
August------	88.0	56.7	72.4	104	41	1,004	1.63	.69	2.42	4	.0
September---	76.6	45.8	61.2	101	24	636	1.09	.24	1.75	3	.0
October-----	63.7	35.0	49.4	89	13	309	.89	.12	1.48	2	.9
November----	44.2	21.0	32.6	72	-7	43	.36	.05	.60	1	3.9
December----	31.4	10.4	20.9	62	-25	23	.34	.09	.54	1	5.8
Yearly:											
Average---	58.5	32.3	45.4	---	---	---	---	---	---	---	---
Extreme---	---	---	---	107	-32	---	---	---	---	---	---
Total-----	---	---	---	---	---	4,708	15.41	12.06	18.11	37	33.5

* 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.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1951-81 at Dupree, South Dakota)

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--	May 8	May 18	May 31
2 years in 10 later than--	May 3	May 13	May 26
5 years in 10 later than--	Apr. 23	May 3	May 17
First freezing temperature in fall:			
1 year in 10 earlier than--	Sept. 24	Sept. 16	Sept. 11
2 years in 10 earlier than--	Sept. 29	Sept. 22	Sept. 14
5 years in 10 earlier than--	Oct. 10	Oct. 2	Sept. 21

TABLE 3.--GROWING SEASON

(Recorded in the period 1951-81 at Dupree, South Dakota)

Probability	Daily minimum temperature during growing season		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	151	131	111
8 years in 10	157	138	116
5 years in 10	169	152	127
2 years in 10	181	165	137
1 year in 10	187	172	142

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AcD	Amor-Cabba loams, 9 to 15 percent slopes	7,630	0.6
Ba	Badland	1,510	0.1
Bk	Bankard loamy fine sand	2,965	0.2
Bn	Bankard Variant loamy fine sand	730	0.1
Bo	Banks loamy fine sand	2,730	0.2
BpB	Bullock-Parchin fine sandy loams, 0 to 9 percent slopes	37,635	3.0
BsC	Bullock-Slickspots-Parchin complex, 2 to 25 percent slopes	13,025	1.0
CaE	Cabba-Lantry complex, 25 to 40 percent slopes	19,395	1.5
CcF	Cabba-Rock outcrop complex, 9 to 60 percent slopes	9,775	0.8
CkF	Cohagen-Rock outcrop complex, 9 to 50 percent slopes	7,670	0.6
CoE	Cohagen-Vebar fine sandy loams, 15 to 40 percent slopes	18,945	1.5
CrD	Cohagen-Vebar-Bullock fine sandy loams, 6 to 25 percent slopes	23,190	1.8
Ct	Craft very fine sandy loam	3,055	0.2
DaA	Daglum loam, 0 to 2 percent slopes	3,260	0.3
DrB	Daglum-Rhoades loams, 2 to 6 percent slopes	26,190	2.1
DuC	Dupree clay, 3 to 15 percent slopes	7,385	0.6
EvB	Evridge loamy fine sand, 0 to 6 percent slopes	2,910	0.2
FaA	Farland silt loam, 0 to 2 percent slopes	2,105	0.2
FaB	Farland silt loam, 2 to 6 percent slopes	1,695	0.1
Fv	Fluvaquents, ponded	1,025	0.1
Gn	Glenross fine sandy loam	1,060	0.1
Gr	Grail silt loam	2,105	0.2
Hc	Haverson silt loam, channeled	1,845	0.1
He	Heil silt loam	7,160	0.6
Hn	Heil Variant silty clay loam, ponded	975	0.1
HpC	Hisle-Pierre complex, 2 to 9 percent slopes	13,525	1.1
HsB	Hisle-Slickspots complex, 2 to 9 percent slopes	4,595	0.4
Ka	Korchea loam	2,405	0.2
Kc	Korchea loam, channeled	8,385	0.7
KyB	Kyle clay, 2 to 6 percent slopes	25,700	2.0
LcD	Lantry-Cabba complex, 9 to 30 percent slopes	73,065	5.6
LdD	Lantry-Cabba-Rhoades complex, 9 to 30 percent slopes	16,650	1.3
LeD	Lantry-Korchea-Cabba complex, 1 to 25 percent slopes	2,110	0.2
Lh	Lohler silty clay loam	1,050	0.1
Lk	Lohler silty clay loam, channeled	1,520	0.1
Ln	Lohmiller silty clay loam	3,610	0.3
Lo	Lohmiller silty clay loam, channeled	9,445	0.7
PbB	Parchin-Bullock fine sandy loams, 1 to 6 percent slopes	10,445	0.8
PeB	Pierre clay, 2 to 6 percent slopes	51,410	4.1
PeC	Pierre clay, 6 to 9 percent slopes	30,490	2.4
PmD	Pierre-Samsil clays, 9 to 30 percent slopes	83,120	6.7
Po	Pits, gravel	130	*
PrA	Promise clay, silty substratum, 0 to 2 percent slopes	12,790	1.0
RaA	Ree loam, 0 to 2 percent slopes	800	0.1
RaB	Ree loam, 2 to 6 percent slopes	565	*
RbB	Reeder loam, 2 to 6 percent slopes	12,945	1.0
RbC	Reeder loam, 6 to 9 percent slopes	780	0.1
RcB	Reeder-Daglum loams, 1 to 6 percent slopes	2,900	0.2
RdC	Reeder-Lantry complex, 2 to 9 percent slopes	70,885	5.7
ReC	Reeder-Rhoades-Lantry complex, 2 to 9 percent slopes	29,310	2.3
RgB	Regent silty clay loam, 2 to 6 percent slopes	47,100	3.7
RgC	Regent silty clay loam, 6 to 9 percent slopes	14,570	1.2
RhD	Regent-Cabba complex, 6 to 15 percent slopes	3,270	0.3
RmB	Regent-Daglum complex, 2 to 6 percent slopes	4,115	0.3
RnB	Regent-Rhoades complex, 2 to 9 percent slopes	51,610	4.1
RoA	Reliance silty clay loam, 0 to 2 percent slopes	3,800	0.3
RoB	Reliance silty clay loam, 2 to 6 percent slopes	3,380	0.3
RrA	Rhoades-Daglum loams, 0 to 2 percent slopes	6,540	0.5
RrB	Rhoades-Daglum loams, 2 to 9 percent slopes	67,205	5.4
RsB	Rhoades-Slickspots complex, 1 to 6 percent slopes	13,320	1.1
RvA	Ridgeview silty clay loam, 0 to 2 percent slopes	3,580	0.3
RvB	Ridgeview silty clay loam, 2 to 6 percent slopes	11,405	0.9

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
Rw	Riverwash	1,200	0.1
SaE	Samsil clay, 15 to 40 percent slopes	177,250	14.2
ScF	Samsil-Rock outcrop complex, 9 to 60 percent slopes	5,530	0.4
SgA	Savage silt loam, 0 to 2 percent slopes	660	0.1
SgB	Savage silt loam, 2 to 6 percent slopes	12,110	1.0
ShE	Schamber-Samsil complex, 9 to 40 percent slopes	6,330	0.5
SkB	Seroco-Tally complex, 2 to 9 percent slopes	1,200	0.1
So	Shambo loam	3,785	0.3
Sp	Slickspots	1,010	0.1
StA	Stady loam, 0 to 3 percent slopes	2,020	0.2
SwB	Swanboy clay, 0 to 6 percent slopes	8,035	0.6
SxC	Swanboy-Kyle clays, 2 to 15 percent slopes	2,710	0.2
SyB	Swanboy-Slickspots complex, 0 to 6 percent slopes	5,210	0.4
TaA	Tally fine sandy loam, 0 to 2 percent slopes	2,740	0.2
TaB	Tally fine sandy loam, 2 to 6 percent slopes	1,625	0.1
Tm	Trembles fine sandy loam	4,165	0.3
Tr	Trembles fine sandy loam, channeled	4,350	0.3
VbB	Vebar fine sandy loam, 2 to 6 percent slopes	2,295	0.2
VbC	Vebar fine sandy loam, 6 to 9 percent slopes	4,990	0.4
VcC	Vebar-Cohagen fine sandy loams, 6 to 15 percent slopes	28,330	2.2
VdC	Vebar-Daglum complex, 3 to 9 percent slopes	61,135	4.9
WcE	Wabek-Cabba complex, 9 to 40 percent slopes	1,500	0.1
WdE	Wayden silty clay loam, 15 to 40 percent slopes	10,660	0.8
We	Wendte silty clay	2,790	0.2
Wn	Wendte silty clay, channeled	1,800	0.1
	Water areas less than 40 acres in size	2,433	0.2
	Total land area	1,260,358	100.0
	Open water areas more than 40 acres in size	2,388	
	Total area	1,262,746	

* Less than 0.1 percent.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE

(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)

Soil name and map symbol	Winter wheat*	Spring wheat	Oats	Alfalfa hay	Cool-season grasses
	Bu	Bu	Bu	Tons	AUM**
AcD. Amor-Cabba					
Ba***. Badland					
Bk. Bankard					
Bn. Bankard Variant					
Bo. Banks					
BpB. Bullock-Parchin					
BsC. Bullock-Slickspots-Parchin					
CaE. Cabba-Lantry					
CcF***. Cabba-Rock outcrop					
CkF***. Cohagen-Rock outcrop					
CoE. Cohagen-Vebar					
CrD. Cohagen-Vebar-Bullock					
Ct---------- Craft	29	22	46	1.5	2.5
DaA---------- Daglum	22	18	25	1.0	1.6
DrB---------- Daglum-Rhoades	15	---	23	0.8	1.3
DuC. Dupree					
EvB---------- Evridge	20	15	24	1.3	2.2
FaA---------- Farland	33	29	56	2.0	3.3
FaB---------- Farland	31	25	52	1.7	2.8

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Winter wheat*	Spring wheat	Oats	Alfalfa hay	Cool-season grasses
	Bu	Bu	Bu	Tons	AUM**
Fv. Fluvaquents					
Gn. Glenross					
Gr---------- Grail	39	31	64	2.5	4.2
Hc---------- Haverson	---	---	---	1.8	2.5
He. Heil					
Hn. Heil Variant					
HpC. Hisle-Pierre					
HsB***. Hisle-Slickspots					
Ka---------- Korchea	29	28	58	2.1	3.5
Kc---------- Korchea	---	---	---	2.2	3.7
KyB---------- Kyle	26	21	38	1.3	2.2
LcD. Lantry-Cabba					
LdD. Lantry-Cabba-Rhoades					
LeD. Lantry-Korchea-Cabba					
Lh---------- Lohler	30	28	52	2.1	3.5
Lk---------- Lohler	---	---	---	2.5	4.2
Ln---------- Lohmiller	30	28	52	2.1	3.5
Lo---------- Lohmiller	---	---	---	2.5	4.2
PbB---------- Parchin-Bullock	---	---	21	0.7	1.2
PeB---------- Pierre	26	20	36	1.2	2.0

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Winter wheat*	Spring wheat	Oats	Alfalfa hay	Cool-season grasses
	Bu	Bu	Bu	Tons	AUM**
PeC---------- Pierre	20	16	30	1.0	1.6
PmD. Pierre-Samsil					
Po***. Pits					
PrA---------- Promise	36	27	44	1.1	2.4
RaA---------- Ree	33	29	56	2.0	3.3
RaB---------- Ree	31	25	52	1.7	2.8
RbB---------- Reeder	28	24	48	1.4	2.3
RbC---------- Reeder	22	17	40	1.1	1.8
RcB---------- Reeder-Daglum	25	20	39	1.2	2.0
RdC---------- Reeder-Lantry	26	22	40	1.2	2.0
ReC---------- Reeder-Rhoades-Lantry	24	16	34	1.1	1.8
RgB---------- Regent	28	24	45	1.4	2.3
RgC---------- Regent	22	17	38	1.1	1.8
RhD. Regent-Cabba					
RmB---------- Regent-Daglum	25	19	36	1.2	2.0
RnB---------- Regent-Rhoades	19	---	34	1.0	1.6
RoA---------- Reliance	35	30	56	2.0	3.3
RoB---------- Reliance	32	26	52	1.8	3.0
RrA, RrB. Rhoades-Daglum					
RsB***. Rhoades-Slickspots					

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Winter wheat*	Spring wheat	Oats	Alfalfa hay	Cool-season grasses
	Bu	Bu	Bu	Tons	AUM**
RvA---------- Ridgeview	35	27	48	1.5	2.5
RvB---------- Ridgeview	32	24	44	1.3	2.2
Rw***. Riverwash					
SaE. Samsil					
ScF***. Samsil-Rock outcrop					
SgA---------- Savage	35	30	54	2.0	3.3
SgB---------- Savage	32	26	49	1.8	3.0
ShE. Schamber-Samsil					
SkB. Seroco-Tally					
So---------- Shambo	33	25	56	2.0	3.3
Sp***. Slickspots					
StA---------- Stady	20	18	40	1.1	1.8
SwB. Swanboy					
SxC. Swanboy-Kyle					
SyB***. Swanboy-Slickspots					
TaA---------- Tally	25	19	45	1.5	2.5
TaB---------- Tally	23	18	43	1.4	2.3
Tm---------- Trembles	24	21	45	1.5	2.5
Tr---------- Trembles	---	---	---	1.7	2.8
VbB---------- Vebar	23	18	42	1.2	2.0

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Winter wheat*	Spring wheat	Oats	Alfalfa hay	Cool-season grasses
	Bu	Bu	Bu	Tons	AUM*
VbC---------- Vebar	19	15	34	1.1	1.8
VcC. Vebar-Cohagen					
VdC---------- Vebar-Daglum	18	13	36	0.9	1.5
WcE. Wabek-Cabba					
WdE. Wayden					
We---------- Wendte	30	24	48	2.0	3.3
Wn---------- Wendte	---	---	---	2.0	3.3

* Most winter wheat is grown under a summer fallow system of management. The yields can be expected only in alternate years.

** Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

*** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--RANGELAND PRODUCTIVITY

(Only the soils that support rangeland vegetation suitable for grazing are listed)

Soil name and map symbol	Range site	Potential annual production for kind of growing season		
		Favorable Lb/acre	Average Lb/acre	Unfavorable Lb/acre
AcD*:				
Amor	Silty	2,500	2,100	1,500
Cabba	Shallow	1,900	1,600	1,100
Bk Bankard	Sands	2,700	2.300	1,600
Bn Bankard Variant	Shallow to Gravel	1,100	900	600
Bo Banks	Sands	2,700	2,300	1,600
BpB*:				
Bullock	Thin Claypan	1,200	1,000	600
Parchin	Claypan	1,800	1,500	1,000
BsC*:				
Bullock	Thin Claypan	1,100	900	500
Slickspots.				
Parchin	Claypan	1,700	1,400	1,100
CaE*:				
Cabba	Shallow	1,800	1,500	1,200
Lantry	Thin Upland	1,900	1,600	1,100
CcF*:				
Cabba	Shallow	1,800	1,500	1,200
Rock outcrop.				
CkF*:				
Cohagen	Shallow	1,800	1,500	1,100
Rock outcrop.				
CoE*:				
Cohagen	Shallow	1,800	1,500	1,100
Vebar	Sandy	2,400	2,000	1,400
CrD*:				
Cohagen	Shallow	1,900	1,600	1,100
Vebar	Sandy	2,400	2,100	1,500
Bullock	Thin Claypan	1,100	900	500
Ct Craft	Loamy Terrace	3,200	2,700	1,900
DaA Daglum	Claypan	1,800	1,500	1,000

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY--Continued

Soil name and map symbol	Range site	Potential annual production for kind of growing season		
		Favorable	Average	Unfavorable
		Lb/acre	Lb/acre	Lb/acre
DrB*:				
Daglum	Claypan	1,800	1,500	1,000
Rhoades	Thin Claypan	1,200	1,000	600
DuC	Dense Clay	2,000	1,500	900
Dupree				
EvB	Sandy	2,500	2,100	1,500
Evridge				
FaA, FaB	Silty	2,600	2,200	1,500
Farland				
Gn	Saline Lowland	2,500	2,300	1,600
Glenross				
Gr	Loamy Overflow	3,700	3,100	2,200
Grail				
Hc	Loamy Overflow	3,600	3,000	2,100
Haverson				
He	Closed Depression	3,100	2,800	2,000
Heil				
HpC*:				
Hisle	Thin Claypan	1,200	1,000	600
Pierre	Clayey	2,400	2,000	1,400
HsB*:				
Hisle	Thin Claypan	1,200	1,000	600
Slickspots.				
Ka	Loamy Terrace	3,400	2,800	2,000
Korchea				
Kc	Loamy Overflow	3,700	3,100	2,200
Korchea				
KyB	Clayey	2,500	2,100	1,500
Kyle				
LcD*:				
Lantry	Thin Upland	2,000	1,700	1,200
Cabba	Shallow	1,800	1,500	1,100
LdD*:				
Lantry	Thin Upland	2,000	1,700	1,200
Cabba	Shallow	1,800	1,500	1,100
Rhoades	Thin Claypan	1,100	900	500
LeD*:				
Lantry	Thin Upland	2,000	1,700	1,200
Korchea	Loamy Overflow	3,700	3,100	2,200

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY--Continued

Soil name and map symbol	Range site	Potential annual production for kind of growing season		
		Favorable	Average	Unfavorable
		Lb/acre	Lb/acre	Lb/acre
LeD*:				
Cabba	Shallow	1,800	1,500	1,100
Lh Lohler	Loamy Terrace	3,200	2,700	1,900
Lk Lohler	Loamy Overflow	3,600	3,000	2,100
Ln Lohmiller	Loamy Terrace	3,200	2,700	1,900
Lo Lohmiller	Loamy Overflow	3,600	3,000	2,100
PbB*:				
Parchin	Claypan	1,800	1,500	1,000
Bullock	Thin Claypan	1,200	1,000	600
PeB, PeC Pierre	Clayey	2,400	2,000	1,400
PmD*:				
Pierre	Clayey	2,300	1,900	1,300
Samsil	Shallow Clay	1,800	1,500	1,000
PrA Promise	Dense Clay	2,200	1,700	1,100
RaA, RaB Ree	Silty	2,600	2,200	1,500
RbB, RbC Reeder	Silty	2,300	2,000	1,700
RcB*:				
Reeder	Silty	2,600	2,200	1,500
Daglum	Claypan	1,800	1,500	1,000
RdC*:				
Reeder	Silty	2,600	2,200	1,500
Lantry	Thin Upland	2,000	1,700	1,200
ReC*:				
Reeder	Silty	2,600	2,200	1,500
Rhoades	Thin Claypan	1,200	1,000	600
Lantry	Thin Upland	2,000	1,700	1,200
RgB, RgC Regent	Clayey	2,400	2,000	1,400
RhD*:				
Regent	Clayey	2,300	1,900	1,300
Cabba	Shallow	1,900	1,600	1,100

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY--Continued

Soil name and map symbol	Range site	Potential annual production for kind of growing season		
		Favorable	Average	Unfavorable
		Lb/acre	Lb/acre	Lb/acre
RmB*:				
Regent	Clayey	2,400	2,000	1,400
Daglum	Claypan	1,800	1,500	1,000
RnB*:				
Regent	Clayey	2,400	2,000	1,400
Rhoades	Thin Claypan	1,200	1,000	600
RoA, RoB Reliance	Silty	2,600	2,200	1,500
RrA*, RrB*:				
Rhoades	Thin Claypan	1,200	1,000	600
Daglum	Claypan	1,800	1,500	1,000
RsB*:				
Rhoades	Thin Claypan	1,200	1,000	600
Slickspots.				
RvA, RvB Ridgeview	Clayey	2,500	2,100	1,500
SaE Samsil	Shallow Clay	1,800	1,500	1,000
ScF*:				
Samsil	Shallow Clay	1,700	1,400	1,000
Rock outcrop.				
SgA, SgB Savage	Silty	2,600	2,200	1,500
ShE*:				
Schamber	Very Shallow	1,200	1,000	600
Samsil	Shallow Clay	1,800	1,500	1,000
SkB*:				
Seroco	Sands	2,500	2,100	1,500
Tally	Sandy	2,600	2,200	1,500
So Shambo	Silty	2,600	2,200	1,500
StA Stady	Silty	2,500	2,100	1,500
SwB Swanboy	Dense Clay	1,800	1,500	900
SxC*:				
Swanboy	Dense Clay	1,800	1,500	900
Kyle	Clayey	2,400	2,000	1,400

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY--Continued

Soil name and map symbol	Range site	Potential annual production for kind of growing season		
		Favorable	Average	Unfavorable
		Lb/acre	Lb/acre	Lb/acre
SyB*:				
Swanboy	Dense Clay	1,800	1,500	900
Slickspots.				
TaA, TaB	Sandy	2,600	2,200	1,500
Tally				
Tm	Loamy Terrace	3,100	2,600	1,800
Trembles				
Tr	Loamy Overflow	3,600	3,000	2,100
Trembles				
VbB, VbC	Sandy	2,400	2,100	1,800
Vebar				
VcC*:				
Vebar	Sandy	2,600	2,200	1,500
Cohagen	Shallow	1,900	1,600	1,100
VdC*:				
Vebar	Sandy	2,600	2,200	1,500
Daglum	Claypan	1,800	1,500	1,000
WcE*:				
Wabek	Very Shallow	1,200	1,000	600
Cabba	Shallow	1,800	1,500	1,100
WdE	Shallow	1,800	1,500	1,100
Wayden				
We	Clayey Overflow	3,400	2,800	2,000
Wendte				
Wn	Clayey Overflow	3,600	3,000	2,100
Wendte				

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS

(The symbol < means less than; > means more than. Absence of an entry indicates that trees generally do not grow to the given height on that soil)

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	<8	8-15	16-25	26-35
AcD*:				
Amor	Lilac, Peking cotoneaster.	Ponderosa pine, Russian-olive, Siberian peashrub, Rocky Mountain juniper, eastern redcedar.	Siberian elm, green ash.	---
Cabba.				
Ba*.				
Badland				
Bk	---	Ponderosa pine, eastern redcedar, Rocky Mountain juniper.	---	---
Bankard				
Bn.				
Bankard Variant				
Bo	---	Ponderosa pine, eastern redcedar, Rocky Mountain juniper.	---	---
Banks				
BpB*:				
Bullock.				
Parchin	Green ash, Russian-olive, eastern redcedar, Rocky Mountain juniper, Siberian peashrub, silver buffaloberry, Tatarian honeysuckle, lilac.	Siberian elm, ponderosa pine.	---	---
BsC*:				
Bullock.				
Slickspots.				
Parchin.				
CaE*:				
Cabba.				
Lantry.				
CcF*:				
Cabba.				
Rock outcrop.				

