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Soils of South Dakota

F. C. Westin

D. D. Malo

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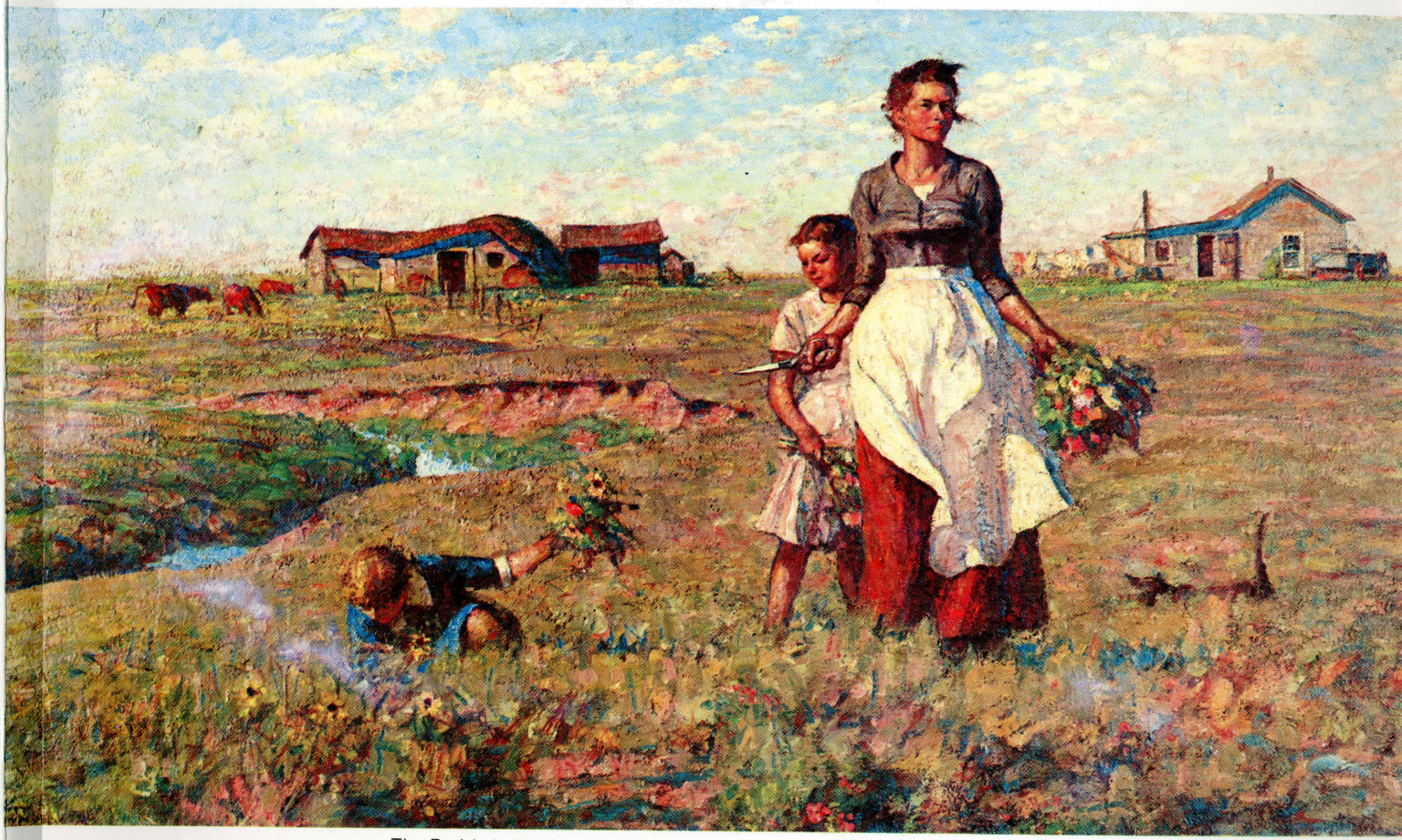

The Prairie Is My Garden by Harvey Dunn. Collection South Dakota Memorial Art Center, Brookings.

Plant Science Department
Agricultural Experiment Station
South Dakota State University, Brookings
In cooperation with the Soil Conservation Service, USDA

COVER: Harvey Thomas Dunn (1884-1952), born on a homestead farm near Manchester, South Dakota, distinguished himself as an illustrator, World War I combat artist, teacher, and painter of pioneer life on the Dakota prairies. *The Prairie Is My Garden,* a gift of Edgar Soreng to the South Dakota Memorial Art Center in Brookings, is considered to be Dunn's masterpiece. Color separations for the cover were loaned to the South Dakota State University Agricultural Experiment Station by North Plains Press, Aberdeen, S.D.

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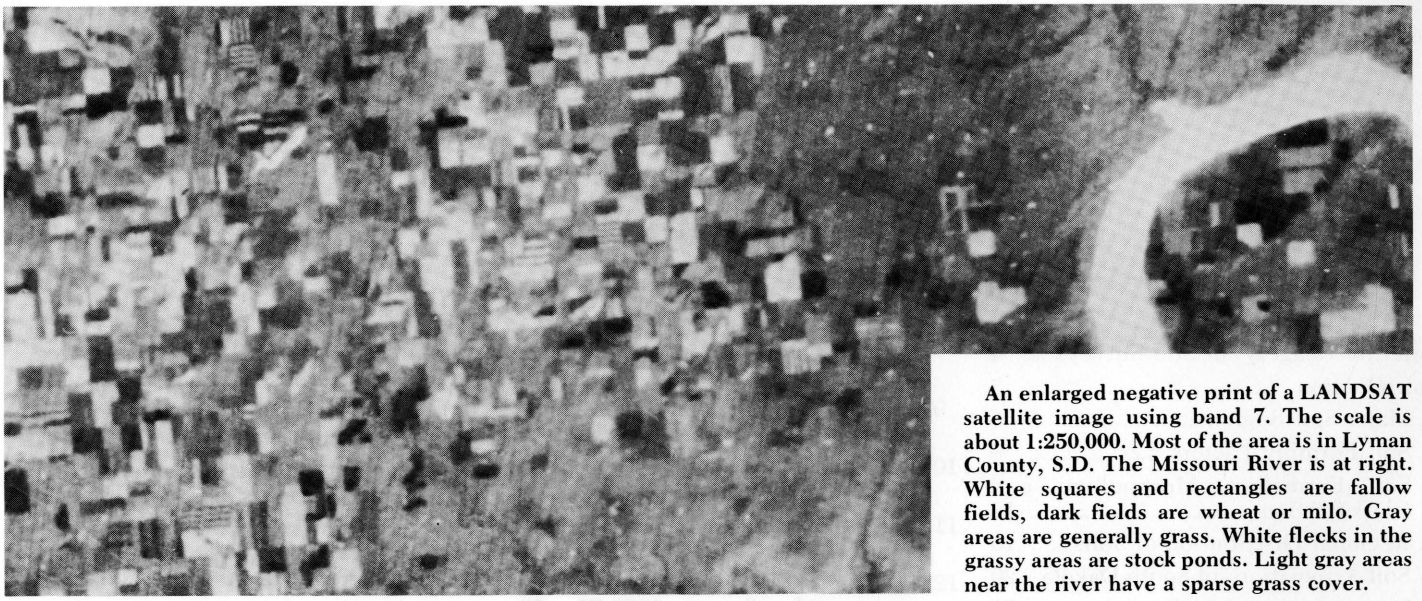

An enlarged negative print of a LANDSAT satellite image using band 7. The scale is about 1:250,000. Most of the area is in Lyman County, S.D. The Missouri River is at right. White squares and rectangles are fallow fields, dark fields are wheat or milo. Gray areas are generally grass. White flecks in the grassy areas are stock ponds. Light gray areas near the river have a sparse grass cover.