See footnote at end of table.

TABLE 7.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	<8	8-15	16-25	26-35
CkF*:				
Cohagen.				
Rock outcrop.				
CoE*:				
Cohagen.				
Vebar.				
CrD*:				
Cohagen.				
Vebar	Lilac, Peking cotoneaster.	Ponderosa pine, Siberian peashrub, eastern redcedar, Rocky Mountain juniper, Russian-olive.	Siberian elm, green ash.	---
Bullock.				
Ct Craft	American plum, Tatarian honeysuckle, Peking cotoneaster.	Eastern redcedar, Manchurian crabapple, common chokecherry, Siberian peashrub.	Golden willow, blue spruce, ponderosa pine, green ash.	Eastern cottonwood.
DaA Daglum	Green ash, Russian-olive, eastern redcedar, Rocky Mountain juniper, Siberian peashrub, silver buffaloberry, lilac, Tatarian honeysuckle.	Siberian elm, ponderosa pine.	---	---
DrB*:				
Daglum	Green ash, Russian-olive, eastern redcedar, Rocky Mountain juniper, Siberian peashrub, silver buffaloberry, lilac, Tatarian honeysuckle.	Siberian elm, ponderosa pine.	---	---
Rhoades.				
DuC. Dupree				
EvB Evridge	American plum, silver buffaloberry.	Russian-olive, Rocky Mountain juniper, Manchurian crabapple, common chokecherry, Tatarian honeysuckle, lilac, Siberian peashrub.	Green ash, ponderosa pine, Siberian elm.	---

See footnote at end of table.

TABLE 7.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	<8	8-15	16-25	26-35
FaA, FaB---------- Farland	---	Manchurian crabapple, Black Hills spruce, Russian-olive, Siberian peashrub, common chokecherry, eastern redcedar, Tatarian honeysuckle, American plum, lilac.	Siberian elm, green ash, ponderosa pine.	---
Fv. Fluvaquents				
Gn. Glenross				
Gr---------- Grail	American plum, Peking cotoneaster, Tatarian honeysuckle.	Manchurian crabapple, eastern redcedar, common chokecherry, Siberian peashrub.	Golden willow, ponderosa pine, green ash, blue spruce.	Eastern cottonwood.
Hc---------- Haverson	American plum, Peking cotoneaster, Tatarian honeysuckle.	Manchurian crabapple, eastern redcedar, common chokecherry, Siberian peashrub.	Green ash, golden willow, ponderosa pine, blue spruce.	Eastern cottonwood.
He. Heil				
Hn. Heil Variant				
HpC*: Hisle.				
Pierre----------	Siberian peashrub, American plum, Tatarian honeysuckle, lilac, golden currant.	Ponderosa pine, green ash, Rocky Mountain juniper, Russian-olive, eastern redcedar, common chokecherry.	Siberian elm----------	---
HsB*: Hisle.				
Slickspots.				
Ka, Kc---------- Korchea	Peking cotoneaster, Tatarian honeysuckle, American plum.	Manchurian crabapple, common chokecherry, eastern redcedar, Siberian peashrub.	Golden willow, ponderosa pine, green ash, blue spruce.	Eastern cottonwood.
KyB---------- Kyle	Siberian peashrub, American plum, Tatarian honeysuckle, lilac, golden currant.	Ponderosa pine, green ash, Rocky Mountain juniper, Russian-olive, eastern redcedar, common chokecherry.	Siberian elm----------	---

See footnote at end of table.

TABLE 7.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	<8	8-15	16-25	26-35
LcD*:				
Lantry.				
Cabba.				
LdD*:				
Lantry.				
Cabba.				
Rhoades.				
LeD*:				
Lantry.				
Korchea	American plum, Tatarian honeysuckle, Peking cotoneaster.	Siberian peashrub, eastern redcedar, common chokecherry, Manchurian crabapple.	Ponderosa pine, golden willow, green ash, blue spruce.	Eastern cottonwood.
Cabba.				
Lh, Lk Lohler	Tatarian honeysuckle, American plum, Peking cotoneaster.	Eastern redcedar, Manchurian crabapple, common chokecherry, Siberian peashrub.	Golden willow, ponderosa pine, green ash, blue spruce.	Eastern cottonwood.
Ln, Lo Lohmiller	American plum, Tatarian honeysuckle, Peking cotoneaster.	Eastern redcedar, Manchurian crabapple, common chokecherry, Siberian peashrub.	Golden willow, ponderosa pine, blue spruce, green ash.	Eastern cottonwood.
PbB*:				
Parchin	Green ash, Russian-olive, eastern redcedar, Rocky Mountain juniper, Siberian peashrub, silver buffaloberry, Tatarian honeysuckle, lilac.	Siberian elm, ponderosa pine.	---	---
Bullock.				
PeB, PeC Pierre	Siberian peashrub, American plum, Tatarian honeysuckle, lilac, golden currant.	Ponderosa pine, green ash, Rocky Mountain juniper, Russian-olive, eastern redcedar, common chokecherry.	Siberian elm	---
PmD*:				
Pierre	Siberian peashrub, American plum, Tatarian honeysuckle, lilac, golden currant.	Ponderosa pine, green ash, Rocky Mountain juniper, Russian-olive, eastern redcedar, common chokecherry.	Siberian elm	---
Samsil.				

See footnote at end of table.

TABLE 7.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	<8	8-15	16-25	26-35
Po*. Pits				
PrA---------- Promise	Lilac, Siberian peashrub, Tatarian honeysuckle, American plum, golden currant.	Common chokecherry, Rocky Mountain juniper, eastern redcedar, ponderosa pine, Russian-olive, green ash.	Siberian elm----------	---
RaA, RaB---------- Ree	---	Manchurian crabapple, Black Hills spruce, Russian-olive, Siberian peashrub, common chokecherry, eastern redcedar, Tatarian honeysuckle, American plum, lilac.	Siberian elm, green ash, ponderosa pine.	---
RbB, RbC---------- Reeder	Peking cotoneaster, lilac.	Russian-olive, Siberian peashrub, eastern redcedar, Rocky Mountain juniper, ponderosa pine.	Siberian elm, green ash.	---
RcB*: Reeder----------	Peking cotoneaster, lilac.	Ponderosa pine, Rocky Mountain juniper, Russian-olive, Siberian peashrub, eastern redcedar.	Siberian elm, green ash.	---
Daglum----------	Green ash, Russian-olive, eastern redcedar, Rocky Mountain juniper, Siberian peashrub, silver buffaloberry, lilac, Tatarian honeysuckle.	Siberian elm, ponderosa pine.	---	---
RdC*: Reeder----------	Peking cotoneaster, lilac.	Ponderosa pine, Rocky Mountain juniper, Russian-olive, Siberian peashrub, eastern redcedar.	Siberian elm, green ash.	---
Lantry----------	Siberian peashrub, Tatarian honeysuckle, lilac, silver buffaloberry, Peking cotoneaster, skunkbush sumac.	Ponderosa pine, green ash, Russian-olive, eastern redcedar, Rocky Mountain juniper.	Siberian elm----------	---

See footnote at end of table.

TABLE 7.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	<8	8-15	16-25	26-35
ReC*:				
Reeder	Peking cotoneaster, lilac.	Ponderosa pine, Rocky Mountain juniper, Russian-olive, Siberian peashrub, eastern redcedar.	Siberian elm, green ash.	---
Rhoades.				
Lantry	Siberian peashrub, Tatarian honeysuckle, lilac, silver buffaloberry, Peking cotoneaster, skunkbush sumac.	Ponderosa pine, green ash, Russian-olive, eastern redcedar, Rocky Mountain juniper.	Siberian elm	---
RgB, RgC	Siberian peashrub,	Ponderosa pine, green	Siberian elm	---
Regent	lilac, American plum, golden currant, Tatarian honeysuckle.	ash, Russian-olive, common chokecherry, Rocky Mountain juniper, eastern redcedar.		
RhD*:				
Regent	Siberian peashrub, lilac, American plum, golden currant, Tatarian honeysuckle.	Ponderosa pine, green ash, Russian-olive, common chokecherry, Rocky Mountain juniper, eastern redcedar.	Siberian elm	---
Cabba.				
RmB*:				
Regent	Siberian peashrub, lilac, American plum, golden currant, Tatarian honeysuckle.	Ponderosa pine, green ash, Russian-olive, common chokecherry, Rocky Mountain juniper, eastern redcedar.	Siberian elm	---
Daglum	Green ash, Russian-olive, eastern redcedar, Rocky Mountain juniper, Siberian peashrub, silver buffaloberry, lilac, Tatarian honeysuckle.	Siberian elm, ponderosa pine.	---	---
RnB*:				
Regent	Siberian peashrub, lilac, American plum, golden currant, Tatarian honeysuckle.	Ponderosa pine, green ash, Russian-olive, common chokecherry, Rocky Mountain juniper, eastern redcedar.	Siberian elm	---
Rhoades.				

See footnote at end of table.

TABLE 7.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	<8	8-15	16-25	26-35
RoA, RoB---------- Reliance	---	Russian-olive, Manchurian crabapple, common chokecherry Siberian peashrub, American plum, eastern redcedar, Tatarian honeysuckle, lilac, Black Hills spruce.	Siberian elm, ponderosa pine, green ash.	---
RrA*, RrB*: Rhoades.				
Daglum----------	Green ash, Russian-olive, eastern redcedar, Rocky Mountain juniper, Siberian peashrub, silver buffaloberry, lilac, Tatarian honeysuckle.	Siberian elm, ponderosa pine.	---	---
RsB*: Rhoades.				
Slickspots.				
RvA, RvB---------- Ridgeview	Siberian peashrub, lilac, Tatarian honeysuckle, American plum, golden currant.	Green ash, ponderosa pine, Rocky Mountain juniper, Russian-olive, eastern redcedar, common chokecherry.	Siberian elm----------	---
Rw*. Riverwash				
SaE. Samsil				
ScF*: Samsil.				
Rock outcrop.				
SgA, SgB---------- Savage	---	Russian-olive, eastern redcedar, lilac, common chokecherry, Siberian peashrub, Tatarian honeysuckle, Black Hills spruce, Manchurian crabapple, American plum.	Siberian elm, green ash, ponderosa pine.	---
ShE*: Schamber.				
Samsil.				

See footnote at end of table.

TABLE 7.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	<8	8-15	16-25	26-35
SkB*:				
Seroco	---	Ponderosa pine, eastern redcedar, Rocky Mountain juniper.	---	---
Tally	American plum, silver buffaloberry.	Rocky Mountain juniper, Siberian peashrub, common chokecherry, Manchurian crabapple, Tatarian honeysuckle, lilac.	Siberian elm, Russian-olive, green ash, ponderosa pine.	---
So	---	Black Hills spruce, eastern redcedar, Russian-olive, Siberian peashrub, common chokecherry, lilac, Tatarian honeysuckle, American plum, Manchurian crabapple.	Siberian elm, green ash, ponderosa pine.	---
Shambo				
Sp*.				
Slickspots				
StA	Siberian peashrub	Ponderosa pine, Russian-olive, eastern redcedar, Rocky Mountain juniper, green ash, hackberry.	Siberian elm	---
Stady				
SwB.				
Swanboy				
SxC*:				
Swanboy.				
Kyle	Siberian peashrub, American plum, Tatarian honeysuckle, lilac, golden currant.	Ponderosa pine, green ash, Rocky Mountain juniper, Russian-olive, eastern redcedar, common chokecherry.	Siberian elm	---
SyB*:				
Swanboy.				
Slickspots.				
TaA, TaB	Silver buffaloberry, American plum.	Rocky Mountain juniper, Siberian peashrub, common chokecherry, Manchurian crabapple, lilac, Tatarian honeysuckle.	Siberian elm, Russian-olive, green ash, ponderosa pine.	---
Tally				

See footnote at end of table.

TABLE 7.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	<8	8-15	16-25	26-35
Tm, Tr---------- Trembles	Peking cotoneaster, American plum, Tatarian honeysuckle.	Siberian peashrub, common chokecherry, eastern redcedar, Manchurian crabapple.	Golden willow, green ash, ponderosa pine, blue spruce.	Eastern cottonwood.
VbB, VbC---------- Vebar	Lilac, Peking cotoneaster.	Ponderosa pine, Russian-olive, Siberian peashrub, eastern redcedar, Rocky Mountain juniper.	Siberian elm, green ash.	---
VcC*: Vebar---------- Cohagen.	Lilac, Peking cotoneaster.	Ponderosa pine, eastern redcedar, Rocky Mountain juniper, Siberian peashrub, Russian-olive.	Siberian elm, green ash.	---
VdC*: Vebar---------- Daglum----------	Lilac, Peking cotoneaster. Green ash, Russian-olive, eastern redcedar, Rocky Mountain juniper, Siberian peashrub, silver buffaloberry, lilac, Tatarian honeysuckle.	Ponderosa pine, Siberian peashrub, eastern redcedar, Russian-olive, Rocky Mountain juniper. Siberian elm, ponderosa pine.	Siberian elm, green ash. ---	--- ---
WcE*: Wabek. Cabba.				
WdE. Wayden				
We, Wn---------- Wendte	Siberian peashrub, Tatarian honeysuckle, American plum, golden currant, lilac.	Ponderosa pine, Rocky Mountain juniper, Russian-olive, eastern redcedar, common chokecherry, green ash.	Siberian elm----------	---

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements								
	Grain and seed crops	Grasses and legumes	Native herbaceous plants	Planted trees and shrubs	Native deciduous trees	Native coniferous trees	Native shrubs	Wetland plants	Shallow water areas
AcD*:									
Amor	Poor	Good	Good	Fair	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Cabba	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Ba* Badland	Very poor.	---	---	---	---	---	---	---	---
Bk Bankard	Very poor.	Very poor.	Fair	Poor	Good	Fair	Fair	Very poor.	Very poor.
Bn Bankard Variant	Very poor.	Very poor.	Poor	Very poor.	Poor	Very poor.	Fair	Very poor.	Very poor.
Bo Banks	Very poor.	Very poor.	Fair	Poor	Good	Fair	Fair	Very poor.	Very poor.
BpB*:									
Bullock	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Fair	Very poor.	Very poor.
Parchin	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Fair	Very poor.	Very poor.
BsC*:									
Bullock	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Fair	Very poor.	Very poor.
Slickspots.									
Parchin	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Fair	Very poor.	Very poor.
CaE*:									
Cabba	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Lantry	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
CcF*:									
Cabba	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Rock outcrop.									
CkF*:									
Cohagen	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Rock outcrop.									

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements								
	Grain and seed crops	Grasses and legumes	Native herbaceous plants	Planted trees and shrubs	Native deciduous trees	Native coniferous trees	Native shrubs	Wetland plants	Shallow water areas
CoE*:									
Cohagen	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Vebar	Very poor.	Very poor.	Good	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
CrD*:									
Cohagen	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Vebar	Very poor.	Fair	Good	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Bullock	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Fair	Very poor.	Very poor.
Ct Craft	Good	Good	Good	Good	Fair	Good	Good	Very poor.	Very poor.
DaA Daglum	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
DrB*:									
Daglum	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Rhoades	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
DuC Dupree	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
EvB Evridge	Poor	Fair	Good	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
FaA, FaB Farland	Good	Good	Good	Good	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Fv Fluvaquents	Very poor.	Very poor.	Very poor.	Very poor.	---	---	---	---	---
Gn Glenross	Very poor	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Poor.
Gr Grail	Good	Good	Good	Good	Good	Very poor.	Very poor.	Very poor.	Very poor.
Hc Haverson	Very poor.	Good	Good	Good	Good	Fair	Fair	Very poor	Very poor.
He Heil	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Fair	Fair.
Hn Heil Variant	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements								
	Grain and seed crops	Grasses and legumes	Native herbaceous plants	Planted trees and shrubs	Native deciduous trees	Native coniferous trees	Native shrubs	Wetland plants	Shallow water areas
HpC*:									
Hisle	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Pierre	Poor	Fair	Good	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
HsB*:									
Hisle	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Slickspots.									
Ka Korchea	Good	Good	Good	Good	Fair	Fair	Fair	Very poor.	Very poor.
Kc Korchea	Poor	Good	Good	Good	Good	Fair	Fair	Very poor.	Very poor.
KyB Kyle	Fair	Fair	Good	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
LcD*:									
Lantry	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Cabba	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
LdD*:									
Lantry	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Cabba	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Rhoades	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
LeD*:									
Lantry	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Korchea	Very poor.	Good	Good	Good	Good	Fair	Fair	Very poor.	Very poor.
Cabba	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Lh Lohler	Good	Good	Good	Good	Fair	Fair	Fair	Very poor.	Very poor.
Lk Lohler	Very poor.	Good	Good	Good	Good	Fair	Fair	Very poor.	Very. poor.
Ln Lohmiller	Good	Good	Good	Good	Poor	Poor	Very poor.	Very poor.	Very poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements								
	Grain and seed crops	Grasses and legumes	Native herbaceous plants	Planted trees and shrubs	Native deciduous trees	Native coniferous trees	Native shrubs	Wetland plants	Shallow water areas
Lo---------- Lohmiller	Very poor.	Good	Good	Good	Good	Poor	Very poor.	Very poor.	Very poor.
PbB*: Parchin----------	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Fair	Very poor.	Very. poor.
Bullock----------	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Fair	Very poor.	Very poor.
PeB---------- Pierre	Fair	Fair	Good	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
PeC---------- Pierre	Poor	Fair	Good	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
PmD*: Pierre----------	Very poor.	Very poor.	Good	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Samsil----------	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.
Po*---------- Pits	Very poor.	---	Very poor.	Very poor.	---	---	---	---	---
PrA---------- Promise	Fair	Fair	Poor	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
RaA, RaB---------- Ree	Good	Good	Good	Good	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
RbB---------- Reeder	Good	Good	Good	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
RbC---------- Reeder	Fair	Good	Good	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
RcB*: Reeder----------	Good	Good	Good	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Daglum----------	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
RdC*: Reeder----------	Good	Good	Good	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Lantry----------	Poor	Fair	Fair	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
ReC*: Reeder----------	Good	Good	Good	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Rhoades----------	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very. poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements								
	Grain and seed crops	Grasses and legumes	Native herbaceous plants	Planted trees and shrubs	Native deciduous trees	Native coniferous trees	Native shrubs	Wetland plants	Shallow water areas
ReC*:									
Lantry	Poor	Fair	Fair	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
RgB Regent	Good	Fair	Good	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
RgC Regent	Fair	Fair	Good	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
RhD*:									
Regent	Poor	Fair	Good	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Cabba	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
RmB*:									
Regent	Good	Fair	Good	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Daglum	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
RnB*:									
Regent	Fair	Fair	Good	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Rhoades	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
RoA, RoB Reliance	Good	Good	Good	Good	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
RrA*, RrB*:									
Rhoades	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Daglum	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
RsB*:									
Rhoades	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Slickspots.									
RvA Ridgeview	Fair	Fair	Good	Fair	Poor	Poor	Poor	Poor	Poor.
RvB Ridgeview	Fair	Fair	Good	Fair	Poor	Poor	Poor	Poor	Poor.
Rw* Riverwash	Very poor.	---	Very poor.	Very poor.	---	---	---	---	---
SaE Samsil	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements								
	Grain and seed crops	Grasses and legumes	Native herbaceous plants	Planted trees and shrubs	Native deciduous trees	Native coniferous trees	Native shrubs	Wetland plants	Shallow water areas
ScF*:									
Samsil	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.
Rock outcrop.									
SgA, SgB	Good	Good	Good	Good	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Savage									
ShE*:									
Schamber	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Samsil	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.
SkB*:									
Seroco	Very poor.	Very poor.	Fair	Poor	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Tally	Fair	Fair	Good	Fair	Very poor.	Very poor.	Poor	Very poor.	Very poor.
So	Good	Good	Good	Good	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Shambo									
Sp*.									
Slickspots									
StA	Fair	Fair	Good	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Stady									
SwB	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Swanboy									
SxC*:									
Swanboy	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Kyle	Very poor.	Very poor.	Good	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
SyB*:									
Swanboy	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Slickspots.									
TaA, TaB	Fair	Fair	Good	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Tally									
Tm	Fair	Fair	Good	Good	Fair	Good	Fair	Very poor.	Very poor.
Trembles									
Tr	Very poor.	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.
Trembles									
VbB	Fair	Fair	Good	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Vebar									

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements								
	Grain and seed crops	Grasses and legumes	Native herbaceous plants	Planted trees and shrubs	Native deciduous trees	Native coniferous trees	Native shrubs	Wetland plants	Shallow water areas
VbC---------- Vebar	Poor	Fair	Good	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
VcC*: Vebar----------	Poor	Fair	Good	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Cohagen----------	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
VdC*: Vebar----------	Poor	Fair	Good	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Daglum----------	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor.
WcE*: Wabek----------	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Cabba----------	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
WdE---------- Wayden	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
We---------- Wendte	Fair	Fair	Good	Fair	Fair	Very poor.	Fair	Very poor.	Very poor.
Wn---------- Wendte	Very poor.	Fair	Good	Fair	Good	Very poor.	Good	Very poor.	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
AcD*:					
Amor	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.
Cabba	Moderate: slope.	Moderate: shrink-swell, slope.	Severe: depth to rock.	Severe: slope.	Moderate: shrink-swell, slope.
Ba*.					
Badland					
Bk	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
Bankard					
Bn	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
Bankard Variant					
Bo	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
Banks					
BpB*:					
Bullock	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: low strength, shrink-swell.
Parchin	Slight	Slight	Slight	Moderate: slope.	Moderate: low strength.
BsC*:					
Bullock	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: low strength, slope, shrink-swell.
Slickspots.					
Parchin	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.
CaE*:					
Cabba	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Lantry	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
CcF*:					
Cabba	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.					