Satellite Imagery for Soil Surveys

Aerial photographs of the earth have been used as a soil survey tool since the 1930's. Since July of 1972, imagery of the earth from Earth Resources Technology Satellites (ERTS, now called LANDSAT) has been available. There now are three satellites in orbit. LANDSAT data are multispectral, temporal, synoptic, and near orthographic (see paragraphs below for details). Thus they have properties not generally available in photographs taken from airplanes. Limits of LANDSAT data include lower resolution than aircraft imagery, atmospheric attenuation and, since data are taken at fixed intervals, there is no chance of avoiding cloudy or stormy weather.

The LANDSAT satellite circles the globe in a near polar, sun-synchronous orbit at an altitude of 920 km (550 miles). Each satellite passes over the same area on the earth every 18 days. Although LANDSAT carries a Return Beam Vidicon camera, the principal source of data has been the multispectral scanner (MSS). The MSS records reflected energy from the earth in four distinct regions of the electromagnetic spectrum: band 4 is 0.5-0.6 um, band 5 is 0.6-0.7 um, band 6 is 0.7-0.8 um, and band 7 is 0.8-1.1 um. Thus band 4 corresponds approximately to the green-yellow-orange part of the electromagnetic spectrum, band 5 the red part, and bands 6 and 7 the reflected near infrared. A fifth band in the thermal range is on board the third satellite which was launched in March of 1978. Each LANDSAT scene covers an area on the ground subtended by a square 185 km (115 miles) on a side.

LANDSAT scenes are available in 9 x 9 inch transparencies and 70 mm chips. In addition, computer compatible tapes of each scene are available for each band. Either positive or negative contact and enlargement prints can be made from transparencies. In addition, false color composite transparencies can be prepared by registering and projecting two or more of the bands through appropriate color filters. Transparencies may be viewed directly over a light table or contact or enlargement color prints can be made. If a color additive viewer is available, each band can be projected and enlarged for a visual display to survey the appropriate combinations of bands and filters for the specific enhancement desired. Color transparencies can then be prepared of useful combinations.

The following characteristics of LANDSAT imagery have a bearing on use of the imagery in a soil survey program:

First, each scene covers such a large area that a *synoptic* view of soil associations is possible. An area of 3.5 million hectares (8 million acres) can be studied where sun angle, condition of soil, stage of vegetative growth and other features are recorded at nearly the same moment. The influence of climate and vegetation, soil parent material and topography on soils can be detected.

Second, the scenes are *near- ortho graphic*. Thus LANDSAT scenes join one another with very little distortion so that mosaics can be constructed. Moreover, LANDSAT scenes fit controlled base maps such as the USGS maps. Such maps, showing geologic, topographic, soils, cultural and other features, can be superimposed as transparencies over LANDSAT scenes.

Third, since LANDSAT passes occur at fixed intervals, scenes can be selected for the time of year best suited for soil survey. This *temporal* feature allows study of soils and vegetation as they change with time. Soil surveyors have had very little control as to flight scheduling for acquiring aerial photographs and have had to accept photographs taken usually in midsummer when the soils are mantled with vegetation.

Fourth, the data are recorded in distinct parts of the spectrum. This is a *multispectral* capability and since both soils and vegetation reflect differently in different parts of the electromagnetic spectrum, the use of the four bands increases the chances for unique signatures for identification of vegetation and soils.

Following are some publications available from the Plant Science Department that illustrate some uses of satellite imagery for soil survey:

1. LANDSAT data, Its Use in a Soil Survey Program, by F. C. Westin and C. J. Frazee, reprinted from Soil Science Society of America Journal Vol 40 No. 1 Jan-Feb, 1976.
2. AES Info Series No. 5 "ERTS (LANDSAT) Mosaic of South Dakota."
3. AES Info Series No. 7 "Soil Texture, Soil Slope and Soil Test Results on an ERTS (LANDSAT) Mosaic of South Dakota."
4. AES Info Series No. 8 "Soil Textures and Land Forms of Brookings County, South Dakota on ERTS-1 (LANDSAT) Imagery."
5. AES Info Series No. 10 "Land Use Interpreted from ERTS-1 (LANDSAT) Imagery" (Pennington County, South Dakota).
6. AES Info Series No. 12 "Soilscapes Interpreted from LANDSAT Imagery."