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
CkF*:					
Cohagen	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
CoE*:					
Cohagen	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Vebar	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
CrD*:					
Cohagen	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Vebar	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Bullock	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Ct Craft	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
DaA Daglum	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
DrB*:					
Daglum	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Rhoades	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
DuC Dupree	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: slope, shrink-swell.	Severe: low strength, shrink-swell.
EvB Evridge	Severe: cutbanks cave.	Slight	Slight	Slight	Slight.
FaA Farland	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.
FaB Farland	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.
Fv. Fluvaquents					

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
Gn---------- Glenross	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, frost action.
Gr---------- Grail	Moderate: too clayey, wetness, flooding.	Severe: flooding, shrink-swell.	Severe: flooding.	Severe: flooding, shrink-swell.	Severe: low strength, flooding, shrink-swell.
Hc---------- Haverson	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
He---------- Heil	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: low strength, ponding, shrink-swell.
Hn---------- Heil Variant	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: low strength, ponding, shrink-swell.
HpC*: Hisle----------	Moderate: too clayey.	Severe shrink-swell.	Slight----------	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Pierre----------	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.
HsB*: Hisle----------	Moderate: too clayey.	Severe: shrink-swell.	Slight----------	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Slickspots.					
Ka---------- Korchea	Slight----------	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: low strength, flooding, shrink-swell.
Kc---------- Korchea	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
KyB---------- Kyle	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
LcD*: Lantry----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Cabba----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
LdD*:					
Lantry	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Cabba	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rhoades	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
LeD*:					
Lantry	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Korchea	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
Cabba	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Lh Lohler	Moderate: too clayey.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: low strength, frost action.
Lk Lohler	Moderate: too clayey, flooding.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: low strength, flooding, shrink-swell.
Ln Lohmiller	Moderate: too clayey.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: low strength, shrink-swell.
Lo Lohmiller	Moderate: too clayey, flooding.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: low strength, flooding, shrink-swell.
PbB*:					
Parchin	Slight	Slight	Slight	Slight	Moderate: low strength.
Bullock	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, shrink-swell.
PeB, PeC Pierre	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.
PmD*:					
Pierre	Severe: cutbanks cave, slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength, slope.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
PmD*: Samsil	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.
Po*. Pits					
PrA Promise	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
RaA Ree	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell.	Severe: low strength.
RaB Ree	Slight	Moderate: shrink-swell.	Slight	Moderate: slope, shrink-swell.	Severe: low strength.
RbB, RbC Reeder	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.
RcB*: Reeder	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.
Daglum	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
RdC*: Reeder	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.
Lantry	Slight	Slight	Slight	Moderate: slope.	Moderate: low strength.
ReC*: Reeder	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.
Rhoades	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Lantry	Slight	Slight	Slight	Moderate: slope.	Moderate: low strength.
RgB, RgC Regent	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
RhD*: Regent	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
RhD*:					
Cabba	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope.	Severe: slope.	Moderate: shrink-swell, slope.
RmB*:					
Regent	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Daglum	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
RnB*:					
Regent	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Rhoades	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
RoA, RoB	Moderate: too clayey.	Severe: shrink-swell.	Moderate: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Reliance					
RrA*, RrB*:					
Rhoades	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Daglum	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
RsB*:					
Rhoades	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Slickspots.					
RvA, RvB	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Ridgeview					
Rw*.					
Riverwash					
SaE	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.
Samsil					
ScF*:					
Samsil	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.
Rock outcrop.					

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
SgA, SgB---------- Savage	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.
ShE*: Schamber----------	Severe: slope, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Samsil----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.
SkB*: Seroco----------	Severe: cutbanks cave.	Slight----------	Slight----------	Moderate: slope.	Slight.
Tally----------	Severe: cutbanks cave.	Slight----------	Slight----------	Moderate: slope.	Moderate: frost action.
So---------- Shambo	Slight----------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, low strength.
Sp*. Slickspots					
StA---------- Stady	Severe: cutbanks cave.	Slight----------	Slight----------	Slight----------	Moderate: frost action.
SwB---------- Swanboy	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
SxC*: Swanboy----------	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
Kyle----------	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
SyB*: Swanboy----------	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Slickspots.					
TaA---------- Tally	Severe: cutbanks cave.	Slight----------	Slight----------	Slight----------	Moderate: frost action.
TaB---------- Tally	Severe: cutbanks cave.	Slight----------	Slight----------	Moderate: slope.	Moderate: frost action.
Tm---------- Trembles	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
Tr Trembles	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
VbB, VbC Vebar	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight.
VcC*: Vebar	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
Cohagen	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.
VdC*: Vebar	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight.
Daglum	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
WcE*: Wabek	Severe: slope, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Cabba	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
WdE Wayden	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
We Wendte	Moderate: too clayey.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: low strength, shrink-swell.
Wn Wendte	Moderate: flooding, too clayey.	Severe: shrink-swell, flooding.	Severe: shrink-swell, flooding.	Severe: shrink-swell, flooding.	Severe: shrink-swell, low strength, flooding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AcD*:					
Amor	Severe: thin layer, seepage.	Severe: seepage, slope.	Severe: seepage.	Moderate: seepage, slope.	Poor: area reclaim.
Cabba	Severe: thin layer, seepage.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: area reclaim.
Ba*.					
Badland					
Bk	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, too sandy.	Severe: flooding.	Poor: seepage, too sandy.
Bankard					
Bn	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding.	Severe: flooding, wetness, too sandy.	Severe: flooding, wetness.	Poor: seepage, too sandy, small stones.
Bankard Variant					
Bo	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage, too sandy.	Severe: flooding, seepage.	Poor: seepage, too sandy.
Banks					
BpB*:					
Bullock	Severe: thin layer, seepage, percs slowly.	Severe: seepage.	Severe: seepage.	Moderate: seepage.	Poor: area reclaim.
Parchin	Severe: thin layer, seepage.	Severe: seepage.	Severe: seepage.	Moderate: seepage.	Poor: area reclaim.
BsC*:					
Bullock	Severe: thin layer, seepage, percs slowly.	Severe: seepage, slope.	Severe: seepage.	Moderate: seepage, slope.	Poor: area reclaim.
Slickspots.					
Parchin	Severe: thin layer, seepage.	Severe: seepage, slope.	Severe: seepage.	Moderate: seepage, slope.	Poor: area reclaim.
CaE*:					
Cabba	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, slope.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
CaE*:					
Lantry	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: slope.	Poor: area reclaim, slope.
CcF*:					
Cabba	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, slope.
Rock outcrop.					
CkF*:					
Cohagen	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, slope.
Rock outcrop.					
CoE*:					
Cohagen	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, slope.
Vebar	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, slope.
CrD*:					
Cohagen	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, slope.
Vebar	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, slope.
Bullock	Severe: thin layer, seepage, percs slowly, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: slope.	Poor: area reclaim, slope.
Ct Craft	Moderate: flooding, percs slowly.	Severe: seepage.	Moderate: flooding, too sandy.	Moderate: flooding.	Good.
DaA Daglum	Severe: percs slowly.	Slight	Severe: too clayey, excess sodium.	Slight	Poor: too clayey, excess sodium.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
DrB*:					
Daglum	Severe: percs slowly.	Moderate: slope.	Severe: too clayey, excess sodium.	Slight	Poor: too clayey, excess sodium.
Rhoades	Severe: percs slowly.	Moderate: seepage, slope.	Severe: seepage, too clayey.	Slight	Poor: too clayey, hard to pack.
DuC Dupree	Severe: thin layer, seepage.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: area reclaim, hard to pack.
EvB Evridge	Severe: percs slowly.	Severe: seepage.	Moderate: too sandy.	Severe: seepage.	Poor: thin layer.
FaA Farland	Moderate: percs slowly.	Moderate: seepage.	Severe: too sandy.	Slight	Good.
FaB Farland	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too sandy.	Slight	Good.
Fv. Fluvaquents					
Gn Glenross	Severe: flooding, wetness, percs slowly.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Poor: wetness, excess salt, excess sodium.
Gr Grail	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Fair: too clayey, wetness.
Hc Haverson	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Good.
He Heil	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey, excess sodium.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
Hn Heil Variant	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
HpC*:					
Hisle	Severe: thin layer, seepage, percs slowly.	Severe: seepage.	Severe: seepage.	Moderate: seepage.	Poor: area reclaim, hard to pack.
Pierre	Severe: thin layer, seepage, percs slowly.	Severe: seepage.	Severe: seepage, too clayey.	Severe: seepage.	Poor: area reclaim, too clayey, hard to pack.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
HsB*:					
Hisle	Severe: thin layer, seepage, percs slowly.	Severe: seepage.	Severe: seepage.	Moderate: seepage.	Poor: area reclaim, hard to pack.
Slickspots.					
Ka Korchea	Moderate: flooding.	Moderate: seepage.	Moderate: flooding, too clayey.	Moderate: flooding.	Fair: too clayey.
Kc Korchea	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Fair: too clayey.
KyB Kyle	Severe: percs slowly.	Moderate: slope.	Slight	Slight	Poor: hard to pack.
LcD*:					
Lantry	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: slope.	Poor: area reclaim, slope.
Cabba	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, slope.
LdD*:					
Lantry	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: slope.	Poor: area reclaim, slope.
Cabba	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, slope.
Rhoades	Severe: percs slowly.	Severe: slope.	Severe: seepage, too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
LeD*:					
Lantry	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: slope.	Poor: area reclaim, slope.
Korchea	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Fair: too clayey.
Cabba	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, slope.
Lh Lohler	Severe: percs slowly.	Slight	Severe: too clayey.	Moderate: flooding.	Poor: too clayey, hard to pack.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Lk---------- Lohler	Severe: flooding, percs slowly.	Severe: flooding.	Severe: flooding, too clayey.	Severe: flooding.	Poor: too clayey, hard to pack.
Ln---------- Lohmiller	Severe: percs slowly.	Slight----------	Moderate: flooding.	Moderate: flooding.	Poor: hard to pack.
Lo---------- Lohmiller	Severe: flooding, percs slowly.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Poor: hard to pack.
PbB*: Parchin----------	Severe: thin layer, seepage.	Severe: seepage.	Severe: seepage.	Moderate: seepage.	Poor: area reclaim.
Bullock----------	Severe: thin layer, seepage, percs slowly.	Severe: seepage.	Severe: seepage.	Moderate: seepage.	Poor: area reclaim.
PeB---------- Pierre	Severe: thin layer, seepage, percs slowly.	Severe: seepage.	Severe: seepage, too clayey.	Moderate: seepage.	Poor: area reclaim, too clayey, hard to pack.
PeC---------- Pierre	Severe: thin layer, seepage, percs slowly.	Severe: seepage, slope.	Severe: seepage, too clayey.	Moderate: seepage.	Poor: area reclaim, too clayey, hard to pack.
PmD*: Pierre----------	Severe: thin layer, seepage, percs slowly.	Severe: seepage, slope.	Severe: seepage, slope, too clayey.	Severe: slope.	Poor: area reclaim, too clayey, hard to pack.
Samsil----------	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, hard to pack, slope.
Po*. Pits					
PrA---------- Promise	Severe: percs slowly.	Severe: seepage.	Severe: seepage, too clayey.	Slight----------	Poor: too clayey, hard to pack.
RaA---------- Ree	Moderate: percs slowly.	Moderate: seepage.	Slight----------	Slight----------	Good.
RaB---------- Ree	Moderate: percs slowly.	Moderate: slope, seepage.	Slight----------	Slight----------	Good.
RbB---------- Reeder	Severe: thin layer, seepage.	Severe: seepage.	Severe: seepage.	Moderate: seepage.	Poor: area reclaim.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
RbC---------- Reeder	Severe: thin layer, seepage.	Severe: seepage, slope.	Severe: seepage.	Moderate: seepage.	Poor: area reclaim.
RcB*: Reeder----------	Severe: thin layer, seepage.	Severe: seepage.	Severe: seepage.	Moderate: seepage.	Poor: area reclaim.
Daglum----------	Severe: percs slowly.	Moderate: seepage, slope.	Severe: seepage, too clayey.	Slight----------	Poor: too clayey, excess sodium.
RdC*: Reeder----------	Severe: thin layer, seepage.	Severe: seepage.	Severe: seepage.	Moderate: seepage.	Poor: area reclaim.
Lantry----------	Severe: thin layer, seepage.	Severe: seepage.	Severe: seepage.	Moderate: seepage.	Poor: area reclaim.
ReC*: Reeder----------	Severe: thin layer, seepage.	Severe: seepage.	Severe: seepage.	Moderate: seepage, slope.	Poor: area reclaim.
Rhoades----------	Severe: percs slowly.	Moderate: seepage, slope.	Severe: seepage, too clayey.	Moderate: seepage, slope.	Poor: too clayey, hard to pack.
Lantry----------	Severe: thin layer, seepage.	Severe: seepage.	Severe: seepage.	Moderate: seepage, slope.	Poor: area reclaim.
RgB---------- Regent	Severe: thin layer, seepage, percs slowly.	Severe: seepage.	Severe: seepage, too clayey.	Moderate: seepage.	Poor: area reclaim, too clayey, hard to pack.
RgC---------- Regent	Severe: thin layer, seepage, percs slowly.	Severe: seepage, slope.	Severe: seepage, too clayey.	Moderate: seepage, slope.	Poor: area reclaim, too clayey, hard to pack.
RhD*: Regent----------	Severe: thin layer, seepage, percs slowly.	Severe: seepage, slope.	Severe: seepage, too clayey.	Moderate: seepage, slope.	Poor: area reclaim, too clayey, hard to pack.
Cabba----------	Severe: thin layer, seepage.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage, slope.	Poor: area reclaim.
RmB*: Regent----------	Severe: thin layer, seepage, percs slowly.	Severe: seepage.	Severe: seepage, too clayey.	Moderate: seepage.	Poor: area reclaim, too clayey, hard to pack.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
RmB*: Daglum	Severe: percs slowly.	Moderate: seepage, slope.	Severe: seepage, too clayey.	Slight	Poor: too clayey, excess sodium.
RnB*: Regent	Severe: thin layer, seepage, percs slowly.	Severe: seepage.	Severe: seepage, too clayey.	Moderate: seepage.	Poor: area reclaim, too clayey, hard to pack.
Rhoades	Severe: percs slowly.	Moderate: seepage, slope.	Severe: seepage, too clayey.	Slight	Poor: too clayey, hard to pack.
RoA Reliance	Severe: percs slowly.	Moderate: seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
RoB Reliance	Severe: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
RrA*: Rhoades	Severe: percs slowly.	Slight	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
Daglum	Severe: percs slowly.	Slight	Severe: too clayey, excess sodium.	Slight	Poor: too clayey, excess sodium.
RrB*: Rhoades	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
Daglum	Severe: percs slowly.	Moderate: slope.	Severe: too clayey, excess sodium.	Slight	Poor: too clayey, excess sodium.
RsB*: Rhoades	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
Slickspots.					
RvA Ridgeview	Severe: percs slowly.	Slight	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
RvB Ridgeview	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
Rw*. Riverwash					

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
SaE---------- Samsil	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, hard to pack, slope.
ScF*: Samsil----------	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, hard to pack, slope.
Rock outcrop.					
SgA---------- Savage	Severe: percs slowly.	Slight----------	Severe: too clayey.	Slight----------	Poor: too clayey, hard to pack.
SgB---------- Savage	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight----------	Poor: too clayey, hard to pack.
ShE*: Schamber----------	Severe: slope, poor filter.	Severe: slope, seepage.	Severe: slope, seepage, too sandy.	Severe: slope, seepage.	Poor: small stones, seepage, too sandy.
Samsil----------	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, hard to pack, slope.
SkB*: Seroco----------	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy.
Tally----------	Slight----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too sandy.
So---------- Shambo	Moderate: percs slowly.	Moderate: seepage.	Moderate: too clayey.	Slight----------	Fair: too clayey.
Sp*. Slickspots					
StA---------- Stady	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
SwB---------- Swanboy	Severe: percs slowly.	Moderate: slope.	Slight----------	Slight----------	Poor: hard to pack.
SxC*: Swanboy----------	Severe: percs slowly.	Severe: slope.	Moderate: slope.	Moderate: slope.	Poor: hard to pack.
Kyle----------	Severe: percs slowly.	Severe: slope.	Slight----------	Slight----------	Poor: hard to pack.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
SyB*:					
Swanboy	Severe: percs slowly.	Moderate: slope.	Slight	Slight	Poor: hard to pack.
Slickspots.					
TaA, TaB	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too sandy.
Tally					
Tm	Moderate: flooding.	Severe: seepage, flooding.	Severe: seepage.	Severe: seepage.	Fair: too sandy.
Trembles					
Tr	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage.	Severe: flooding, seepage.	Fair: too sandy.
Trembles					
VbB	Severe: thin layer, seepage.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: area reclaim.
Vebar					
VbC	Severe: thin layer, seepage.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: area reclaim.
Vebar					
VcC*:					
Vebar	Severe: thin layer, seepage.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: area reclaim.
Cohagen	Severe: thin layer, seepage.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: area reclaim.
VdC*:					
Vebar	Severe: thin layer, seepage.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: area reclaim.
Daglum	Severe: percs slowly.	Moderate: seepage, slope.	Severe: seepage, too clayey.	Slight	Poor: too clayey, excess sodium.
WcE*:					
Wabek	Severe: slope, poor filter.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: too sandy, seepage, small stones.
Cabba	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: slope.	Poor: area reclaim, slope.
WdE	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope, too clayey.	Severe: slope.	Poor: area reclaim, too clayey, hard to pack.
Wayden					

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
We Wendte	Severe: percs slowly.	Slight	Severe: too clayey.	Moderate: flooding.	Poor: too clayey, hard to pack.
Wn Wendte	Severe: percs slowly, flooding.	Severe: flooding.	Severe: too clayey, flooding.	Severe: flooding.	Poor: too clayey, hard to pack.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AcD*:				
Amor	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, thin layer, slope.
Cabba	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
Ba*. Badland				
Bk Bankard	Good	Probable	Improbable: too sandy.	Poor: small stones, area reclaim.
Bn Bankard Variant	Good	Probable	Probable	Poor: small stones, area reclaim.
Bo Banks	Good	Probable	Improbable: too sandy.	Fair: too sandy.
BpB*:				
Bullock	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
Parchin	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, excess sodium.
BsC*:				
Bullock	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
Slickspots.				
Parchin	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, excess sodium.
CaE*:				
Cabba	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
Lantry	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
CcF*:				
Cabba	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
CcF*:				
Rock outcrop.				
CkF*:				
Cohagen	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
Rock outcrop.				
CoE*:				
Cohagen	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
Vebar	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
CrD*:				
Cohagen	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
Vebar	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Bullock	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium, slope.
Ct Craft	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
DaA Daglum	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
DrB*:				
Daglum	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
Rhoades	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
DuC Dupree	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, too clayey.
EvB Evridge	Fair: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy, small stones, thin layer.
FaA, FaB Farland	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Fv. Fluvaquents				
Gn Glenross	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt, wetness, excess sodium.
Gr Grail	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Hc Haverson	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
He Heil	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, excess sodium.
Hn Heil Variant	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
HpC*: Hisle	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
Pierre	Poor: area reclaim, shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
HsB*: Hisle	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
Slickspots.				
Ka, Kc Korchea	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Good.
KyB Kyle	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
LcD*: Lantry	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Cabba	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
LdD*: Lantry	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
LdD*:				
Cabba	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
Rhoades	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines	Poor: excess sodium.
LeD*:				
Lantry	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Korchea	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Good.
Cabba	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
Lh, Lk Lohler	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Ln Lohmiller	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Lo Lohmiller	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
PbB*:				
Parchin	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, excess sodium.
Bullock	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
PeB, PeC Pierre	Poor: area reclaim, shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
PmD*:				
Pierre	Poor: area reclaim, shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Samsil	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, too clayey, slope.
Po*. Pits				

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
PrA---------- Promise	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
RaA, RaB---------- Ree	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
RbB, RbC---------- Reeder	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, thin layer.
RcB*: Reeder----------	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, thin layer.
Daglum----------	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
RdC*: Reeder----------	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, thin layer.
Lantry----------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, thin layer.
ReC*: Reeder----------	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, thin layer.
Rhoades----------	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
Lantry----------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, thin layer.
RgB, RgC---------- Regent	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey.
RhD*: Regent----------	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey.
Cabba----------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
RmB*: Regent----------	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
RmB*:				
Daglum	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
RnB*:				
Regent	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey.
Rhoades	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
RoA, RoB	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Reliance				
RrA*, RrB*:				
Rhoades	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
Daglum	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
RsB*:				
Rhoades	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
Slickspots.				
RvA, RvB	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Ridgeview				
Rw*.				
Riverwash				
SaE	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, too clayey, slope.
Samsil				
ScF*:				
Samsil	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, too clayey, slope.
Rock outcrop.				
SgA, SgB	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Savage				

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
ShE*: Schamber	Fair: slope.	Probable	Probable	Poor: slope, small stones, area reclaim.
Samsil	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, too clayey, slope.
SkB*: Seroco	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
Tally	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
So Shambo	Fair: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
Sp*. Slickspots				
StA Stady	Good	Probable	Probable	Poor: area reclaim.
SwB Swanboy	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
SxC*: Swanboy	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Kyle	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
SyB*: Swanboy	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Slickspots.				
TaA, TaB Tally	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
Tm, Tr Trembles	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
VbB, VbC Vebar	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
VcC*:				
Vebar	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.
Cohagen	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
VdC*:				
Vebar	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
Daglum	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
WcE*:				
Wabek	Fair: slope.	Probable	Probable	Poor: small stones, slope, area reclaim.
Cabba	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
WdE	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
Wayden				
We	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Wendte				
Wn	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Wendte				

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
AcD*:						
Amor	Severe: slope.	Severe: piping.	Deep to water	Thin layer, slope.	Slope, area reclaim.	Slope, area reclaim.
Cabba	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, thin layer.	Slope, area reclaim, erodes easily.	Slope, erodes easily, area reclaim.
Ba*.						
Badland						
Bk	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
Bankard						
Bn	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, fast intake, soil blowing.	Large stones, too sandy.	Droughty, large stones.
Bankard Variant						
Bo	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
Banks						
BpB*:						
Bullock	Moderate: seepage, slope.	Severe: excess sodium.	Deep to water	Droughty, soil blowing.	Area reclaim, erodes easily.	Excess sodium, erodes easily.
Parchin	Moderate: seepage, slope.	Severe: excess sodium.	Deep to water	Soil blowing, percs slowly.	Area reclaim, erodes easily.	Excess sodium, erodes easily.
BsC*:						
Bullock	Severe: slope.	Severe: excess sodium.	Deep to water	Droughty, soil blowing.	Slope, area reclaim, erodes easily.	Slope, excess sodium, erodes easily.
Slickspots.						
Parchin	Severe: slope.	Severe: excess sodium.	Deep to water	Soil blowing, percs slowly.	Slope, area reclaim, erodes easily.	Slope, excess sodium, erodes easily.
CaE*:						
Cabba	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, depth to rock.	Slope, area reclaim, erodes easily.	Slope, erodes easily, area reclaim.
Lantry	Severe: slope.	Severe: piping.	Deep to water	Thin layer, slope, erodes easily.	Slope, area reclaim, erodes easily.	Slope, erodes easily, area reclaim.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
CcF*:						
Cabba	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, thin layer.	Slope, area reclaim, erodes easily.	Slope, erodes easily, area reclaim.
Rock outcrop.						
CkF*:						
Cohagen	Severe: seepage, slope.	Severe: piping.	Deep to water	Soil blowing, thin layer, slope.	Slope, area reclaim, soil blowing.	Slope, area reclaim.
Rock outcrop.						
CoE*:						
Cohagen	Severe: seepage, slope.	Severe: piping.	Deep to water	Soil blowing, thin layer, slope.	Slope, area reclaim, soil blowing.	Slope, area reclaim.
Vebar	Severe: seepage, slope.	Severe: piping.	Deep to water	Soil blowing, thin layer, slope.	Slope, area reclaim, soil blowing.	Slope, area reclaim.
CrD*:						
Cohagen	Severe: seepage, slope.	Severe: piping.	Deep to water	Soil blowing, thin layer, slope.	Slope, area reclaim, soil blowing.	Slope, area reclaim.
Vebar	Severe: seepage, slope.	Severe: piping.	Deep to water	Soil blowing, thin layer, slope.	Slope, area reclaim, soil blowing.	Slope, area reclaim.
Bullock	Severe: slope.	Severe: excess sodium.	Deep to water	Droughty, soil blowing.	Slope, area reclaim, erodes easily.	Slope, excess sodium, erodes easily.
Ct Craft	Moderate: seepage.	Severe: piping.	Deep to water	Favorable	Erodes easily	Erodes easily.
DaA Daglum	Slight	Severe: excess sodium.	Deep to water	Percs slowly	Percs slowly	Excess sodium, percs slowly.
DrB*:						
Daglum	Moderate: slope.	Severe: excess sodium.	Deep to water	Percs slowly, slope.	Percs slowly	Excess sodium, percs slowly.
Rhoades	Moderate: slope.	Severe: excess sodium.	Deep to water	Percs slowly, slope.	Percs slowly	Excess sodium, percs slowly.
DuC Dupree	Severe: seepage, slope.	Severe: hard to pack.	Deep to water	Droughty, slow intake, percs slowly.	Slope, area reclaim, erodes easily.	Slope, erodes easily, droughty.
EvB Evridge	Severe: seepage.	Severe: piping.	Deep to water	Droughty, fast intake, soil blowing.	Soil blowing	Droughty, percs slowly.
FaA Farland	Moderate: seepage.	Severe: piping.	Deep to water	Favorable	Favorable	Favorable.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
FaB---------- Farland	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope----------	Favorable------	Favorable.
Fv. Fluvaquents						
Gn---------- Glenross	Severe: seepage.	Severe: wetness, excess sodium, excess salt.	Percs slowly, flooding, frost action.	Wetness, soil blowing.	Wetness, soil blowing, percs slowly.	Wetness, excess sodium, percs slowly.
Gr---------- Grail	Slight---------	Severe: piping.	Deep to water	Flooding-------	Favorable------	Favorable.
Hc---------- Haverson	Moderate: seepage.	Severe: piping.	Deep to water	Favorable------	Favorable------	Favorable.
He---------- Heil	Slight---------	Severe: hard to pack, ponding, excess sodium.	Ponding, percs slowly, excess salt.	Ponding, percs slowly.	Ponding, percs slowly.	Wetness, excess sodium, percs slowly.
Hn---------- Heil Variant	Slight---------	Severe: hard to pack, ponding.	Ponding, percs slowly.	Ponding, droughty, percs slowly.	Erodes easily, ponding, percs slowly.	Wetness, erodes easily, droughty.
HpC*: Hisle----------	Moderate: seepage, slope.	Severe: hard to pack, excess sodium.	Deep to water	Droughty, percs slowly, depth to rock.	Area reclaim, erodes easily.	Excess sodium, erodes easily.
Pierre----------	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slope, droughty, slow intake.	Area reclaim, erodes easily.	Too arid, erodes easily.
HsB*: Hisle----------	Moderate: seepage, slope.	Severe: hard to pack, excess sodium.	Deep to water	Droughty, percs slowly, depth to rock.	Area reclaim, erodes easily.	Excess sodium, erodes easily.
Slickspots.						
Ka---------- Korchea	Moderate: seepage.	Severe: piping.	Deep to water	Favorable------	Favorable------	Favorable.
Kc---------- Korchea	Moderate: seepage.	Severe: piping.	Deep to water	Flooding-------	Favorable------	Favorable.
KyB---------- Kyle	Moderate: slope.	Severe: hard to pack.	Deep to water	Droughty, slow intake, percs slowly.	Erodes easily, percs slowly.	Erodes easily, droughty.
LcD*: Lantry----------	Severe: slope.	Severe: piping.	Deep to water	Thin layer, slope, erodes easily.	Slope, area reclaim, erodes easily.	Slope, erodes easily, area reclaim.
Cabba----------	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, thin layer.	Slope, area reclaim, erodes easily.	Slope, erodes easily, area reclaim.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
LdD*:						
Lantry	Severe: slope.	Severe: piping.	Deep to water	Thin layer, slope, erodes easily.	Slope, area reclaim, erodes easily.	Slope, erodes easily, area reclaim.
Cabba	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, thin layer.	Slope, area reclaim, erodes easily.	Slope, erodes easily, area reclaim.
Rhoades	Severe: slope.	Severe: excess sodium.	Deep to water	Percs slowly, slope.	Slope, percs slowly.	Slope, excess sodium, percs slowly.
LeD*:						
Lantry	Severe: slope.	Severe: piping.	Deep to water	Thin layer, slope, erodes easily.	Slope, area reclaim, erodes easily.	Slope, erodes easily, area reclaim.
Korchea	Moderate: seepage.	Severe: piping.	Deep to water	Flooding	Favorable	Favorable.
Cabba	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, thin layer.	Slope, area reclaim, erodes easily.	Slope, erodes easily, area reclaim.
Lh, Lk Lohler	Slight	Moderate: hard to pack.	Deep to water	Droughty, percs slowly.	Percs slowly	Droughty, percs slowly.
Ln Lohmiller	Slight	Moderate: hard to pack, piping.	Deep to water	Percs slowly	Percs slowly	Percs slowly.
Lo Lohmiller	Slight	Moderate: thin layer, hard to pack.	Deep to water	Percs slowly, flooding.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
PbB*:						
Parchin	Moderate: seepage, slope.	Severe: excess sodium.	Deep to water	Soil blowing, percs slowly.	Area reclaim, erodes easily.	Excess sodium, erodes easily.
Bullock	Moderate: seepage, slope.	Severe: excess sodium.	Deep to water	Droughty, soil blowing.	Area reclaim, erodes easily.	Excess sodium, erodes easily.
PeB, PeC Pierre	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slope, droughty, slow intake.	Area reclaim, erodes easily.	Erodes easily.
PmD*:						
Pierre	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, droughty, slow intake.	Slope, area reclaim, erodes easily.	Slope, erodes easily.
Samsil	Severe: seepage, slope.	Severe: hard to pack.	Deep to water	Droughty, slow intake, percs slowly.	Slope, area reclaim, erodes easily.	Slope, erodes easily, droughty.
Po*. Pits						

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
PrA---------- Promise	Moderate: seepage.	Severe: hard to pack.	Deep to water	Droughty, slow intake, percs slowly.	Erodes easily, percs slowly.	Erodes easily, droughty, percs slowly.
RaA---------- Ree	Moderate: seepage.	Moderate: piping.	Deep to water	Favorable------	Favorable------	Favorable.
RaB---------- Ree	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Slope----------	Favorable------	Favorable.
RbB, RbC---------- Reeder	Moderate: seepage, slope.	Severe: piping.	Deep to water	Thin layer, slope.	Area reclaim---	Area reclaim.
RcB*: Reeder----------	Moderate: seepage, slope.	Severe: piping.	Deep to water	Thin layer, slope.	Area reclaim---	Area reclaim.
Daglum----------	Moderate: seepage, slope.	Severe: excess sodium.	Deep to water	Percs slowly, slope.	Percs slowly---	Excess sodium, percs slowly.
RdC*: Reeder----------	Moderate: seepage, slope.	Severe: piping.	Deep to water	Thin layer, slope.	Area reclaim---	Area reclaim.
Lantry----------	Moderate: seepage, slope.	Severe: piping.	Deep to water	Thin layer, slope, erodes easily.	Area reclaim, erodes easily.	Erodes easily, area reclaim.
ReC*: Reeder----------	Moderate: seepage, slope.	Severe: piping.	Deep to water	Thin layer, slope.	Area reclaim---	Area reclaim.
Rhoades----------	Moderate: seepage, slope.	Severe: excess sodium.	Deep to water	Percs slowly, slope.	Percs slowly---	Excess sodium, percs slowly.
Lantry----------	Moderate: seepage, slope.	Severe: piping.	Deep to water	Thin layer, slope, erodes easily.	Area reclaim, erodes easily.	Erodes easily, area reclaim.
RgB, RgC---------- Regent	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Percs slowly, thin layer.	Area reclaim, percs slowly.	Area reclaim, percs slowly.
RhD*: Regent----------	Severe: slope.	Severe: hard to pack.	Deep to water	Percs slowly, thin layer.	Slope, area reclaim, percs slowly.	Slope, area reclaim, percs slowly.
Cabba----------	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, thin layer.	Slope, area reclaim, erodes easily.	Slope, erodes easily, area reclaim.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
RmB*:						
Regent	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Percs slowly, thin layer.	Area reclaim, percs slowly.	Area reclaim, percs slowly.
Daglum	Moderate: seepage, slope.	Severe: excess sodium.	Deep to water	Percs slowly, slope.	Percs slowly	Excess sodium, percs slowly.
RnB*:						
Regent	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Percs slowly, thin layer.	Area reclaim, percs slowly.	Area reclaim, percs slowly.
Rhoades	Moderate: seepage, slope.	Severe: excess sodium.	Deep to water	Percs slowly, slope.	Percs slowly	Excess sodium, percs slowly.
RoA	Moderate: seepage.	Moderate: piping.	Deep to water	Favorable	Favorable	Favorable.
Reliance						
RoB	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Slope	Favorable	Favorable.
Reliance						
RrA*:						
Rhoades	Slight	Severe: excess sodium.	Deep to water	Percs slowly	Percs slowly	Excess sodium, percs slowly.
Daglum	Slight	Severe: excess sodium.	Deep to water	Percs slowly	Percs slowly	Excess sodium, percs slowly.
RrB*:						
Rhoades	Moderate: slope.	Severe: excess sodium.	Deep to water	Percs slowly, slope.	Percs slowly	Excess sodium, percs slowly.
Daglum	Moderate: slope.	Severe: excess sodium.	Deep to water	Percs slowly, slope.	Percs slowly	Excess sodium, percs slowly.
RsB*:						
Rhoades	Moderate: slope.	Severe: excess sodium.	Deep to water	Percs slowly, slope.	Percs slowly	Excess sodium, percs slowly.
Slickspots.						
RvA	Slight	Severe: hard to pack.	Deep to water	Droughty, percs slowly.	Erodes easily, percs slowly.	Erodes easily, droughty, percs slowly.
Ridgeview						
RvB	Moderate: slope.	Severe: hard to pack.	Deep to water	Droughty, percs slowly, slope.	Erodes easily, percs slowly.	Erodes easily, droughty, percs slowly.
Ridgeview						
Rw*.						
Riverwash						
SaE	Severe: seepage, slope.	Severe: hard to pack.	Deep to water	Droughty, slow intake, percs slowly.	Slope, area reclaim, erodes easily.	Slope, erodes easily, droughty.
Samsil						

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
ScF*:						
Samsil	Severe: seepage, slope.	Severe: hard to pack.	Deep to water	Droughty, slow intake, percs slowly.	Slope, area reclaim, erodes easily.	Slope, erodes easily, droughty.
Rock outcrop.						
SgA---------- Savage	Slight	Severe: hard to pack.	Deep to water	Percs slowly, erodes easily.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
SgB---------- Savage	Moderate: slope.	Severe: hard to pack.	Deep to water	Percs slowly, slope, erodes easily.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
ShE*:						
Schamber	Severe: slope, seepage.	Severe: seepage.	Deep to water	Droughty, slope.	Slope, too sandy.	Slope, droughty.
Samsil	Severe: seepage, slope.	Severe: hard to pack.	Deep to water	Droughty, slow intake, percs slowly.	Slope, area reclaim, erodes easily.	Slope, erodes easily, droughty.
SkB*:						
Seroco	Severe: seepage.	Severe: piping.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
Tally	Severe: seepage.	Severe: seepage, piping.	Deep to water	Soil blowing, slope.	Soil blowing	Favorable.
So---------- Shambo	Moderate: seepage.	Severe: piping.	Deep to water	Favorable	Favorable	Favorable.
Sp*. Slickspots						
StA---------- Stady	Severe: seepage.	Severe: seepage, piping.	Deep to water	Rooting depth	Too sandy	Rooting depth.
SwB---------- Swanboy	Moderate: slope.	Severe: hard to pack.	Deep to water	Droughty, slow intake, percs slowly.	Erodes easily, percs slowly.	Erodes easily, droughty.
SxC*:						
Swanboy	Severe: slope.	Severe: hard to pack.	Deep to water	Droughty, slow intake, percs slowly.	Slope, erodes easily, percs slowly.	Slope, erodes easily, droughty.
Kyle	Moderate: slope.	Severe: hard to pack.	Deep to water	Droughty, slow intake, percs slowly.	Erodes easily, percs slowly.	Erodes easily, droughty.
SyB*:						
Swanboy	Moderate: slope.	Severe: hard to pack.	Deep to water	Droughty, slow intake, percs slowly.	Erodes easily, percs slowly.	Erodes easily, droughty.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
SyB*: Slickspots.						
TaA---- Tally	Severe: seepage.	Severe: seepage, piping.	Deep to water	Soil blowing---	Soil blowing---	Favorable.
TaB---- Tally	Severe: seepage.	Severe: seepage, piping.	Deep to water	Soil blowing, slope.	Soil blowing---	Favorable.
Tm---- Trembles	Severe: seepage.	Severe: piping.	Deep to water	Soil blowing---	Too sandy, soil blowing.	Favorable.
Tr---- Trembles	Severe: seepage.	Severe: piping.	Deep to water	Soil blowing, flooding.	Too sandy, soil blowing.	Favorable.
VbB, VbC---- Vebar	Severe: seepage.	Severe: piping.	Deep to water	Soil blowing, thin layer, slope.	Area reclaim, soil blowing.	Area reclaim.
VcC*: Vebar----	Severe: seepage, slope.	Severe: piping.	Deep to water	Soil blowing, thin layer, slope.	Slope, area reclaim, soil blowing.	Slope, area reclaim.
Cohagen----	Severe: seepage, slope.	Severe: piping.	Deep to water	Soil blowing, thin layer, slope.	Slope, area reclaim, soil blowing.	Slope, area reclaim.
VdC*: Vebar----	Severe: seepage.	Severe: piping.	Deep to water	Soil blowing, thin layer, slope.	Area reclaim, soil blowing.	Area reclaim.
Daglum----	Moderate: seepage, slope.	Severe: excess sodium.	Deep to water	Percs slowly, slope.	Percs slowly---	Excess sodium, percs slowly.
WcE*: Wabek----	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Droughty, slope.	Slope, too sandy.	Slope, droughty.
Cabba----	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, thin layer.	Slope, area reclaim, erodes easily.	Slope, erodes easily, area reclaim.
WdE---- Wayden	Severe: seepage, slope.	Severe: thin layer.	Deep to water	Percs slowly, thin layer.	Slope, area reclaim, percs slowly.	Slope, area reclaim, percs slowly.
We---- Wendte	Slight---	Severe: hard to pack.	Deep to water	Percs slowly---	Percs slowly---	Percs slowly.
Wn---- Wendte	Slight---	Severe: hard to pack.	Deep to water	Flooding, percs slowly.	Percs slowly---	Percs slowly.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
AcD*:											
Amor	0-5	Loam	ML, CL, CL-ML	A-4, A-6	0	100	95-100	90-100	65-85	25-40	3-18
	5-36	Clay loam, loam, fine sandy loam.	ML, CL, CL-ML	A-4, A-6, A-7	0	100	95-100	75-100	50-95	20-45	2-25
	36-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Cabba	0-4	Loam	ML, CL-ML	A-4	0-5	90-100	85-100	70-90	60-80	20-30	NP-10
	4-16	Loam, silt loam, clay loam.	CL, CL-ML	A-6, A-4	0-5	95-100	90-100	85-100	80-95	25-35	5-15
	16-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Ba*. Badland											
Bk	0-4	Loamy fine sand	SM	A-2	0	95-100	80-100	50-75	15-25	---	NP
Bankard	4-60	Stratified loam to fine sand.	SP-SM, SM	A-1, A-2, A-3	0-5	80-100	75-100	40-70	5-35	---	NP
Bn	0-4	Loamy fine sand	SM, SM-SC	A-2, A-1	0	100	100	30-55	13-30	<30	NP-7
Bankard Variant	4-13	Stratified loamy fine sand to sand.	SM, SP, SW, SW-SM	A-2, A-3, A-1	0	100	100	30-60	3-25	<25	NP-7
	13-60	Very gravelly sand.	SW, SW-SM, GW, GP-GM	A-1, A-2	0-30	30-60	30-50	10-30	3-20	<25	NP-7
Bo	0-3	Loamy fine sand	SM, SP-SM	A-2, A-4	0	100	100	60-80	10-40	---	NP
Banks	3-60	Stratified fine sandy loam to sand.	SM, SP-SM	A-2	0	100	100	50-70	10-25	---	NP
BpB*:											
Bullock	0-3	Fine sandy loam	SM, ML, SM-SC, CL-ML	A-4	0	100	100	90-100	40-65	25-35	NP-10
	3-9	Sandy clay loam, clay loam, loam.	SC, CL	A-4, A-6, A-7	0	100	100	90-100	40-70	30-45	8-20
	9-23	Sandy clay loam, clay loam, loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	35-70	30-50	10-30
	23-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Parchin	0-4	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-4	0	100	100	90-100	35-60	20-30	NP-7
	4-9	Fine sandy loam, loamy fine sand, very fine sandy loam.	SM, SM-SC, ML, CL-ML	A-2, A-4	0	100	100	90-100	30-60	<30	NP-7
	9-17	Sandy clay loam, loam, clay loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	35-60	30-50	10-30
	17-24	Fine sandy loam, loam, sandy clay loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	40-60	30-50	10-30
	24-60	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
BsC*:											
Bullock	0-3	Fine sandy loam	SM, ML, SM-SC, CL-ML	A-4	0	100	100	90-100	40-65	25-35	NP-10
	3-9	Sandy clay loam, clay loam, loam.	SC, CL	A-4, A-6, A-7	0	100	100	90-100	40-70	30-45	8-20
	9-23	Sandy clay loam, clay loam, loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	35-70	30-50	10-30
	23-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Slickspots.											
Parchin	0-4	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-4	0	100	100	90-100	35-60	20-30	NP-7
	4-9	Fine sandy loam, loamy fine sand, very fine sandy loam.	SM, SM-SC, ML, CL-ML	A-2, A-4	0	100	100	90-100	30-60	<30	NP-7
	9-17	Sandy clay loam, loam, clay loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	35-60	30-50	10-30
	17-24	Fine sandy loam, loam, sandy clay loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	40-60	30-50	10-30
	24-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
CaE*:											
Cabba	0-4	Loam	ML, CL-ML	A-4	0-5	90-100	85-100	70-90	60-80	20-30	NP-10
	4-16	Loam, silt loam, clay loam.	CL, CL-ML	A-6, A-4	0-5	95-100	90-100	85-100	80-95	25-35	5-15
	16-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Lantry	0-4	Silt loam	CL, CL-ML, ML	A-4, A-6	0	100	100	95-100	85-100	20-35	3-12
	4-33	Silt loam, loam, very fine sandy loam.	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-100	20-40	3-15
	33-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
CcF*:											
Cabba	0-4	Loam	ML, CL-ML	A-4	0-5	90-100	85-100	70-90	60-80	20-30	NP-10
	4-16	Loam, silt loam, clay loam.	CL, CL-ML	A-6, A-4	0-5	95-100	90-100	85-100	80-95	25-35	5-15
	16-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
CkF*:											
Cohagen	0-11	Fine sandy loam	SM	A-2, A-4	0	100	95-100	60-85	30-50	---	NP
	11-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
CoE*:											
Cohagen	0-11	Fine sandy loam	SM	A-2, A-4	0	100	95-100	60-85	30-50	---	NP
	11-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Vebar	0-18	Fine sandy loam	SM, ML	A-4, A-2	0	95-100	90-100	60-100	30-55	---	NP
	18-30	Fine sandy loam, loamy fine sand, sandy loam.	SM, ML	A-4, A-2	0	95-100	90-100	60-100	30-55	---	NP
	30-60	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
CrD*:											
Cohagen	0-11	Fine sandy loam	SM	A-2, A-4	0	100	95-100	60-85	30-50	---	NP
	11-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Vebar	0-18	Fine sandy loam	SM, ML	A-4, A-2	0	95-100	90-100	60-100	30-55	---	NP
	18-30	Fine sandy loam, loamy fine sand, sandy loam.	SM, ML	A-4, A-2	0	95-100	90-100	60-100	30-55	---	NP
	30-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Bullock	0-3	Fine sandy loam	SM, ML, SM-SC, CL-ML	A-4	0	100	100	90-100	40-65	25-35	NP-10
	3-9	Sandy clay loam, clay loam, loam.	SC, CL	A-4, A-6, A-7	0	100	100	90-100	40-70	30-45	8-20
	9-23	Sandy clay loam, clay loam, loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	35-70	30-50	10-30
	23-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Ct	0-6	Very fine sandy loam.	ML, CL-ML, CL	A-4, A-6	0	95-100	95-100	85-100	50-98	<25	NP-15
Craft	6-60	Stratified loamy very fine sand to silty clay loam.	ML, CL-ML, CL	A-4, A-6	0	95-100	95-100	85-100	55-90	20-35	NP-15
DaA	0-6	Loam	SM, ML, CL-ML, SM-SC	A-4	0	100	100	75-90	45-65	20-30	3-10
Daglum	6-17	Clay, silty clay, silty clay loam.	CL, CH	A-7, A-6	0	100	100	90-100	70-95	35-75	15-45
	17-60	Clay, silty clay, clay loam.	CL	A-7	0	100	100	90-100	65-95	40-50	20-30
DrB*:											
Daglum	0-6	Loam	SM, ML, CL-ML, SM-SC	A-4	0	100	100	75-90	45-65	20-30	3-10
	6-17	Clay, silty clay, silty clay loam.	CL, CH	A-7, A-6	0	100	100	90-100	70-95	35-75	15-45
	17-60	Clay, silty clay, clay loam.	CL	A-7	0	100	100	90-100	65-95	40-50	20-30
Rhoades	0-2	Loam	SM, ML, SC, CL	A-4, A-6	0	100	100	75-90	45-65	20-35	NP-15
	2-21	Clay loam, silty clay, clay.	CL, CH	A-7	0	100	100	90-100	80-95	40-75	20-45
	21-60	Silty clay, silty clay loam, loam.	CL, CH	A-6, A-7	0	100	100	85-100	75-95	35-70	20-40
DuC	0-2	Clay	CH	A-7	0	100	100	95-100	85-100	60-100	35-70
Dupree	2-16	Clay	CH	A-7	0	95-100	95-100	90-100	85-100	65-100	30-65
	16-60	Weathered bedrock	CH	A-7	0	100	95-100	95-100	85-100	65-100	30-65