Soils of South Dakota

Frederick C. Westin, professor, and
Douglas D. Malo, assistant professor,
Plant Science Department
Agricultural Experiment Station;
South Dakota State University.

Introduction

When a state depends heavily upon agriculture for its livelihood, soil management becomes an especially important matter. Furthermore, the job a person does in management depends upon his knowledge of the soil's characteristics and qualities.

South Dakota is an agricultural state with an area of 77,047 square miles and a population density of about 9 persons to the square mile. Its 1975 cash receipts from farming totalled more than $2.3 billion. About 43% of this total came directly from crops, according to the South Dakota Crop and Livestock Reporting Service, 1976.

Here is how the state ranked nationally in 1975 in agricultural production: 2nd in oats, rye, and flaxseed; 3rd in durum wheat; 4th in other spring wheat; 6th in alfalfa seed, alfalfa hay, and all hay; 7th in barley; 11th in sorghum grain; and 12th in all wheat and wild hay (South Dakota Crop and Livestock Reporting Service, 1976).

These crops or their products, along with forage and pasture grown in the state, provide feed for large numbers of livestock. In 1975 South Dakota ranked 5th in all sheep and lambs, 6th in beef cows that have calved, 9th in all cattle and calves, 10th in cattle on feed, and 11th in pigs, sheep and lambs on feed, and cash receipts from livestock (South Dakota Crop and Livestock Reporting Service, 1976).

This production is possible because South Dakota has large areas of productive soils. However, soils in some areas are less productive. They may be less productive because of several reasons: excessive or poor drainage, overly sandy or clayey, claypans, salinity, or they occur in drier areas.

This publication describes in general the characteristics and qualities of soils recognized to date in South Dakota. It shows the distribution and areal extent of the state's soils. It is primarily for educational purposes. For specific purposes, such as farm planning, public land acquisition, flood control, and engineering uses, consult large scale county soil association maps, and detailed soil surveys. The County Extension Agent and the Soil Conservation Service Officer in your area have specific soil information.

A glossary of soil-related terms is included in the appendix. The appendices also include a map showing the progress of soil surveys in South Dakota, and a description of the soils on experimental fields, along with a tabular listing of research carried out at each site.

This publication is a contribution from the Department of Plant Science and the South Dakota Agricultural Experiment Station, South Dakota State University, Brookings 57007. Project Numbers H-728 and H-769. It is an adaptation from and an expanded revision of *Soils of South Dakota*, Soil Survey Series Number 3, July 1967.

1 Major Soil Regions

South Dakota is near the center of the great grassland area of mid-North America that once extended between the eastern and western forest regions. Except for the forested Black Hills and scattered cottonwoods and shrubs of the alluvial lands, South Dakota was a vast sea of grass for thousands of years before its soils were tilled.

This grassland environment and the accompanying subhumid to semiarid climatic environment are the two factors which have exerted the greatest influence on the development of the state's soils. Effects of parent material, relief, and time are also important soil forming factors that will be considered later.

Seven Regions

Climate and vegetation have interacted in South Dakota to produce seven major soil regions. These regions are named: Cool, Moist Forest (Typic Boralfs)[1]; Cool, Very Dry Plain (Aridic Borolls); Warm, Very Dry Plain (Aridic Ustolls); Cool Dry Plain (Typic Borolls); Warm Dry Plain (Typic Ustolls); Cool Moist Prairie (Udic Borolls); and Warm Moist Prairie (Udic Ustolls). See Figure 1.

The Cool Moist Forest Region, the Black Hills, is unique for South Dakota because the included soils have developed under forested conditions in a cool, humid climate. In the other regions soils have developed under grassland in climates ranging from moist subhumid to semiarid. In Figure 1, arrows indicate the general kind of soil profile which has developed on well-drained positions in each region.