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
EvB----------	0-5	Loamy fine sand	SM, SM-SC	A-2, A-4	0	100	100	80-95	25-40	<30	NP-5
Evridge	5-24	Loamy fine sand, fine sandy loam.	SM, SM-SC, ML	A-2, A-4	0	100	100	80-95	25-55	<30	NP-7
	24-30	Fine sandy loam, sandy loam, loam.	SM, SM-SC, SC, ML	A-4, A-6	0	100	100	75-95	40-60	25-40	5-15
	30-35	Fine sandy loam, sandy loam, loam.	SM, SM-SC, ML, CL-ML	A-4	0-5	90-100	70-100	60-80	40-60	25-35	5-10
	35-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
FaA, FaB---------	0-8	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	85-100	70-90	20-40	5-25
Farland	8-20	Silty clay loam, clay loam.	CL, CH	A-7	0	100	100	90-100	75-95	40-60	15-35
	20-38	Loam, silt loam, silty clay loam.	CL, CL-ML	A-6, A-7, A-4	0	100	100	85-100	70-90	25-50	5-30
	38-60	Stratified very fine sand to silty clay.	CL, ML, CL-ML	A-4, A-6, A-7	0	100	100	75-100	50-95	20-50	3-25
Fv. Fluvaquents											
Gn----------	0-1	Fine sandy loam	SM, SM-SC	A-4	0	100	100	80-95	35-50	20-30	NP-7
Glenross	1-60	Sandy clay loam, fine sandy loam, clay loam.	SC, CL	A-4, A-6	0	100	100	80-90	35-55	25-40	8-20
Gr----------	0-9	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	95-100	85-100	25-40	5-15
Grail	9-28	Silty clay loam, silty clay, clay.	CL, CH	A-7	0	100	100	95-100	85-100	40-60	15-30
	28-60	Silty clay loam, silt loam, silty clay.	CL, ML	A-4, A-6, A-7	0	100	100	95-100	80-100	30-45	5-20
Hc----------	0-4	Silt loam--------	ML	A-4	0	95-100	90-100	85-100	55-90	25-35	NP-10
Haverson	4-60	Stratified clay loam to gravelly sandy loam.	CL, CL-ML	A-4, A-6	0	95-100	85-100	70-95	50-70	25-40	5-15
He----------	0-2	Silt loam--------	CL	A-6, A-7	0	100	100	90-100	70-95	25-50	10-25
Heil	2-29	Silty clay, clay, silty clay loam.	CH	A-7	0	100	100	90-100	75-95	50-70	25-45
	29-60	Silty clay, silty clay loam, loam.	CH, CL	A-7, A-6	0	100	100	85-100	60-95	25-60	11-45
Hn----------	0-3	Silty clay loam	CL, CH, MH, ML	A-6, A-7	0	100	100	95-100	85-100	30-55	10-25
Heil Variant	3-16	Silt loam, silty clay loam, silty clay.	CL, CH	A-4, A-6, A-7	0	100	100	80-100	70-95	30-60	8-30
	16-60	Silty clay, clay	CH, MH	A-7	0	100	100	90-100	85-95	50-80	20-45
HpC*:											
Hisle----------	0-1	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	95-100	90-100	25-40	5-15
	1-35	Clay, silty clay	CH, CL	A-7	0	95-100	90-100	85-100	80-100	45-85	20-55
	35-60	Weathered bedrock	CH	A-7	0	100	95-100	95-100	85-100	50-90	30-60

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
HpC*:											
Pierre	0-5	Clay	CH, MH	A-7	0	100	100	90-100	80-100	60-80	29-45
	5-22	Clay	CH, MH	A-7	0	100	100	90-100	80-100	60-90	30-50
	22-32	Shaly clay, clay	CH, MH	A-7	0	100	95-100	90-100	80-100	60-90	30-50
	32-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
HsB*:											
Hisle	0-1	Silt loam	CL-ML, CL	A-4, A-6	0	100	100	95-100	90-100	25-40	5-15
	1-35	Clay, silty clay	CH, CL	A-7	0	95-100	90-100	85-100	80-100	45-85	20-55
	35-60	Weathered bedrock	CH	A-7	0	100	95-100	95-100	85-100	50-90	30-60
Slickspots.											
Ka	0-6	Loam	CL, CL-ML	A-4, A-6	0	100	100	75-95	50-70	15-30	5-15
Korchea	6-60	Stratified fine sandy loam to silty clay loam.	SM-SC, CL-ML, CL, SC	A-4, A-6, A-7	0	100	100	70-100	40-95	20-50	5-20
Kc	0-6	Loam	CL, CL-ML	A-4, A-6	0	100	100	75-95	50-70	15-30	5-15
Korchea	6-60	Stratified fine sandy loam to silty clay loam.	SM-SC, CL-ML, CL, SC	A-4, A-6, A-7	0	100	100	70-100	40-80	20-50	5-20
KyB	0-3	Clay	CH, MH	A-7	0	100	100	90-100	80-100	55-75	25-45
Kyle	3-23	Clay	CH, MH	A-7	0	100	100	90-100	80-100	55-75	25-45
	23-60	Clay	CH, MH	A-7	0	100	100	90-100	80-100	60-90	25-55
LcD*:											
Lantry	0-4	Silt loam	CL, CL-ML, ML	A-4, A-6	0	100	100	95-100	85-100	20-35	3-12
	4-33	Silt loam, loam, very fine sandy loam.	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-100	20-40	3-15
	33-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Cabba	0-4	Loam	ML, CL-ML	A-4	0-5	90-100	85-100	70-90	60-80	20-30	NP-10
	4-16	Loam, silt loam, clay loam.	CL, CL-ML	A-6, A-4	0-5	95-100	90-100	85-100	80-95	25-35	5-15
	16-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
LdD*:											
Lantry	0-4	Silt loam	CL, CL-ML, ML	A-4, A-6	0	100	100	95-100	85-100	20-35	3-12
	4-33	Silt loam, loam, very fine sandy loam.	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-100	20-40	3-15
	33-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Cabba	0-4	Loam	ML, CL-ML	A-4	0-5	90-100	85-100	70-90	60-80	20-30	NP-10
	4-16	Loam, silt loam, clay loam.	CL, CL-ML	A-6, A-4	0-5	95-100	90-100	85-100	80-95	25-35	5-15
	16-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rhoades	0-2	Loam	SM, ML, SC, CL	A-4, A-6	0	100	100	75-90	45-65	20-35	NP-15
	2-21	Clay loam, silty clay, clay.	CL, CH	A-7	0	100	100	90-100	80-95	40-75	20-45
	21-50	Silty clay, silty clay loam, loam.	CL, CH	A-6, A-7	0	100	100	85-100	75-95	35-70	20-40
	50-60	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
LeD*:											
Lantry----------	0-4	Silt loam--------	CL, CL-ML, ML	A-4, A-6	0	100	100	95-100	85-100	20-35	3-12
	4-33	Silt loam, loam, very fine sandy loam.	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-100	20-40	3-15
	33-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Korchea---------	0-6	Loam------------	CL, CL-ML	A-4, A-6	0	100	100	75-95	50-70	15-30	5-15
	6-60	Stratified fine sandy loam to silty clay loam.	SM-SC, CL-ML, CL, SC	A-4, A-6, A-7	0	100	100	70-100	40-80	20-50	5-20
Cabba----------	0-4	Loam------------	ML, CL-ML	A-4	0-5	90-100	85-100	70-90	60-80	20-30	NP-10
	4-16	Loam, silt loam, clay loam.	CL, CL-ML	A-6, A-4	0-5	95-100	90-100	85-100	80-95	25-35	5-15
	16-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Lh, Lk---------- Lohler	0-4	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	70-95	30-45	10-20
	4-60	Silty clay loam, clay, silty clay.	CH, CL, ML, MH	A-7	0	100	100	95-100	80-95	40-70	20-35
Ln---------- Lohmiller	0-5	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-100	35-50	12-25
	5-13	Silty clay loam, clay loam, silty clay.	CL, CH	A-7	0	100	95-100	90-100	70-100	40-60	15-30
	13-60	Stratified fine sandy loam to clay.	CL, CH	A-7	0	95-100	95-100	90-100	65-95	40-60	15-30
Lo---------- Lohmiller	0-5	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-100	35-50	15-25
	5-13	Silty clay loam, clay loam, silty clay.	CL, CH	A-7	0	100	95-100	90-100	70-100	40-60	15-30
	13-60	Stratified fine sandy loam to clay.	CL, ML, CL-ML	A-4, A-6	0	95-100	95-100	90-100	65-75	30-40	5-15
PbB*:											
Parchin---------	0-4	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-4	0	100	100	90-100	35-60	20-30	NP-7
	4-9	Fine sandy loam, loamy fine sand, very fine sandy loam.	SM, SM-SC, ML, CL-ML	A-2, A-4	0	100	100	90-100	30-60	<30	NP-7
	9-17	Sandy clay loam, loam, clay loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	35-60	30-50	10-30
	17-24	Fine sandy loam, loam, sandy clay loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	40-60	30-50	10-30
	24-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Bullock---------	0-3	Fine sandy loam	SM, ML, SM-SC, CL-ML	A-4	0	100	100	90-100	40-65	25-35	NP-10
	3-9	Sandy clay loam, clay loam, loam.	SC, CL	A-4, A-6, A-7	0	100	100	90-100	40-70	30-45	8-20
	9-23	Sandy clay loam, clay loam, loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	35-70	30-50	10-30
	23-60	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
PeB, PeC--------- Pierre	0-5	Clay----------	CH, MH	A-7	0	100	100	90-100	80-100	60-80	29-45
	5-22	Clay----------	CH, MH	A-7	0	100	100	90-100	80-100	60-90	30-50
	22-32	Shaly clay, clay	CH, MH	A-7	0	100	95-100	90-100	80-100	60-90	30-50
	32-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
PmD*: Pierre----------	0-5	Clay----------	CH, MH	A-7	0	100	100	90-100	80-100	60-80	29-45
	5-22	Clay----------	CH, MH	A-7	0	100	100	90-100	80-100	60-90	30-50
	22-32	Shaly clay, clay	CH, MH	A-7	0	100	95-100	90-100	80-100	60-90	30-50
	32-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Samsil----------	0-3	Clay----------	CH, MH	A-7	0	100	85-100	80-100	70-100	50-85	20-50
	3-12	Clay----------	CH, MH	A-7	0	100	95-100	90-100	85-100	50-90	18-55
	12-60	Weathered bedrock	CH, MH	A-7	0	100	95-100	90-100	85-100	50-90	20-55
Po*. Pits											
PrA----------	0-4	Clay----------	CH, MH	A-7	0	100	100	90-100	80-95	50-85	25-55
Promise	4-24	Clay----------	CH, MH	A-7	0	100	100	90-100	80-95	50-85	25-55
	24-46	Clay----------	CH, MH	A-7	0	100	100	90-100	80-95	50-85	25-55
	46-60	Stratified fine sandy loam to silty clay loam.	CL, SC	A-4, A-6, A-7	0	95-100	85-100	60-95	40-95	25-50	8-25
RaA, RaB--------- Ree	0-7	Loam----------	CL, ML	A-4, A-6, A-7	0	95-100	90-100	80-100	70-95	30-45	8-20
	7-28	Clay loam, sandy clay loam, silty clay loam.	CL	A-6, A-7	0	95-100	90-100	70-100	65-85	30-45	10-20
	28-60	Stratified fine sandy loam to clay loam.	CL, CL-ML, SM-SC, SC	A-4, A-6, A-7	0	95-100	85-100	70-100	35-85	25-45	5-22
RbB, RbC--------- Reeder	0-5	Loam----------	CL, CL-ML	A-4, A-6	0	100	100	90-100	65-85	20-40	5-20
	5-35	Clay loam, loam, sandy clay loam.	CL, CL-ML	A-4, A-6, A-7	0	100	100	90-100	60-80	25-50	5-30
	35-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
RcB*: Reeder----------	0-5	Loam----------	CL, CL-ML	A-4, A-6	0	100	100	90-100	65-85	20-40	5-20
	5-35	Clay loam, loam, sandy clay loam.	CL, CL-ML	A-4, A-6, A-7	0	100	100	90-100	60-80	25-50	5-30
	35-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Daglum----------	0-6	Loam----------	SM, ML, CL-ML, SM-SC	A-4	0	100	100	75-90	45-65	20-30	3-10
	6-17	Clay, silty clay, silty clay loam.	CL, CH	A-7, A-6	0	100	100	90-100	70-95	35-75	15-45
	17-50	Clay, silty clay, clay loam.	CL	A-7	0	100	100	90-100	65-95	40-50	20-30
	50-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
RdC*: Reeder----------	0-5	Loam----------	CL, CL-ML	A-4, A-6	0	100	100	90-100	65-85	20-40	5-20
	5-35	Clay loam, loam, sandy clay loam.	CL, CL-ML	A-4, A-6, A-7	0	100	100	90-100	60-80	25-50	5-30
	35-60	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
RdC*:											
Lantry	0-4	Silt loam	CL, CL-ML, ML	A-4, A-6	0	100	100	95-100	85-100	20-35	3-12
	4-33	Silt loam, loam, very fine sandy loam.	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-100	20-40	3-15
	33-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
ReC*:											
Reeder	0-5	Loam	CL, CL-ML	A-4, A-6	0	100	100	90-100	65-85	20-40	5-20
	5-35	Clay loam, loam, sandy clay loam.	CL, CL-ML	A-4, A-6, A-7	0	100	100	90-100	60-80	25-50	5-30
	35-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rhoades	0-2	Loam	SM, ML, SC, CL	A-4, A-6	0	100	100	75-90	45-65	20-35	NP-15
	2-21	Clay loam, silty clay, clay.	CL, CH	A-7	0	100	100	90-100	80-95	40-75	20-45
	21-50	Silty clay, clay loam, loam.	CL, CH	A-6, A-7	0	100	100	85-100	75-95	35-70	20-40
	50-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Lantry	0-4	Silt loam	CL, CL-ML, ML	A-4, A-6	0	100	100	95-100	85-100	20-35	3-12
	4-33	Silt loam, loam, very fine sandy loam.	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-100	20-40	3-15
	33-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
RgB, RgC	0-7	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	80-95	30-50	15-30
Regent	7-28	Silty clay loam, silty clay.	CL, CH	A-7	0	100	100	90-100	80-95	40-70	15-45
	28-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
RhD*:											
Regent	0-7	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	80-95	30-50	15-30
	7-28	Silty clay loam, silty clay.	CL, CH	A-7	0	100	100	90-100	80-95	40-70	15-45
	28-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Cabba	0-4	Loam	ML, CL-ML	A-4	0-5	90-100	85-100	70-90	60-80	20-30	NP-10
	4-16	Loam, silt loam, clay loam.	CL, CL-ML	A-6, A-4	0-5	95-100	90-100	85-100	80-95	25-35	5-15
	16-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
RmB*:											
Regent	0-7	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	80-95	30-50	15-30
	7-28	Silty clay loam, silty clay.	CL, CH	A-7	0	100	100	90-100	80-95	40-70	15-45
	28-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Daglum	0-6	Loam	SM, ML, CL-ML, SM-SC	A-4	0	100	100	75-90	45-65	20-30	3-10
	6-17	Clay, silty clay, silty clay loam.	CL, CH	A-7, A-6	0	100	100	90-100	70-95	35-75	15-45
	17-50	Clay, silty clay, clay loam.	CL	A-7	0	100	100	90-100	65-95	40-50	20-30
	50-60	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
RnB*:											
Regent	0-7	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	80-95	30-50	15-30
	7-28	Silty clay loam, silty clay.	CL, CH	A-7	0	100	100	90-100	80-95	40-70	15-45
	28-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rhoades	0-2	Loam	SM, ML, SC, CL	A-4, A-6	0	100	100	75-90	45-65	20-35	NP-15
	2-21	Clay loam, silty clay, clay.	CL, CH	A-7	0	100	100	90-100	80-95	40-75	20-45
	21-50	Silty clay, silty clay loam, loam.	CL, CH	A-6, A-7	0	100	100	85-100	75-95	35-70	20-40
	50-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
RoA, RoB	0-8	Silty clay loam	CL, ML, CH, MH	A-6, A-7	0	100	100	95-100	80-100	35-55	15-25
Reliance	8-26	Silty clay loam, silty clay.	CL, CH	A-6, A-7	0	100	100	95-100	85-100	35-60	15-30
	26-60	Silty clay loam, silt loam.	CL, CH	A-6, A-7	0	100	100	90-100	70-100	30-55	10-30
RrA*, RrB*:											
Rhoades	0-2	Loam	SM, ML, SC, CL	A-4, A-6	0	100	100	75-90	45-65	20-35	NP-15
	2-21	Clay loam, silty clay, clay.	CL, CH	A-7	0	100	100	90-100	80-95	40-75	20-45
	21-60	Silty clay, silty clay loam, loam.	CL, CH	A-6, A-7	0	100	100	85-100	75-95	35-70	20-40
Daglum	0-6	Loam	SM, ML, CL-ML, SM-SC	A-4	0	100	100	75-90	45-65	20-30	3-10
	6-17	Clay, silty clay, silty clay loam.	CL, CH	A-7, A-6	0	100	100	90-100	70-95	35-75	15-45
	17-60	Clay, silty clay, clay loam.	CL	A-7	0	100	100	90-100	65-95	40-50	20-30
RsB*:											
Rhoades	0-2	Loam	SM, ML, SC, CL	A-4, A-6	0	100	100	75-90	45-65	20-35	NP-15
	2-21	Clay loam, silty clay, clay.	CL, CH	A-7	0	100	100	90-100	80-95	40-75	20-45
	21-60	Silty clay, silty clay loam, loam.	CL, CH	A-6, A-7	0	100	100	85-100	75-95	35-70	20-40
Slickspots.											
RvA, RvB	0-5	Silty clay loam	CL, CH, ML, MH	A-7	0	100	100	95-100	85-95	40-65	15-30
Ridgeview	5-12	Silty clay, silty clay loam, clay.	CH, MH	A-7	0	100	100	95-100	90-95	50-80	25-40
	12-33	Clay, silty clay	CH	A-7	0	100	100	90-100	85-95	50-80	25-45
	33-60	Clay, silty clay	CH, CL	A-7	0	100	95-100	90-100	85-95	45-75	20-45
Rw*.											
Riverwash											
SaE	0-3	Clay	CH, MH	A-7	0	100	85-100	80-100	70-100	50-85	20-50
Samsil	3-12	Clay	CH, MH	A-7	0	100	95-100	90-100	85-100	50-90	18-55
	12-60	Weathered bedrock	CH, MH	A-7	0	100	95-100	90-100	85-100	50-90	20-55

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
ScF*:											
Samsil	0-3	Clay	CH, MH	A-7	0	100	85-100	80-100	70-100	50-85	20-50
	3-12	Clay	CH, MH	A-7	0	100	95-100	90-100	85-100	50-90	18-55
	12-60	Weathered bedrock	CH, MH	A-7	0	100	95-100	90-100	85-100	50-90	20-55
Rock outcrop.											
SgA, SgB	0-6	Silt loam	CL	A-6	0	100	100	90-100	70-80	20-40	10-20
Savage	6-19	Silty clay, clay, silty clay loam.	CL, CH	A-7	0	100	100	95-100	85-95	40-70	20-45
	19-28	Silty clay, clay, silty clay loam.	CL, CH	A-7	0	100	100	95-100	85-95	40-70	20-45
	28-60	Silty clay loam, silty clay, clay.	CL, CH	A-7	0	100	100	95-100	85-95	40-70	20-45
ShE*:											
Schamber	0-9	Gravelly loam	SM, SW-SM, GM, GW-GM	A-2, A-1	0-5	55-90	50-75	40-60	10-35	<25	NP-5
	9-60	Very gravelly sand, very gravelly loamy sand.	SW, SW-SM, GW, GW-GM	A-1	0-15	30-80	25-50	5-20	0-10	<25	NP-5
Samsil	0-3	Clay	CH, MH	A-7	0	100	85-100	80-100	70-100	50-85	20-50
	3-12	Clay	CH, MH	A-7	0	100	95-100	90-100	85-100	50-90	18-55
	12-60	Weathered bedrock	CH, MH	A-7	0	100	95-100	90-100	85-100	50-90	20-55
SkB*:											
Seroco	0-3	Loamy fine sand	SM	A-2	0	100	100	50-75	15-30	---	NP
	3-60	Fine sand, loamy fine sand, loamy sand.	SM	A-2	0	100	100	65-80	20-35	---	NP
Tally	0-6	Fine sandy loam	SM, SM-SC, ML	A-2, A-4	0	90-100	80-100	55-100	25-55	15-30	NP-10
	6-26	Fine sandy loam, sandy loam.	SM, SM-SC	A-4, A-2	0	90-100	80-100	60-100	25-50	15-25	NP-10
	26-60	Sandy loam, fine sandy loam, loamy fine sand.	SM	A-4, A-2	0	90-100	80-100	60-100	15-50	15-25	NP-10
So	0-6	Loam	ML, CL, CL-ML	A-4, A-6	0	100	100	85-95	60-75	25-35	3-13
Shambo	6-20	Loam, silt loam, clay loam.	ML, CL, CL-ML	A-4, A-6	0	100	100	85-95	60-75	25-40	3-18
	20-60	Stratified loam to silty clay loam.	ML, CL, CL-ML	A-4, A-6	0	100	100	85-95	60-75	25-40	3-18
Sp*.											
Slickspots											
StA	0-7	Loam	ML, CL	A-4, A-6	0-1	95-100	95-100	85-95	60-75	25-40	3-15
Stady	7-20	Loam	ML, CL	A-4, A-6	0-1	95-100	95-100	85-95	60-75	25-40	3-15
	20-32	Loam, gravelly loam.	ML, CL	A-4, A-6	0-1	80-100	80-100	75-95	55-75	25-40	3-15
	32-60	Gravelly sand	SM, SP, GM, GP	A-1	0-1	50-100	50-95	10-30	2-15	---	NP

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
SwB----------	0-6	Clay----------	CH, MH	A-7	0	100	100	90-100	75-95	60-90	30-55
Swanboy	6-60	Clay, silty clay	CH, MH	A-7	0	100	100	90-100	75-95	65-90	30-55
SxC*:											
Swanboy---------	0-6	Clay----------	CH, MH	A-7	0	100	100	90-100	75-95	60-90	30-55
	6-60	Clay, silty clay	CH, MH	A-7	0	100	100	90-100	75-95	65-90	30-55
Kyle----------	0-3	Clay----------	CH, MH	A-7	0	100	100	90-100	80-100	55-75	25-45
	3-23	Clay----------	CH, MH	A-7	0	100	100	90-100	80-100	55-75	25-45
	23-60	Clay----------	CH, MH	A-7	0	100	100	90-100	80-100	60-90	25-55
SyB*:											
Swanboy---------	0-6	Clay----------	CH, MH	A-7	0	100	100	90-100	75-95	60-90	30-55
	6-60	Clay, silty clay	CH, MH	A-7	0	100	100	90-100	75-95	65-90	30-55
Slickspots.											
TaA, TaB---------	0-6	Fine sandy loam	SM, SM-SC, ML	A-2, A-4	0	90-100	80-100	55-100	25-55	15-30	NP-10
Tally	6-26	Fine sandy loam, sandy loam.	SM, SM-SC	A-4, A-2	0	90-100	80-100	60-100	25-50	15-25	NP-10
	26-60	Sandy loam, fine sandy loam, loamy fine sand.	SM	A-4, A-2	0	90-100	80-100	60-100	15-50	15-25	NP-10
Tm----------	0-6	Fine sandy loam	SM, ML	A-4	0	100	100	70-85	40-55	20-30	NP-5
Trembles	6-38	Stratified fine sandy loam to loam.	SM, ML	A-4	0	100	100	65-85	35-60	20-30	NP-5
	38-60	Stratified fine sandy loam to loamy sand.	SM	A-4, A-2	0	100	100	60-80	25-50	15-25	NP-5
Tr----------	0-6	Fine sandy loam	SM, ML	A-4	0	100	100	75-85	45-55	20-30	NP-5
Trembles	6-38	Stratified fine sandy loam to loam.	SM, ML	A-2, A-4	0	100	100	65-85	30-55	20-30	NP-5
	38-60	Stratified fine sandy loam to loamy sand.	SM	A-2, A-4	0	100	100	60-80	25-50	15-25	NP-5
VbB, VbC---------	0-18	Fine sandy loam	SM, ML	A-4, A-2	0	95-100	90-100	60-100	30-55	---	NP
Vebar	18-30	Fine sandy loam, loamy fine sand, sandy loam.	SM, ML	A-4, A-2	0	95-100	90-100	60-100	30-55	---	NP
	30-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
VcC*:											
Vebar----------	0-18	Fine sandy loam	SM, ML	A-4, A-2	0	95-100	90-100	60-100	30-55	---	NP
	18-30	Fine sandy loam, loamy fine sand, sandy loam.	SM, ML	A-4, A-2	0	95-100	90-100	60-100	30-55	---	NP
	30-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Cohagen---------	0-11	Fine sandy loam	SM	A-2, A-4	0	100	95-100	60-85	30-50	---	NP
	11-60	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
VdC*:											
Vebar	0-18	Fine sandy loam	SM, ML	A-4, A-2	0	95-100	90-100	60-100	30-55	---	NP
	18-30	Fine sandy loam, loamy fine sand, sandy loam.	SM, ML	A-4, A-2	0	95-100	90-100	60-100	30-55	---	NP
	30-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Daglum	0-6	Loam	SM, ML, CL-ML, SM-SC	A-4	0	100	100	75-90	45-65	20-30	3-10
	6-17	Clay, silty clay, silty clay loam.	CL, CH	A-7, A-6	0	100	100	90-100	70-95	35-75	15-45
	17-50	Clay, silty clay, clay loam.	CL	A-7	0	100	100	90-100	65-95	40-50	20-30
	50-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
WcE*:											
Wabek	0-4	Gravelly loam	ML	A-4	0-1	90-100	90-100	75-90	50-70	25-40	NP-10
	4-7	Gravelly sandy loam, gravelly loam, gravelly coarse sandy loam.	SM, GM	A-2, A-4	0-1	50-100	50-95	50-65	20-40	---	NP
	7-60	Very gravelly sand.	GM, GP, SM, SP	A-1	0-1	25-75	10-60	5-35	0-25	---	NP
Cabba	0-4	Loam	ML, CL-ML	A-4	0-5	90-100	85-100	70-90	60-80	20-30	NP-10
	4-16	Loam, silt loam, silty clay loam.	CL, CL-ML	A-6, A-4	0-5	95-100	90-100	85-100	80-95	25-35	5-15
	16-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
WdE	0-4	Silty clay loam	CL, CH	A-6, A-7	0	100	100	90-100	70-95	35-60	15-30
Wayden	4-11	Silty clay, clay, silty clay loam.	CH, CL	A-7	0	100	100	90-100	75-95	40-60	15-30
	11-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
We, Wn	0-5	Silty clay	CL, CH	A-7	0	100	100	90-100	70-100	45-70	20-40
Wendte	5-60	Stratified silty clay loam to clay.	CH, MH	A-7	0	100	100	90-100	70-100	50-80	20-45

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
									K	T		
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm					Pct
AcD*:												
Amor	0-5	15-25	1.00-1.40	0.6-2.0	0.20-0.23	6.1-7.3	<2	Moderate	0.28	4	6	3-6
	5-36	18-30	1.20-1.60	0.6-2.0	0.15-0.18	6.6-8.4	<2	Moderate	0.28			
	36-60	---	---	---	---	---	---	---	---			
Cabba	0-4	10-27	1.30-1.50	0.6-2.0	0.16-0.20	6.6-8.4	<4	Low	0.32	2	4L	1-3
	4-16	20-35	1.30-1.50	0.6-2.0	0.14-0.18	7.4-9.0	2-8	Moderate	0.32			
	16-60	---	---	---	---	---	---	---	---			
Ba*.												
Badland												
Bk	0-4	2-10	1.65-1.75	6.0-20	0.05-0.08	7.4-8.4	<2	Low	0.17	5	2	.5-1
Bankard	4-60	2-10	1.70-1.80	>20	0.05-0.06	7.4-8.4	<2	Low	0.10			
Bn	0-4	5-15	1.45-1.60	6.0-20.0	0.06-0.10	7.4-8.4	<2	Low	0.17	3	2	.5-1
Bankard Variant	4-13	2-15	1.45-1.65	6.0-20.0	0.06-0.10	7.4-9.0	<2	Low	0.17			
	13-60	0-5	1.65-1.80	>20	0.03-0.06	7.4-9.0	<4	Low	0.10			
Bo	0-3	0-10	1.30-1.50	6.0-20	0.06-0.09	6.6-7.8	<2	Low	0.17	5	2	<1
Banks	3-60	0-10	1.40-1.70	6.0-20	0.07-0.09	7.4-8.4	<2	Low	0.17			
BpB*:												
Bullock	0-3	5-10	1.35-1.60	2.0-6.0	0.12-0.17	6.1-7.8	<2	Low	0.28	3	3	1-2
	3-9	18-35	1.50-1.80	<0.2	0.13-0.17	6.6-8.4	<4	Moderate	0.37			
	9-23	18-35	1.45-1.70	<0.06	0.07-0.15	7.4-9.0	4-8	Moderate	0.37			
	23-60	---	---	---	---	---	---	---	---			
Parchin	0-4	5-15	1.35-1.65	2.0-6.0	0.13-0.16	5.1-7.3	<2	Low	0.24	3	3	1-3
	4-9	5-15	1.35-1.65	2.0-6.0	0.08-0.14	5.6-7.3	<2	Low	0.24			
	9-17	18-34	1.50-1.85	<0.2	0.13-0.15	7.4-9.0	2-8	Moderate	0.37			
	17-24	15-30	1.40-1.60	0.6-2.0	0.11-0.13	7.4-9.0	2-8	Low	0.37			
	24-60	---	---	---	---	---	---	---	---			
BsC*:												
Bullock	0-3	5-10	1.35-1.60	2.0-6.0	0.12-0.17	6.1-7.8	<2	Low	0.28	3	3	1-2
	3-9	18-35	1.50-1.80	<0.2	0.13-0.17	6.6-8.4	<4	Moderate	0.37			
	9-23	18-35	1.45-1.70	<0.06	0.07-0.15	7.4-9.0	4-8	Moderate	0.37			
	23-60	---	---	---	---	---	---	---	---			
Slickspots.												
Parchin	0-4	5-15	1.35-1.65	2.0-6.0	0.13-0.16	5.1-7.3	<2	Low	0.24	3	3	1-3
	4-9	5-15	1.35-1.65	2.0-6.0	0.08-0.14	5.6-7.3	<2	Low	0.24			
	9-17	18-34	1.50-1.85	<0.2	0.13-0.15	7.4-9.0	2-8	Moderate	0.37			
	17-24	15-30	1.40-1.60	0.6-2.0	0.11-0.13	7.4-9.0	2-8	Low	0.37			
	24-60	---	---	---	---	---	---	---	---			
CaE*:												
Cabba	0-4	10-27	1.30-1.50	0.6-2.0	0.16-0.20	6.6-8.4	<4	Low	0.32	2	4L	1-3
	4-16	20-35	1.30-1.50	0.6-2.0	0.14-0.18	7.4-9.0	2-8	Moderate	0.32			
	16-60	---	---	---	---	---	---	---	---			
Lantry	0-4	15-26	1.10-1.30	0.6-2.0	0.17-0.22	7.4-8.4	<2	Low	0.43	4	4L	1-3
	4-33	18-27	1.20-1.40	0.6-2.0	0.17-0.20	7.4-8.4	<2	Low	0.43			
	33-60	---	---	---	---	---	---	---	---			

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
									K	T		
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm					Pct
CcF*:												
Cabba	0-4	10-27	1.30-1.50	0.6-2.0	0.16-0.20	6.6-8.4	<4	Low	0.32	2	4L	1-3
	4-16	20-35	1.30-1.50	0.6-2.0	0.14-0.18	7.4-9.0	2-8	Moderate	0.32			
	16-60	---	---	---	---	---	---	---	---			
Rock outcrop.												
CkF*:												
Cohagen	0-11	10-18	1.20-1.60	0.6-6.0	0.13-0.18	6.6-8.4	<2	Low	0.24	2	3	<1
	11-60	---	---	---	---	---	---	---	---			
Rock outcrop.												
CoE*:												
Cohagen	0-11	10-18	1.20-1.60	0.6-6.0	0.13-0.18	6.6-8.4	<2	Low	0.24	2	3	<1
	11-60	---	---	---	---	---	---	---	---			
Vebar	0-18	10-18	1.20-1.60	2.0-6.0	0.15-0.17	6.1-7.8	<2	Low	0.20	4	3	1-4
	18-30	10-18	1.20-1.60	2.0-6.0	0.15-0.17	6.1-8.4	<2	Low	0.20			
	30-60	---	---	---	---	---	---	---	---			
CrD*:												
Cohagen	0-11	10-18	1.20-1.60	0.6-6.0	0.13-0.18	6.6-8.4	<2	Low	0.24	2	3	<1
	11-60	---	---	---	---	---	---	---	---			
Vebar	0-18	10-18	1.20-1.60	2.0-6.0	0.15-0.17	6.1-7.8	<2	Low	0.20	4	3	1-4
	18-30	10-18	1.20-1.60	2.0-6.0	0.15-0.17	6.1-8.4	<2	Low	0.20			
	30-60	---	---	---	---	---	---	---	---			
Bullock	0-3	5-10	1.35-1.60	2.0-6.0	0.12-0.17	6.1-7.8	<2	Low	0.28	3	3	1-2
	3-9	18-35	1.50-1.80	<0.2	0.13-0.17	6.6-8.4	<4	Moderate	0.37			
	9-23	18-35	1.45-1.70	<0.06	0.07-0.15	7.4-9.0	4-8	Moderate	0.37			
	23-60	---	---	---	---	---	---	---	---			
Ct	0-6	8-20	1.20-1.40	0.6-2.0	0.20-0.24	7.4-8.4	<2	Low	0.37	5	4L	.5-2
Craft	6-60	8-36	1.15-1.30	0.6-2.0	0.17-0.20	7.4-8.4	<2	Low	0.43			
DaA	0-6	10-25	1.20-1.50	0.6-6.0	0.13-0.15	5.6-7.3	<2	Low	0.32	3	6	2-4
Daglum	6-17	35-60	1.30-1.60	<0.2	0.12-0.14	6.1-9.0	2-8	High	0.32			
	17-60	36-60	1.50-1.70	<0.2	0.12-0.14	7.9-9.0	8-16	High	0.32			
DrB*:												
Daglum	0-6	10-25	1.20-1.50	0.6-6.0	0.13-0.15	5.6-7.3	<2	Low	0.32	3	6	2-4
	6-17	35-60	1.30-1.60	<0.2	0.12-0.14	6.1-9.0	2-8	High	0.32			
	17-60	36-60	1.50-1.70	<0.2	0.12-0.14	7.9-9.0	8-16	High	0.32			
Rhoades	0-2	10-27	1.10-1.30	0.6-6.0	0.13-0.15	5.6-7.3	<2	Low	0.32	3	6	2-6
	2-21	35-50	1.20-1.50	<0.2	0.10-0.12	>6.5	2-16	High	0.32			
	21-60	20-45	1.20-1.50	<0.2	0.10-0.12	>7.3	8-16	High	0.32			
DuC	0-2	55-70	1.15-1.30	<0.2	0.08-0.12	5.6-7.8	<2	Very high	0.37	2	4	1-3
Dupree	2-16	55-70	1.15-1.35	<0.06	0.08-0.12	5.6-7.8	<4	Very high	0.37			
	16-60	---	---	---	---	---	---	---	---			
EvB	0-5	5-10	1.25-1.40	2.0-6.0	0.10-0.12	6.1-7.3	<2	Low	0.17	4	2	1-2
Evridge	5-24	5-10	1.20-1.40	2.0-6.0	0.10-0.14	6.1-8.4	<2	Low	0.17			
	24-30	10-18	1.30-1.45	0.06-0.2	0.09-0.12	7.9-9.0	4-8	Moderate	0.24			
	30-35	10-18	1.35-1.50	0.06-0.2	0.08-0.11	7.9-9.0	4-16	Low	0.24			
	35-60	---	---	---	---	---	---	---	---			

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
									K	T		
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm					Pct
FaA, FaB--------- Farland	0-8 8-20 20-38 38-60	15-30 27-35 20-35 5-35	1.20-1.50 1.20-1.50 1.20-1.50 1.20-1.50	0.6-2.0 0.6-2.0 0.6-2.0 0.6-2.0	0.19-0.21 0.16-0.20 0.17-0.20 0.16-0.18	6.1-7.8 6.6-7.8 6.6-8.4 7.9-9.0	<2 <2 <4 <8	Low------- Moderate Moderate Moderate	0.32 0.32 0.32 0.32	5	6	3-7
Fv. Fluvaquents												
Gn---------- Glenross	0-1 1-60	10-15 18-30	1.25-1.40 1.30-1.45	2.0-6.0 <0.2	0.12-0.15 0.13-0.15	7.4-9.0 >7.8	2-4 >8	Low------- Moderate	0.20 0.32	3	8	2-4
Gr---------- Grail	0-9 9-28 28-60	15-27 35-45 18-45	1.10-1.40 1.20-1.60 1.20-1.70	0.6-2.0 0.2-0.6 0.2-0.6	0.19-0.22 0.13-0.18 0.14-0.22	6.1-7.3 6.6-7.8 7.4-8.4	<2 <2 <2	Moderate High------ Moderate	0.32 0.32 0.32	5	6	4-6
Hc---------- Haverson	0-4 4-60	10-26 18-35	1.20-1.35 1.30-1.45	0.6-2.0 0.6-2.0	0.14-0.18 0.14-0.18	6.6-8.4 7.4-9.0	<2 2-4	Low------- Low-------	0.28 0.28	5	4L	1-3
He---------- Heil	0-2 2-29 29-60	18-35 45-60 20-50	1.20-1.40 1.20-1.70 1.20-1.70	<0.06 <0.06 <0.06	0.15-0.24 0.13-0.18 0.13-0.18	5.6-7.3 6.6-9.0 7.4-9.0	<2 4-16 4-16	Moderate High------ High------	0.28 0.28 0.28	3	7	3-6
Hn---------- Heil Variant	0-3 3-16 16-60	27-40 18-55 40-65	1.15-1.25 1.20-1.35 1.20-1.30	0.2-0.6 0.2-2.0 <0.06	0.17-0.20 0.08-0.20 0.08-0.12	7.9-9.0 7.9-9.0 7.9-9.0	<2 2-4 2-8	Moderate Moderate High------	0.37 0.37 0.37	5	8	1-2
HpC*: Hisle---------- Pierre----------	0-1 1-35 35-60 0-5 5-22 22-32 32-60	18-27 50-60 --- 50-70 60-70 60-70 ---	1.10-1.25 1.25-1.40 --- 1.10-1.25 1.10-1.25 1.10-1.35 ---	0.6-2.0 <0.06 --- <0.06 <0.06 <0.06 ---	0.16-0.20 0.05-0.12 --- 0.08-0.12 0.08-0.12 0.08-0.12 ---	6.1-7.8 7.4-9.0 6.1-8.4 6.1-7.8 6.6-8.4 7.4-8.4 ---	<2 2-16 --- <2 <2 2-8 ---	Low------- Very high ---------- Very high Very high Very high ----------	0.28 0.37 ---- 0.37 0.37 0.37 ----	3 4	6 4	1-3 1-3
HsB*: Hisle---------- Slickspots.	0-1 1-35 35-60	18-27 50-60 ---	1.10-1.25 1.25-1.40 ---	0.6-2.0 <0.06 ---	0.16-0.20 0.05-0.12 ---	6.1-7.8 7.4-9.0 6.1-8.4	<2 2-16 ---	Low------- Very high ----------	0.28 0.37 ----	3	6	1-3
Ka, Kc---------- Korchea	0-6 6-60	18-27 18-35	1.20-1.50 1.30-1.60	0.6-2.0 0.6-2.0	0.17-0.21 0.16-0.18	6.6-8.4 7.4-9.0	<2 <2	Low------- Moderate	0.28 0.28	5	6	2-6
KyB---------- Kyle	0-3 3-23 23-60	50-65 60-65 60-65	1.15-1.30 1.15-1.30 1.15-1.30	<0.06 <0.06 <0.06	0.08-0.12 0.08-0.12 0.08-0.12	6.6-7.8 7.4-8.4 7.4-8.4	<2 <4 2-8	Very high Very high Very high	0.37 0.37 0.37	5	4	1-3
LcD*: Lantry---------- Cabba----------	0-4 4-33 33-60 0-4 4-16 16-60	15-26 18-27 --- 10-27 20-35 ---	1.10-1.30 1.20-1.40 --- 1.30-1.50 1.30-1.50 ---	0.6-2.0 0.6-2.0 --- 0.6-2.0 0.6-2.0 ---	0.17-0.22 0.17-0.20 --- 0.16-0.20 0.14-0.18 ---	7.4-8.4 7.4-8.4 --- 6.6-8.4 7.4-9.0 ---	<2 <2 --- <4 2-8 ---	Low------- Low------- ---------- Low------- Moderate ----------	0.43 0.43 ---- 0.32 0.32 ----	4 2	4L 4L	1-3 1-3