Soils Reflect Climate

In South Dakota the lines of equal temperature and the lines of equal precipitation cross roughly at right angles. Relatively speaking, this makes the southeast warm and moist, the northeast cool and moist, the southwest warm and very dry, and the northwest cool and very dry.

One way in which the climate of the state is reflected in the soils is in the depth of leaching of carbonates. Figure 1 shows that the depth of leaching is greater in the more humid east than in the drier west and greater in the warmer south than in the cooler north.

Organic Matter Varies

Native grassland vegetation, which was greatly influenced by climate, has determined the amounts of organic matter in the soils. In general, the more humid eastern portion of the state supported tall grass stands that left relatively large amounts of organic matter in the soils. Moving westward, the grass type changed to mid- and finally to short grasses in response to the drier climate. This change was reflected in the lower contents of organic matter in the soils developed under drier climates.

Temperature also has played a part in determining the organic matter content of the soils. In the cooler northern part of the state more soil organic matter and total nitrogen were present than in the southern part under comparable precipitation. This is due to slower biological decomposition and chemical activity under cooler temperatures.

Organic matter and total nitrogen content of most soils in the state today are substantially lower than when the original prairie sod was plowed. These losses are generally about one-third of the total and apply about equally over the state. Therefore, present contents of organic matter and total nitrogen reflect the original amounts present but are about one-third lower. The approximate amounts of organic matter and total nitrogen now present in the acre-furrow slice of the typical, well-drained grassland soil in each region are presented in Figure 2.

Soil Colors Differ

Differences are apparent in the surface soil color in the various areas of the state. It is possible to determine soil colors scientifically by comparing them with specially prepared color charts. These charts are manufactured by the Munsell Company[2] and the color chips are arranged according to hue, value, and chroma — the three simple variables which combine to produce all colors. Hue is the dominant spectral color, value refers to the relative lightness of the color, and chroma is the relative purity or strength of the color.

The two variables which give the best measure of surface soil color differences among the six grassland soil regions are value and chroma of the moist soil. These data are given in Figure 3 (arrows are used to compare the regions).

Figure 3 shows that the darkest soils are in northeast South Dakota. These soils also have the lowest chroma. In Figure 2 it is seen that these soils have the highest organic matter and total nitrogen supplies of any region in the state. Figure 1 indicates that the climate for this region is cool-moist.

The soils of southwest South Dakota have the lightest color (highest value), are browner (highest chroma), and have less organic matter and total nitrogen than soils of the other regions. Figure 1 indicates that the climate here is warm and very dry. Thus it is that color value correlates well with total amounts of organic matter and nitrogen present.

Experimental data show that nitrogen release to plants is more a function of temperature than of precipitation. Thus the southern and western soils release nitrogen faster than the northern and eastern soils. Data show that in southeastern South Dakota slightly over 2% of the total nitrogen usually is released annually to plants. In northeastern South Dakota slightly less than 2% of the total nitrogen of the soils is released annually. The amounts of available nitrogen, therefore, appear to correlate well with chroma, being greatest for the highest chromas and least for the lowest chromas.

This brief outline of the climatic and vegetative environments of the soils of the state shows how these environments gave rise to major soil regions. In each region the typical well-drained soils are characterized by certain colors, depths of leaching of carbonates, and amounts of organic matter and total nitrogen. The soils within each of the major regions are further subdivided into soil associations on the basis of texture, drainage, and profile charcteristics, including the presence of claypans and salts. To account for these soil differences it is necessary to discuss in more detail the environmental factors of soil formation as they operate across the state.

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[1] Names in parenthesis are technical soil taxonomic names which are described in *Soil Taxonomy* (Soil Survey Staff, 1975).

[2] Trade names are included for the benefit of the reader and do not imply endorsement or preferential treatment of the named product by South Dakota State University or the South Dakota Agricultural Experiment Station.