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
									K	T		
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm					Pct
LdD*:												
Lantry----------	0-4	15-26	1.10-1.30	0.6-2.0	0.17-0.22	7.4-8.4	<2	Low-------	0.43	4	4L	1-3
	4-33	18-27	1.20-1.40	0.6-2.0	0.17-0.20	7.4-8.4	<2	Low-------	0.43			
	33-60	---	---	---	---	---	---	----------	----			
Cabba----------	0-4	10-27	1.30-1.50	0.6-2.0	0.16-0.20	6.6-8.4	<4	Low-------	0.32	2	4L	1-3
	4-16	20-35	1.30-1.50	0.6-2.0	0.14-0.18	7.4-9.0	2-8	Moderate	0.32			
	16-60	---	---	---	---	---	---	----------	----			
Rhoades---------	0-2	10-27	1.10-1.30	0.6-6.0	0.13-0.15	5.6-7.3	<2	Low-------	0.32	3	6	2-6
	2-21	35-50	1.20-1.50	<0.2	0.10-0.12	>6.5	2-16	High------	0.32			
	21-50	20-45	1.20-1.50	<0.2	0.10-0.12	>7.3	8-16	High------	0.32			
	50-60	---	---	---	---	---	---	----------	----			
LeD*:												
Lantry----------	0-4	15-26	1.10-1.30	0.6-2.0	0.17-0.22	7.4-8.4	<2	Low-------	0.43	4	4L	1-3
	4-33	18-27	1.20-1.40	0.6-2.0	0.17-0.20	7.4-8.4	<2	Low-------	0.43			
	33-60	---	---	---	---	---	---	----------	----			
Korchea---------	0-6	18-27	1.20-1.50	0.6-2.0	0.17-0.21	6.6-8.4	<2	Low-------	0.28	5	6	2-6
	6-60	18-35	1.30-1.60	0.6-2.0	0.16-0.18	7.4-9.0	<2	Moderate	0.28			
Cabba----------	0-4	10-27	1.30-1.50	0.6-2.0	0.16-0.20	6.6-8.4	<4	Low-------	0.32	2	4L	1-3
	4-16	20-35	1.30-1.50	0.6-2.0	0.14-0.18	7.4-9.0	2-8	Moderate	0.28			
	16-60	---	---	---	---	---	---	----------	----			
Lh, Lk----------	0-4	28-40	1.15-1.25	0.2-0.6	0.14-0.20	6.6-8.4	<2	Moderate	0.32	5	4L	1-2
Lohler	4-60	28-55	1.15-1.35	<0.2	0.08-0.16	6.6-8.4	2-8	High------	0.32			
Ln---------------	0-5	30-45	1.15-1.25	0.06-0.6	0.14-0.17	6.6-8.4	<4	Moderate	0.32	5	4L	1-3
Lohmiller	5-13	35-50	1.20-1.35	0.06-0.6	0.11-0.16	6.6-8.4	<4	High------	0.32			
	13-60	35-50	1.30-1.45	0.06-0.6	0.14-0.16	7.4-8.4	<8	High------	0.32			
Lo---------------	0-5	30-40	1.15-1.25	0.06-0.6	0.14-0.17	6.6-8.4	<4	Moderate	0.32	5	4L	1-3
Lohmiller	5-13	35-50	1.20-1.35	0.06-0.6	0.11-0.16	7.4-8.4	<4	High------	0.32			
	13-60	25-35	1.30-1.45	0.06-0.6	0.14-0.16	7.4-8.4	<4	Moderate	0.32			
PbB*:												
Parchin---------	0-4	5-15	1.35-1.65	2.0-6.0	0.13-0.16	5.1-7.3	<2	Low-------	0.24	3	3	1-3
	4-9	5-15	1.35-1.65	2.0-6.0	0.08-0.14	5.6-7.3	<2	Low-------	0.24			
	9-17	18-34	1.50-1.85	<0.2	0.13-0.15	7.4-9.0	2-8	Moderate	0.37			
	17-24	15-30	1.40-1.60	0.6-2.0	0.11-0.13	7.4-9.0	2-8	Low-------	0.37			
	24-60	---	---	---	---	---	---	----------	----			
Bullock---------	0-3	5-10	1.35-1.60	2.0-6.0	0.12-0.17	6.1-7.8	<2	Low-------	0.28	3	3	1-2
	3-9	18-35	1.50-1.80	<0.2	0.13-0.17	6.6-8.4	<4	Moderate	0.37			
	9-23	18-35	1.45-1.70	<0.06	0.07-0.15	7.4-9.0	4-8	Moderate	0.37			
	23-60	---	---	---	---	---	---	----------	----			
PeB, PeC---------	0-5	50-70	1.10-1.25	<0.06	0.08-0.12	6.1-7.8	<2	Very high	0.37	4	4	1-3
Pierre	5-22	60-70	1.10-1.25	<0.06	0.08-0.12	6.6-8.4	<2	Very high	0.37			
	22-32	60-70	1.10-1.35	<0.06	0.08-0.12	7.4-8.4	2-8	Very high	0.37			
	32-60	---	---	---	---	---	---	----------	----			
PmD*:												
Pierre----------	0-5	50-70	1.10-1.25	<0.06	0.08-0.12	6.1-7.8	<2	Very high	0.37	4	4	1-3
	5-22	60-70	1.10-1.25	<0.06	0.08-0.12	6.6-8.4	<2	Very high	0.37			
	22-32	60-70	1.10-1.35	<0.06	0.08-0.12	7.4-8.4	2-8	Very high	0.37			
	32-60	---	---	---	---	---	---	----------	----			

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
									K	T		
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm					Pct
PmD*:												
Samsil	0-3	45-60	1.15-1.30	0.06-0.2	0.08-0.12	7.4-8.4	<2	Very high	0.37	2	4	1-3
	3-12	50-65	1.15-1.30	0.06-0.2	0.08-0.12	7.4-8.4	<2	Very high	0.37			
	12-60	---	---	---	---	---	---	---	---			
Po*.												
Pits												
PrA	0-4	60-70	1.15-1.30	<0.06	0.10-0.14	6.1-7.8	<2	Very high	0.37	5	4	2-4
Promise	4-24	60-70	1.15-1.30	<0.06	0.08-0.14	6.6-7.8	<2	Very high	0.37			
	24-46	60-70	1.15-1.40	<0.06	0.08-0.12	7.4-9.0	<4	Very high	0.37			
	46-60	15-40	1.25-1.45	0.06-6.0	0.12-0.17	7.9-9.0	<4	Low	0.37			
RaA, RaB	0-7	22-26	1.15-1.30	0.6-2.0	0.18-0.22	6.1-7.3	<2	Moderate	0.28	5	6	2-4
Ree	7-28	27-35	1.20-1.35	0.6-2.0	0.17-0.22	6.6-8.4	<2	Moderate	0.28			
	28-60	15-35	1.30-1.50	0.6-2.0	0.09-0.20	7.4-8.4	<2	Low	0.28			
RbB, RbC	0-5	10-27	1.10-1.30	0.6-2.0	0.20-0.23	6.1-7.3	<2	Moderate	0.28	4	6	3-5
Reeder	5-35	18-35	1.20-1.40	0.6-2.0	0.15-0.18	6.6-8.4	<2	Moderate	0.28			
	35-60	---	---	---	---	---	---	---	---			
RcB*:												
Reeder	0-5	10-27	1.10-1.30	0.6-2.0	0.20-0.23	6.1-7.3	<2	Moderate	0.28	4	6	3-5
	5-35	18-35	1.20-1.40	0.6-2.0	0.15-0.18	6.6-8.4	<2	Moderate	0.28			
	35-60	---	---	---	---	---	---	---	---			
Daglum	0-6	10-25	1.20-1.50	0.6-6.0	0.13-0.15	5.6-7.3	<2	Low	0.32	3	6	2-4
	6-17	35-60	1.30-1.60	<0.2	0.12-0.14	6.1-9.0	2-8	High	0.32			
	17-50	36-60	1.50-1.70	<0.2	0.12-0.14	7.9-9.0	8-16	High	0.32			
	50-60	---	---	---	---	---	---	---	---			
RdC*:												
Reeder	0-5	10-27	1.10-1.30	0.6-2.0	0.20-0.23	6.1-7.3	<2	Moderate	0.28	4	6	3-5
	5-35	18-35	1.20-1.40	0.6-2.0	0.15-0.18	6.6-8.4	<2	Moderate	0.28			
	35-60	---	---	---	---	---	---	---	---			
Lantry	0-4	15-26	1.10-1.30	0.6-2.0	0.17-0.22	7.4-8.4	<2	Low	0.43	4	4L	1-3
	4-33	18-27	1.20-1.40	0.6-2.0	0.17-0.20	7.4-8.4	<2	Low	0.43			
	33-60	---	---	---	---	---	---	---	---			
ReC*:												
Reeder	0-5	10-27	1.10-1.30	0.6-2.0	0.20-0.23	6.1-7.3	<2	Moderate	0.28	4	6	3-5
	5-35	18-35	1.20-1.40	0.6-2.0	0.15-0.18	6.6-8.4	<2	Moderate	0.28			
	35-60	---	---	---	---	---	---	---	---			
Rhoades	0-2	10-27	1.10-1.30	0.6-6.0	0.13-0.15	5.6-7.3	<2	Low	0.32	3	6	2-6
	2-21	35-50	1.20-1.50	<0.2	0.10-0.12	>6.5	2-16	High	0.32			
	21-50	20-45	1.20-1.50	<0.2	0.10-0.12	>7.3	8-16	High	0.32			
	50-60	---	---	---	---	---	---	---	---			
Lantry	0-4	15-26	1.10-1.30	0.6-2.0	0.17-0.22	7.4-8.4	<2	Low	0.43	4	4L	1-3
	4-33	18-27	1.20-1.40	0.6-2.0	0.17-0.20	7.4-8.4	<2	Low	0.43			
	33-60	---	---	---	---	---	---	---	---			
RgB, RgC	0-7	27-40	1.10-1.30	0.06-0.2	0.17-0.20	6.1-7.8	<2	High	0.32	4	7	2-4
Regent	7-28	35-50	1.30-1.50	0.06-0.2	0.17-0.20	7.4-9.0	<8	High	0.32			
	28-60	---	---	---	---	---	---	---	---			

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
									K	T		
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm					Pct
RhD*:												
Regent	0-7	27-40	1.10-1.30	0.06-0.2	0.17-0.20	6.1-7.8	<2	High	0.32	4	7	2-4
	7-28	35-50	1.30-1.50	0.06-0.2	0.17-0.20	7.4-9.0	<8	High	0.32			
	28-60	---	---	---	---	---	---	---	---			
Cabba	0-4	10-27	1.30-1.50	0.6-2.0	0.16-0.20	6.6-8.4	<4	Low	0.32	2	4L	1-3
	4-16	20-35	1.30-1.50	0.6-2.0	0.14-0.18	7.4-9.0	2-8	Moderate	0.32			
	16-60	---	---	---	---	---	---	---	---			
RmB*:												
Regent	0-7	27-40	1.10-1.30	0.06-0.2	0.17-0.20	6.1-7.8	<2	High	0.32	4	7	2-4
	7-28	35-50	1.30-1.50	0.06-0.2	0.17-0.20	7.4-9.0	<8	High	0.32			
	28-60	---	---	---	---	---	---	---	---			
Daglum	0-6	10-25	1.20-1.50	0.6-6.0	0.13-0.15	5.6-7.3	<2	Low	0.32	3	6	2-4
	6-17	35-60	1.30-1.60	<0.2	0.12-0.14	6.1-9.0	2-8	High	0.32			
	17-50	36-60	1.50-1.70	<0.2	0.12-0.14	7.9-9.0	8-16	High	0.32			
	50-60	---	---	---	---	---	---	---	---			
RnB*:												
Regent	0-7	27-40	1.10-1.30	0.06-0.2	0.17-0.20	6.1-7.8	<2	High	0.32	4	7	2-4
	7-28	35-50	1.30-1.50	0.06-0.2	0.17-0.20	7.4-9.0	<8	High	0.32			
	28-60	---	---	---	---	---	---	---	---			
Rhoades	0-2	10-27	1.10-1.30	0.6-6.0	0.13-0.15	5.6-7.3	<2	Low	0.32	3	6	2-6
	2-21	35-50	1.20-1.50	<0.2	0.10-0.12	>6.5	2-16	High	0.32			
	21-50	20-45	1.20-1.50	<0.2	0.10-0.12	>7.3	8-16	High	0.32			
	50-60	---	---	---	---	---	---	---	---			
RoA, RoB	0-8	27-35	1.15-1.25	0.6-2.0	0.19-0.22	6.1-7.3	<2	Moderate	0.32	5	7	2-4
Reliance	8-26	35-45	1.20-1.40	0.2-0.6	0.11-0.19	6.1-7.8	<2	High	0.32			
	26-60	25-40	1.20-1.35	0.2-2.0	0.14-0.20	7.4-8.4	<2	Moderate	0.32			
RrA*, RrB*:												
Rhoades	0-2	10-27	1.10-1.30	0.6-6.0	0.13-0.15	5.6-7.3	<2	Low	0.32	3	6	2-6
	2-21	35-50	1.20-1.50	<0.2	0.10-0.12	>6.5	2-16	High	0.32			
	21-60	20-45	1.20-1.50	<0.2	0.10-0.12	>7.3	8-16	High	0.32			
Daglum	0-6	10-25	1.20-1.50	0.6-6.0	0.13-0.15	5.6-7.3	<2	Low	0.32	3	6	2-4
	6-17	35-60	1.30-1.60	<0.2	0.12-0.14	6.1-9.0	2-8	High	0.32			
	17-60	36-60	1.50-1.70	<0.2	0.12-0.14	7.9-9.0	8-16	High	0.32			
RsB*:												
Rhoades	0-2	10-27	1.10-1.30	0.6-6.0	0.13-0.15	5.6-7.3	<2	Low	0.32	3	6	2-6
	2-21	35-50	1.20-1.50	<0.2	0.10-0.12	>6.5	2-16	High	0.32			
	21-60	20-45	1.20-1.50	<0.2	0.10-0.12	>7.3	8-16	High	0.32			
Slickspots.												
RvA, RvB	0-5	27-35	1.15-1.25	0.2-0.6	0.16-0.19	6.1-7.3	<2	High	0.37	5	4	2-4
Ridgeview	5-12	35-45	1.20-1.40	0.06-0.2	0.13-0.18	6.1-7.3	<2	High	0.37			
	12-33	45-60	1.20-1.40	0.06-0.2	0.08-0.16	6.6-8.4	<4	High	0.37			
	33-60	40-55	1.30-1.45	0.06-0.2	0.08-0.16	7.4-8.4	<4	High	0.37			
Rw*.												
Riverwash												
SaE	0-3	45-60	1.15-1.30	0.06-0.2	0.08-0.12	7.4-8.4	<2	Very high	0.37	2	4	1-3
Samsil	3-12	50-65	1.15-1.30	0.06-0.2	0.08-0.12	7.4-8.4	<2	Very high	0.37			
	12-60	---	---	---	---	---	---	---	---			

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
									K	T		
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm					Pct
ScF*:												
Samsil	0-3	45-60	1.15-1.30	0.06-0.2	0.08-0.12	7.4-8.4	<2	Very high	0.37	2	4	1-3
	3-12	50-65	1.15-1.30	0.06-0.2	0.08-0.12	7.4-8.4	<2	Very high	0.37			
	12-60	---	---	---	---	---	---	---	---			
Rock outcrop.												
SgA, SgB	0-6	15-27	1.10-1.30	0.6-2.0	0.22-0.24	6.1-7.8	<2	Moderate	0.37	5	6	1-3
Savage	6-19	35-45	1.25-1.50	0.06-0.6	0.12-0.20	6.6-7.8	<2	High	0.37			
	19-28	35-45	1.30-1.50	0.06-0.6	0.12-0.20	7.4-8.4	2-4	High	0.37			
	28-60	35-45	1.30-1.50	0.06-0.6	0.12-0.20	7.4-8.4	4-8	High	0.37			
ShE*:												
Schamber	0-9	18-25	1.40-1.60	>6.0	0.03-0.06	6.1-8.4	<2	Low	0.17	2	6	.5-2
	9-60	2-10	1.40-1.65	>6.0	0.03-0.06	7.4-8.4	<2	Low	0.10			
Samsil	0-3	45-60	1.15-1.30	0.06-0.2	0.08-0.12	7.4-8.4	<2	Very high	0.37	2	4	1-3
	3-12	50-65	1.15-1.30	0.06-0.2	0.08-0.12	7.4-8.4	<2	Very high	0.37			
	12-60	---	---	---	---	---	---	---	---			
SkB*:												
Seroco	0-3	0-10	1.10-1.50	6.0-20	0.10-0.12	6.1-7.3	<2	Low	0.15	5	2	1-2
	3-60	0-10	1.30-1.70	6.0-20	0.06-0.08	6.6-8.4	<2	Low	0.15			
Tally	0-6	5-20	1.20-1.60	2.0-6.0	0.14-0.16	6.1-7.8	<2	Low	0.20	5	3	1-3
	6-26	5-18	1.30-1.60	2.0-6.0	0.13-0.15	6.6-8.4	<2	Low	0.20			
	26-60	5-18	1.30-1.60	2.0-6.0	0.11-0.13	7.4-8.4	<2	Low	0.20			
So	0-6	10-27	1.10-1.30	0.6-2.0	0.20-0.22	6.1-7.3	<2	Low	0.28	5	6	2-6
Shambo	6-20	18-30	1.20-1.50	0.6-2.0	0.17-0.19	6.6-8.4	<2	Moderate	0.28			
	20-60	18-30	1.20-1.50	0.6-2.0	0.17-0.19	7.4-9.0	<2	Moderate	0.28			
Sp*.												
Slickspots												
StA	0-7	18-27	1.10-1.30	0.6-2.0	0.20-0.22	6.6-7.3	<2	Low	0.28	4	6	2-4
Stady	7-20	18-27	1.10-1.30	0.6-2.0	0.17-0.19	6.6-7.3	<2	Low	0.28			
	20-32	18-27	1.10-1.40	0.6-2.0	0.17-0.19	7.4-8.4	<2	Low	0.28			
	32-60	0-5	1.30-1.80	>20.0	0.02-0.04	7.4-8.4	<2	Low	0.10			
SwB	0-6	55-70	1.05-1.15	<0.06	0.08-0.12	6.6-9.0	<2	Very high	0.37	5	4	1-2
Swanboy	6-60	60-70	1.10-1.30	<0.06	0.05-0.12	7.4-9.0	2-16	Very high	0.37			
SxC*:												
Swanboy	0-6	55-70	1.05-1.15	<0.06	0.08-0.12	6.6-9.0	<2	Very high	0.37	5	4	1-2
	6-60	60-70	1.10-1.30	<0.06	0.05-0.12	7.4-9.0	2-16	Very high	0.37			
Kyle	0-3	50-65	1.15-1.30	<0.06	0.08-0.12	6.6-7.8	<2	Very high	0.37	5	4	1-3
	3-23	60-65	1.15-1.30	<0.06	0.08-0.12	7.4-8.4	<4	Very high	0.37			
	23-60	60-65	1.15-1.30	<0.06	0.08-0.12	7.4-8.4	2-8	Very high	0.37			
SyB*:												
Swanboy	0-6	55-70	1.05-1.15	<0.06	0.08-0.12	6.6-9.0	<2	Very high	0.37	5	4	1-2
	6-60	60-70	1.10-1.30	<0.06	0.05-0.12	7.4-9.0	2-16	Very high	0.37			
Slickspots.												
TaA, TaB	0-6	5-20	1.20-1.60	2.0-6.0	0.14-0.16	6.1-7.8	<2	Low	0.20	5	3	1-3
Tally	6-26	5-18	1.30-1.60	2.0-6.0	0.13-0.15	6.6-8.4	<2	Low	0.20			
	26-60	5-18	1.30-1.60	2.0-6.0	0.11-0.13	7.4-8.4	<2	Low	0.20			

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
									K	T		
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm					Pct
Tm	0-6	10-20	---	2.0-6.0	0.12-0.14	6.6-8.4	<2	Low	0.20	5	3	1-3
Trembles	6-38	8-15	---	2.0-6.0	0.11-0.13	7.4-8.4	<2	Low	0.20			
	38-60	8-15	---	2.0-6.0	0.10-0.12	7.4-9.0	<2	Low	0.20			
Tr	0-6	10-20	1.25-1.45	2.0-6.0	0.13-0.15	6.6-8.4	<2	Low	0.20	5	3	1-3
Trembles	6-38	8-15	1.30-1.50	2.0-6.0	0.11-0.13	7.4-8.4	<2	Low	0.20			
	38-60	8-15	1.35-1.55	2.0-6.0	0.10-0.12	7.4-9.0	<2	Low	0.20			
VbB, VbC	0-18	10-18	1.20-1.60	2.0-6.0	0.15-0.17	6.1-7.8	<2	Low	0.20	4	3	1-4
Vebar	18-30	10-18	1.20-1.60	2.0-6.0	0.15-0.17	6.1-8.4	<2	Low	0.20			
	30-60	---	---	---	---	---	---	---	---			
VcC*:												
Vebar	0-18	10-18	1.20-1.60	2.0-6.0	0.15-0.17	6.1-7.8	<2	Low	0.20	4	3	1-4
	18-30	10-18	1.20-1.60	2.0-6.0	0.15-0.17	6.1-8.4	<2	Low	0.20			
	30-60	---	---	---	---	---	---	---	---			
Cohagen	0-11	10-18	1.20-1.60	0.6-6.0	0.13-0.18	6.6-8.4	<2	Low	0.24	2	3	<1
	11-60	---	---	---	---	---	---	---	---			
VdC*:												
Vebar	0-18	10-18	1.20-1.60	2.0-6.0	0.15-0.17	6.1-7.8	<2	Low	0.20	4	3	1-4
	18-30	10-18	1.20-1.60	2.0-6.0	0.15-0.17	6.1-8.4	<2	Low	0.20			
	30-60	---	---	---	---	---	---	---	---			
Daglum	0-6	10-25	1.20-1.50	0.6-6.0	0.13-0.15	5.6-7.3	<2	Low	0.32	3	6	2-4
	6-17	35-60	1.30-1.60	<0.2	0.12-0.14	6.1-9.0	2-8	High	0.32			
	17-50	36-60	1.50-1.70	<0.2	0.12-0.14	7.9-9.0	8-16	High	0.32			
	50-60	---	---	---	---	---	---	---	---			
WcE*:												
Wabek	0-4	10-18	1.10-1.50	2.0-6.0	0.20-0.22	6.6-7.8	<2	Low	0.28	2	5	1-2
	4-7	5-15	1.20-1.60	2.0-6.0	0.11-0.15	6.6-7.8	<2	Low	0.10			
	7-60	0-10	1.30-1.70	>20	0.02-0.04	7.4-8.4	<2	Low	0.10			
Cabba	0-4	10-27	1.30-1.50	0.6-2.0	0.16-0.20	6.6-8.4	<4	Low	0.32	2	4L	1-3
	4-16	20-35	1.30-1.50	0.6-2.0	0.14-0.18	7.4-9.0	2-8	Moderate	0.32			
	16-60	---	---	---	---	---	---	---	---			
WdE	0-4	35-40	1.10-1.50	0.2-0.6	0.18-0.23	7.4-9.0	<2	High	0.32	2	4L	.5-2
Wayden	4-11	35-50	1.10-1.50	0.06-0.2	0.14-0.19	7.4-9.0	<8	High	0.32			
	11-60	---	---	---	---	---	---	---	---			
We	0-5	27-35	1.15-1.30	0.2-0.6	0.16-0.19	7.4-8.4	<2	High	0.37	5	7	2-4
Wendte	5-60	45-55	1.20-1.40	0.06-0.2	0.11-0.17	7.4-8.4	<2	High	0.37			
Wn	0-5	27-35	1.15-1.30	0.2-0.6	0.16-0.19	7.4-8.4	<2	High	0.37	5	7	3-5
Wendte	5-60	45-55	1.20-1.40	0.06-0.2	0.11-0.17	7.4-8.4	<2	High	0.37			

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
AcD*:												
Amor	B	None	---	---	>6.0	---	---	20-40	Soft	Moderate	High	Moderate.
Cabba	D	None	---	---	>6.0	---	---	10-20	Soft	Moderate	High	Low.
Ba*. Badland												
Bk Bankard	A	Frequent	Brief	Mar-Jun	>6.0	---	---	>60	---	Low	High	Low.
Bn Bankard Variant	A	Frequent	Brief	Mar-Jun	3.0-6.0	Apparent	Mar-Jun	>60	---	Low	Low	Low.
Bo Banks	A	Frequent	Brief	Mar-Jun	>6.0	---	---	>60	---	Low	Moderate	Low.
BpB*:												
Bullock	D	None	---	---	>6.0	---	---	20-40	Soft	Low	High	High.
Parchin	D	None	---	---	>6.0	---	---	20-40	Soft	Low	High	Moderate.
BsC*:												
Bullock	D	None	---	---	>6.0	---	---	20-40	Soft	Low	High	High.
Slickspots.												
Parchin	D	None	---	---	>6.0	---	---	20-40	Soft	Low	High	Moderate.
CaE*:												
Cabba	D	None	---	---	>6.0	---	---	10-20	Soft	Moderate	High	Low.
Lantry	B	None	---	---	>6.0	---	---	20-40	Soft	Low	Moderate	Moderate.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
CcF*:												
Cabba	D	None	---	---	>6.0	---	---	10-20	Soft	Moderate	High	Low.
Rock outcrop.												
CkF*:												
Cohagen	D	None	---	---	>6.0	---	---	10-20	Soft	Moderate	Moderate	Low.
Rock outcrop.												
CoE*:												
Cohagen	D	None	---	---	>6.0	---	---	10-20	Soft	Moderate	Moderate	Low.
Vebar	B	None	---	---	>6.0	---	---	20-40	Soft	Low	Moderate	Low.
CrD*:												
Cohagen	D	None	---	---	>6.0	---	---	10-20	Soft	Moderate	Moderate	Low.
Vebar	B	None	---	---	>6.0	---	---	20-40	Soft	Low	Moderate	Low.
Bullock	D	None	---	---	>6.0	---	---	20-40	Soft	Low	High	High.
Ct	B	Rare	---	---	>6.0	---	---	>60	---	Low	High	Low.
Craft												
DaA	D	None	---	---	>6.0	---	---	>60	---	Moderate	High	Moderate.
Daglum												
DrB*:												
Daglum	D	None	---	---	>6.0	---	---	>60	---	Moderate	High	Moderate.
Rhoades	D	None	---	---	>6.0	---	---	>60	---	Low	High	Moderate.
DuC	D	None	---	---	>6.0	---	---	10-20	Soft	Low	High	Moderate.
Dupree												
EvB	B	None	---	---	>6.0	---	---	24-40	Soft	Low	High	Moderate.
Evridge												

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
FaA, FaB---------- Farland	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	High-----	Moderate.
Fv. Fluvaquents												
Gn---------- Glenross	D	Occasional	Very brief	Apr-Oct	0-1.0	Apparent	Oct-Jun	>60	---	High-----	High-----	High.
Gr---------- Grail	C	Frequent----	Very brief	Mar-Oct	3.0-5.0	Perched	Mar-Oct	>60	---	Moderate	High-----	Low.
Hc---------- Haverson	B	Occasional	Brief-----	May-Sep	>6.0	---	---	>60	---	Low------	High-----	Low.
He---------- Heil	D	None--------	---	---	+1-1.0	Apparent	Mar-Sep	>60	---	Moderate	High-----	Moderate.
Hn---------- Heil Variant	D	None--------	---	---	+2-1.0	Apparent	Nov-Oct	>60	---	Moderate	High-----	Low.
HpC*: Hisle----------	D	None--------	---	---	>6.0	---	---	20-40	Soft	Low------	High-----	Moderate.
Pierre----------	D	None--------	---	---	>6.0	---	---	20-40	Soft	Low------	High-----	Moderate.
HsB*: Hisle----------	D	None--------	---	---	>6.0	---	---	20-40	Soft	Low------	High-----	Moderate.
Slickspots.												
Ka---------- Korchea	B	Rare--------	---	---	>6.0	---	---	>60	---	Moderate	High-----	Moderate.
Kc---------- Korchea	B	Frequent----	Very brief to brief.	Mar-Jun	>6.0	---	---	>60	---	Moderate	High-----	Moderate.
KyB---------- Kyle	D	None--------	---	---	>6.0	---	---	>60	---	Low------	High-----	Moderate.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
LcD*:												
Lantry	B	None	---	---	>6.0	---	---	20-40	Soft	Low	Moderate	Moderate.
Cabba	D	None	---	---	>6.0	---	---	10-20	Soft	Moderate	High	Low.
LdD*:												
Lantry	B	None	---	---	>6.0	---	---	20-40	Soft	Low	Moderate	Moderate.
Cabba	D	None	---	---	>6.0	---	---	10-20	Soft	Moderate	High	Low.
Rhoades	D	None	---	---	>6.0	---	---	40-60	Soft	Low	High	Moderate.
LeD*:												
Lantry	B	None	---	---	>6.0	---	---	20-40	Soft	Low	Moderate	Moderate.
Korchea	B	Frequent	Very brief to brief.	Mar-Jun	>6.0	---	---	>60	---	Moderate	High	Moderate.
Cabba	D	None	---	---	>6.0	---	---	10-20	Soft	Moderate	High	Low.
Lh Lohler	C	Rare	---	---	>6.0	---	---	>60	---	High	High	Low.
Lk Lohler	C	Frequent	Brief	Apr-Sep	>6.0	---	---	>60	---	High	High	Low.
Ln Lohmiller	C	Rare	---	---	>6.0	---	---	>60	---	Low	High	Moderate.
Lo Lohmiller	C	Frequent	Brief	Mar-Sep	>6.0	---	---	>60	---	Low	High	Moderate.
PbB*:												
Parchin	D	None	---	---	>6.0	---	---	20-40	Soft	Low	High	Moderate.
Bullock	D	None	---	---	>6.0	---	---	20-40	Soft	Low	High	High.
PeB, PeC Pierre	D	None	---	---	>6.0	---	---	20-40	Soft	Low	High	Moderate.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
PmD*:												
Pierre	D	None	---	---	>6.0	---	---	20-40	Soft	Low	High	Moderate.
Samsil	D	None	---	---	>6.0	---	---	10-20	Soft	Low	High	Moderate.
Po*.												
Pits												
PrA Promise	D	None	---	---	>6.0	---	---	>60	---	Low	High	Low.
RaA, RaB Ree	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Low.
RbB, RbC Reeder	B	None	---	---	>6.0	---	---	20-40	Soft	Moderate	High	Moderate.
RcB*:												
Reeder	B	None	---	---	>6.0	---	---	20-40	Soft	Moderate	High	Moderate.
Daglum	D	None	---	---	>6.0	---	---	40-60	Soft	Moderate	High	Moderate.
RdC*:												
Reeder	B	None	---	---	>6.0	---	---	20-40	Soft	Moderate	High	Moderate.
Lantry	B	None	---	---	>6.0	---	---	20-40	Soft	Low	Moderate	Moderate.
ReC*:												
Reeder	B	None	---	---	>6.0	---	---	20-40	Soft	Moderate	High	Moderate.
Rhoades	D	None	---	---	>6.0	---	---	40-60	Soft	Low	High	Moderate.
Lantry	B	None	---	---	>6.0	---	---	20-40	Soft	Low	Moderate	Moderate.
RgB, RgC Regent	C	None	---	---	>6.0	---	---	20-40	Soft	Low	High	Moderate.
RhD*:												
Regent	C	None	---	---	>6.0	---	---	20-40	Soft	Low	High	Moderate.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
RhD*:												
Cabba	D	None	---	---	>6.0	---	---	10-20	Soft	Moderate	High	Low.
RmB*:												
Regent	C	None	---	---	>6.0	---	---	20-40	Soft	Low	High	Moderate.
Daglum	D	None	---	---	>6.0	---	---	40-60	Soft	Moderate	High	Moderate.
RnB*:												
Regent	C	None	---	---	>6.0	---	---	20-40	Soft	Low	High	Moderate.
Rhoades	D	None	---	---	>6.0	---	---	40-60	Soft	Low	High	Moderate.
RoA, RoB Reliance	C	None	---	---	>6.0	---	---	>60	---	Low	High	Low.
RrA*, RrB*:												
Rhoades	D	None	---	---	>6.0	---	---	>60	---	Low	High	Moderate.
Daglum	D	None	---	---	>6.0	---	---	>60	---	Moderate	High	Moderate.
RsB*:												
Rhoades	D	None	---	---	>6.0	---	---	>60	---	Low	High	Moderate.
Slickspots.												
RvA, RvB Ridgeview	D	None	---	---	>6.0	---	---	>60	---	Low	High	Moderate.
Rw*. Riverwash												
SaE Samsil	D	None	---	---	>6.0	---	---	10-20	Soft	Low	High	Moderate.
ScF*:												
Samsil	D	None	---	---	>6.0	---	---	10-20	Soft	Low	High	Moderate.
Rock outcrop.												

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
SgA, SgB---------- Savage	C	None--------	---	---	>6.0	---	---	>60	---	Low------	High-----	Low.
ShE*:												
Schamber---------	A	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate	Low.
Samsil-----------	D	None--------	---	---	>6.0	---	---	10-20	Soft	Low------	High-----	Moderate.
SkB*:												
Seroco-----------	A	None--------	---	---	>6.0	---	---	>60	---	Low------	Low------	Low.
Tally------------	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	High-----	Low.
So---------------- Shambo	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Low.
Sp*. Slickspots												
StA---------------- Stady	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Low.
SwB---------------- Swanboy	D	None--------	---	---	>6.0	---	---	>60	---	Low------	High-----	High.
SxC*:												
Swanboy----------	D	None--------	---	---	>6.0	---	---	>60	---	Low------	High-----	High.
Kyle-------------	D	None--------	---	---	>6.0	---	---	>60	---	Low------	High-----	Moderate.
SyB*:												
Swanboy----------	D	None--------	---	---	>6.0	---	---	>60	---	Low------	High-----	High.
Slickspots.												
TaA, TaB---------- Tally	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	High-----	Low.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
Tm---------- Trembles	B	Rare--------	---	---	>6.0	---	---	>60	---	Moderate	High-----	Low.
Tr---------- Trembles	B	Frequent----	Brief-----	Apr-Jun	>6.0	---	---	>60	---	Moderate	High-----	Low.
VbB, VbC---------- Vebar	B	None--------	---	---	>6.0	---	---	20-40	Soft	Low------	Moderate	Low.
VcC*:												
Vebar----------	B	None--------	---	---	>6.0	---	---	20-40	Soft	Low------	Moderate	Low.
Cohagen----------	D	None--------	---	---	>6.0	---	---	10-20	Soft	Moderate	Moderate	Low.
VdC*:												
Vebar----------	B	None--------	---	---	>6.0	---	---	20-40	Soft	Low------	Moderate	Low.
Daglum----------	D	None--------	---	---	>6.0	---	---	40-60	Soft	Moderate	High-----	Moderate.
WcE*:												
Wabek----------	A	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate	Low.
Cabba----------	D	None--------	---	---	>6.0	---	---	10-20	Soft	Moderate	High-----	Low.
WdE---------- Wayden	D	None--------	---	---	>6.0	---	---	10-20	Soft	Low------	High-----	Moderate.
We---------- Wendte	D	Rare--------	---	---	>6.0	---	---	>60	---	Low------	High-----	Low.
Wn---------- Wendte	D	Frequent----	Brief-----	Apr-Oct	>6.0	---	---	>60	---	Low------	High-----	Low.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Amor	Fine-loamy, mixed Typic Haploborolls
Bankard	Sandy, mixed, mesic Ustic Torrifluvents
Bankard Variant	Sandy-skeletal, mixed, mesic Ustic Torrifluvents
Banks	Sandy, mixed, frigid Typic Ustifluvents
Bullock	Fine-loamy, mixed Borollic Natrargids
Cabba	Loamy, mixed (calcareous), frigid, shallow Typic Ustorthents
Cohagen	Loamy, mixed (calcareous), frigid, shallow Typic Ustorthents
Craft	Coarse-silty, mixed (calcareous), mesic Ustic Torrifluvents
Daglum	Fine, montmorillonitic Typic Natriborolls
Dupree	Clayey, montmorillonitic, mesic, shallow Paralithic Vertic Ustochrepts
Evridge	Coarse-loamy, mixed Typic Natriborolls
Farland	Fine-silty, mixed Typic Argiborolls
Fluvaquents	Ustic Fluvaquents, (calcareous), mesic
Glenross	Fine-loamy, mixed, frigid Typic Natraqualfs
Grail	Fine, montmorillonitic Pachic Argiborolls
*Haverson	Fine-loamy, mixed (calcareous), mesic Ustic Torrifluvents
Heil	Fine, montmorillonitic, frigid Typic Natraquolls
Heil Variant	Fine, montmorillonitic (calcareous), frigid Typic Haplaquents
Hisle	Fine, montmorillonitic, mesic Ustollic Natrargids
Korchea	Fine-loamy, mixed (calcareous), frigid Mollic Ustifluvents
Kyle	Very fine, montmorillonitic, mesic Typic Torrerts
Lantry	Fine-silty, mixed (calcareous), frigid Typic Ustorthents
Lohler	Fine, montmorillonitic (calcareous), frigid Typic Ustifluvents
Lohmiller	Fine, montmorillonitic (calcareous), mesic Ustic Torrifluvents
Parchin	Fine-loamy, mixed Borollic Natrargids
Pierre	Very fine, montmorillonitic, mesic Typic Torrerts
Promise	Very fine, montmorillonitic, mesic Udic Chromusterts
Ree	Fine-loamy, mixed, mesic Typic Argiustolls
Reeder	Fine-loamy, mixed Typic Argiborolls
Regent	Fine, montmorillonitic Typic Argiborolls
Reliance	Fine, montmorillonitic, mesic Typic Argiustolls
Rhoades	Fine, montmorillonitic Leptic Natriborolls
Ridgeview	Fine, montmorillonitic Vertic Argiborolls
Samsil	Clayey, montmorillonitic (calcareous), mesic, shallow Ustic Torriorthents
Savage	Fine, montmorillonitic Typic Argiborolls
Schamber	Sandy-skeletal, mixed, mesic Ustic Torriorthents
Seroco	Mixed, frigid Typic Ustipsamments
Shambo	Fine-loamy, mixed Typic Haploborolls
Stady	Fine-loamy over sandy or sandy-skeletal, mixed Typic Haploborolls
Swanboy	Very fine, montmorillonitic, mesic Typic Torrerts
Tally	Coarse-loamy, mixed Typic Haploborolls
Trembles	Coarse-loamy, mixed (calcareous), frigid Typic Ustifluvents
Vebar	Coarse-loamy, mixed Typic Haploborolls
Wabek	Sandy-skeletal, mixed Entic Haploborolls
Wayden	Clayey, montmorillonitic (calcareous), frigid, shallow Typic Ustorthents
Wendte	Fine, montmorillonitic (calcareous), mesic Vertic Ustifluvents

Interpretive Groups

INTERPRETIVE GROUPS

(Dashes indicate that the soil was not assigned to the interpretive group)

Map symbol and soil name	Land capability	Range site	Windbreak suitability group*
AcD:			
Amor	IVe-1	Silty	6R
Cabba	VIe-11	Shallow	10
Ba Badland	VIIIs-2	---	---
Bk Bankard	VIe-8	Sands	7
Bn Bankard Variant	VIe-8	Shallow to Gravel	10
Bo Banks	VIe-8	Sands	7
BpB:			
Bullock	VIs-3	Thin Claypan	10
Parchin	IVe-12	Claypan	9
BsC:			
Bullock	VIs-3	Thin Claypan	10
Slickspots	VIIIs-3	---	---
Parchin	VIe-5	Claypan	9
CaE:			
Cabba	VIIe-7	Shallow	10
Lantry	VIIe-3	Thin Upland	10
CcF:			
Cabba	VIIe-7	Shallow	10
Rock outcrop	VIIIs-1	---	---
CkF:			
Cohagen	VIIe-4	Shallow	10
Rock outcrop	VIIIs-1	---	---
CoE:			
Cohagen	VIIe-4	Shallow	10
Vebar	VIe-6	Sandy	10
CrD:			
Cohagen	VIe-10	Shallow	10
Vebar	VIe-6	Sandy	6R
Bullock	VIs-3	Thin Claypan	10
Ct Craft	IIc-1	Loamy Terrace	1
DaA Daglum	IVs-2	Claypan	9
DrB:			
Daglum	IVs-3	Claypan	9
Rhoades	VIs-1	Thin Claypan	10

See footnote at end of table.

INTERPRETIVE GROUPS--Continued

Map symbol and soil name	Land capability	Range site	Windbreak suitability group*
DuC---------- Dupree	VIe-12	Dense Clay---------	10
EvB---------- Evridge	IVe-13	Sandy----------	5
FaA---------- Farland	IIc-2	Silty----------	3
FaB---------- Farland	IIe-1	Silty----------	3
Fv---------- Fluvaquents	VIIIw-1	---	---
Gn---------- Glenross	VIw-4	Saline Lowland-----	10
Gr---------- Grail	IIc-3	Loamy Overflow-----	1
Hc---------- Haverson	VIw-1	Loamy Overflow-----	1
He---------- Heil	VIs-1	Closed Depression	10
Hn---------- Heil Variant	VIIIw-1	---	---
HpC:			
Hisle----------	VIs-1	Thin Claypan-------	10
Pierre----------	IVe-4	Clayey----------	4C
HsB:			
Hisle----------	VIs-1	Thin Claypan-------	10
Slickspots--------	VIIIs-3	---	---
Ka---------- Korchea	IIc-1	Loamy Terrace------	1
Kc---------- Korchea	VIw-1	Loamy Overflow-----	1
KyB---------- Kyle	IIIe-4	Clayey----------	4C
LcD:			
Lantry----------	VIe-3	Thin Upland--------	10
Cabba----------	VIe-11	Shallow----------	10
LdD:			
Lantry----------	VIe-3	Thin Upland--------	10
Cabba----------	VIe-11	Shallow----------	10
Rhoades----------	VIs-1	Thin Claypan-------	10
LeD:			
Lantry----------	VIe-3	Thin Upland--------	10
Korchea----------	VIw-1	Loamy Overflow-----	1
Cabba----------	VIe-11	Shallow----------	10

See footnote at end of table.

INTERPRETIVE GROUPS--Continued

Map symbol and soil name	Land capability	Range site	Windbreak suitability group*
Lh Lohler	IIc-1	Loamy Terrace	1
Lk Lohler	VIw-1	Loamy Overflow	1
Ln Lohmiller	IIc-1	Loamy Terrace	1
Lo Lohmiller	VIw-1	Loamy Overflow	1
PbB: Parchin Bullock	 IVe-12 VIs-3	 Claypan Thin Claypan	 9 10
PeB Pierre	IIIe-4	Clayey	4C
PeC Pierre	IVe-4	Clayey	4C
PmD: Pierre Samsil	 VIe-4 VIe-12	 Clayey Shallow Clay	 4C 10
Po Pits	VIIIs-2	---	---
PrA Promise	IIIs-3	Dense Clay	4C
RaA Ree	IIc-2	Silty	3
RaB Ree	IIe-1	Silty	3
RbB Reeder	IIe-1	Silty	6R
RbC Reeder	IIIe-1	Silty	6R
RcB: Reeder Daglum	 IIe-1 IVs-3	 Silty Claypan	 6R 9
RdC: Reeder Lantry	 IIe-1 IVe-3	 Silty Thin Upland	 6R 8
ReC: Reeder Rhoades Lantry	 IIe-1 VIs-1 IVe-3	 Silty Thin Claypan Thin Upland	 6R 10 8
RgB Regent	IIe-1	Clayey	4C

See footnote at end of table.

INTERPRETIVE GROUPS--Continued

Map symbol and soil name	Land capability	Range site	Windbreak suitability group*
RgC---- Regent	IIIe-1	Clayey----	4C
RhD:			
Regent----	IVe-1	Clayey----	4C
Cabba----	VIe-11	Shallow----	10
RmB:			
Regent----	IIe-1	Clayey----	4C
Daglum----	IVs-3	Claypan----	9
RnB:			
Regent----	IIIe-1	Clayey----	4C
Rhoades----	VIs-1	Thin Claypan----	10
RoA---- Reliance	IIc-2	Silty----	3
RoB---- Reliance	IIe-2	Silty----	3
RrA:			
Rhoades----	VIs-1	Thin Claypan----	10
Daglum----	IVs-2	Claypan----	9
RrB:			
Rhoades----	VIs-1	Thin Claypan----	10
Daglum----	IVs-3	Claypan----	9
RsB:			
Rhoades----	VIs-1	Thin Claypan----	10
Slickspots----	VIIIs-3	---	---
RvA---- Ridgeview	IIIs-3	Clayey----	4C
RvB---- Ridgeview	IIIe-4	Clayey----	4C
Rw---- Riverwash	VIIIe-1	---	---
SaE---- Samsil	VIIe-8	Shallow Clay----	10
ScF:			
Samsil----	VIIe-8	Shallow Clay----	10
Rock outcrop----	VIIIs-2	---	---
SgA---- Savage	IIc-2	Silty----	3
SgB---- Savage	IIe-1	Silty----	3
ShE:			
Schamber----	VIIs-4	Very Shallow----	10
Samsil----	VIIe-8	Shallow Clay----	10

See footnote at end of table.

INTERPRETIVE GROUPS--Continued

Map symbol and soil name	Land capability	Range site	Windbreak suitability group*
SkB:			
Seroco	VIe-7	Sands	7
Tally	IIIe-8	Sandy	5
So	IIc-2	Silty	3
Shambo			
Sp	VIIIs-3	---	---
Slickspots			
StA	IIIs-2	Silty	6G
Stady			
SwB	VIs-5	Dense Clay	10
Swanboy			
SxC:			
Swanboy	VIs-5	Dense Clay	10
Kyle	VIe-4	Clayey	4C
SyB:			
Swanboy	VIs-5	Dense Clay	10
Slickspots	VIIIs-3	---	---
TaA			
Tally	IIIe-7	Sandy	5
TaB	IIIe-8	Sandy	5
Tally			
Tm	IIIe-7	Loamy Terrace	1
Trembles			
Tr	VIw-1	Loamy Overflow	1
Trembles			
VbB	IIIe-10	Sandy	6R
Vebar			
VbC	IVe-8	Sandy	6R
Vebar			
VcC:			
Vebar	IVe-8	Sandy	6R
Cohagen	VIe-10	Shallow	10
VdC:			
Vebar	IVe-8	Sandy	6R
Daglum	IVs-3	Claypan	9
WcE:			
Wabek	VIIs-4	Very Shallow	10
Cabba	VIIe-7	Shallow	10
WdE	VIIe-8	Shallow	10
Wayden			

See footnote at end of table.

INTERPRETIVE GROUPS--Continued

Map symbol and soil name	Land capability	Range site	Windbreak suitability group*
We---------- Wendte	IIIs-3	Clayey Overflow----	4C
Wn---------- Wendte	VIw-1	Clayey Overflow----	4C

* Soils in windbreak suitability group 10 are unsuited to windbreaks.

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