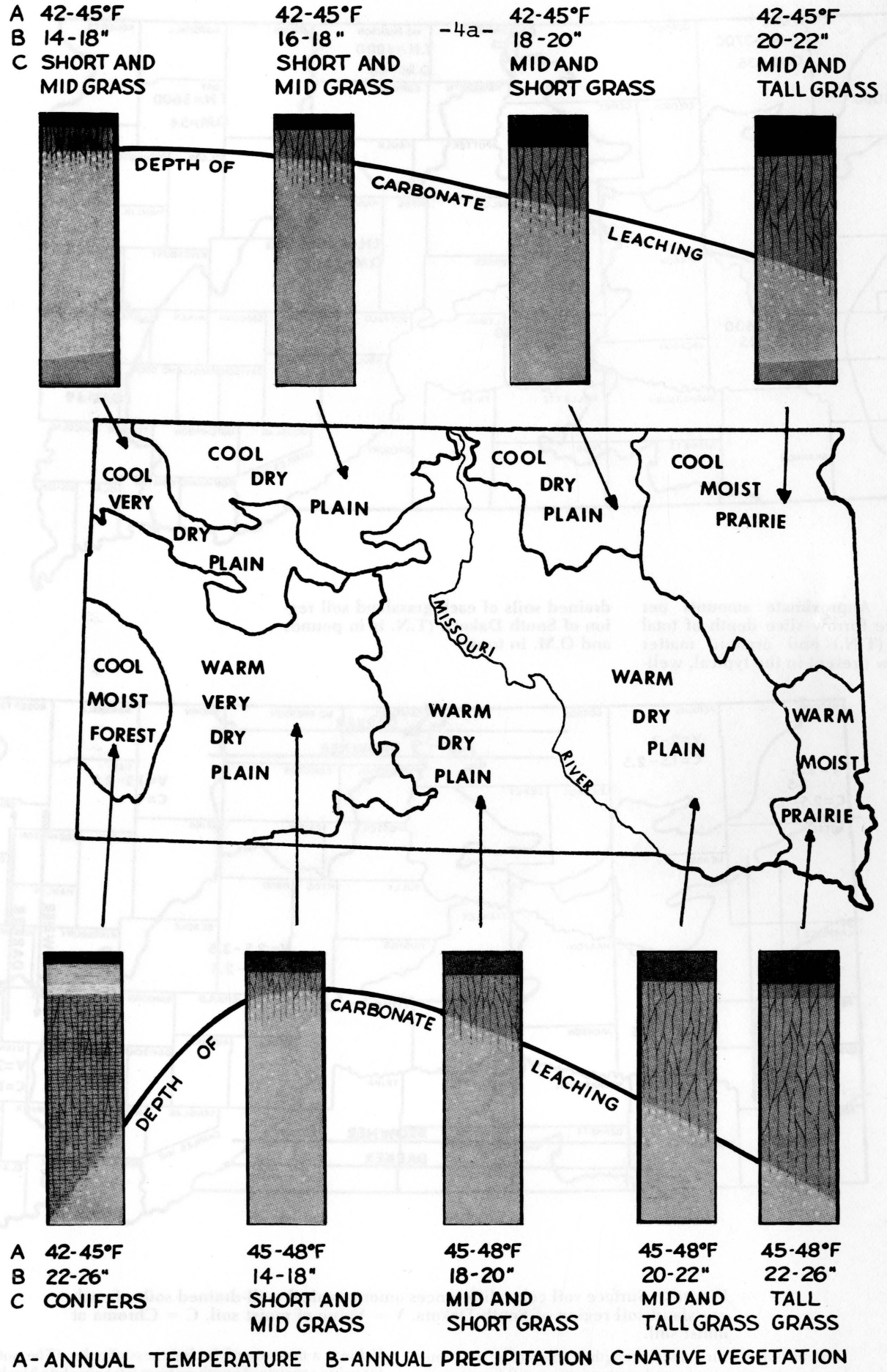


Figure 1. Relationships among climate, vegetation, and soils in South Dakota.

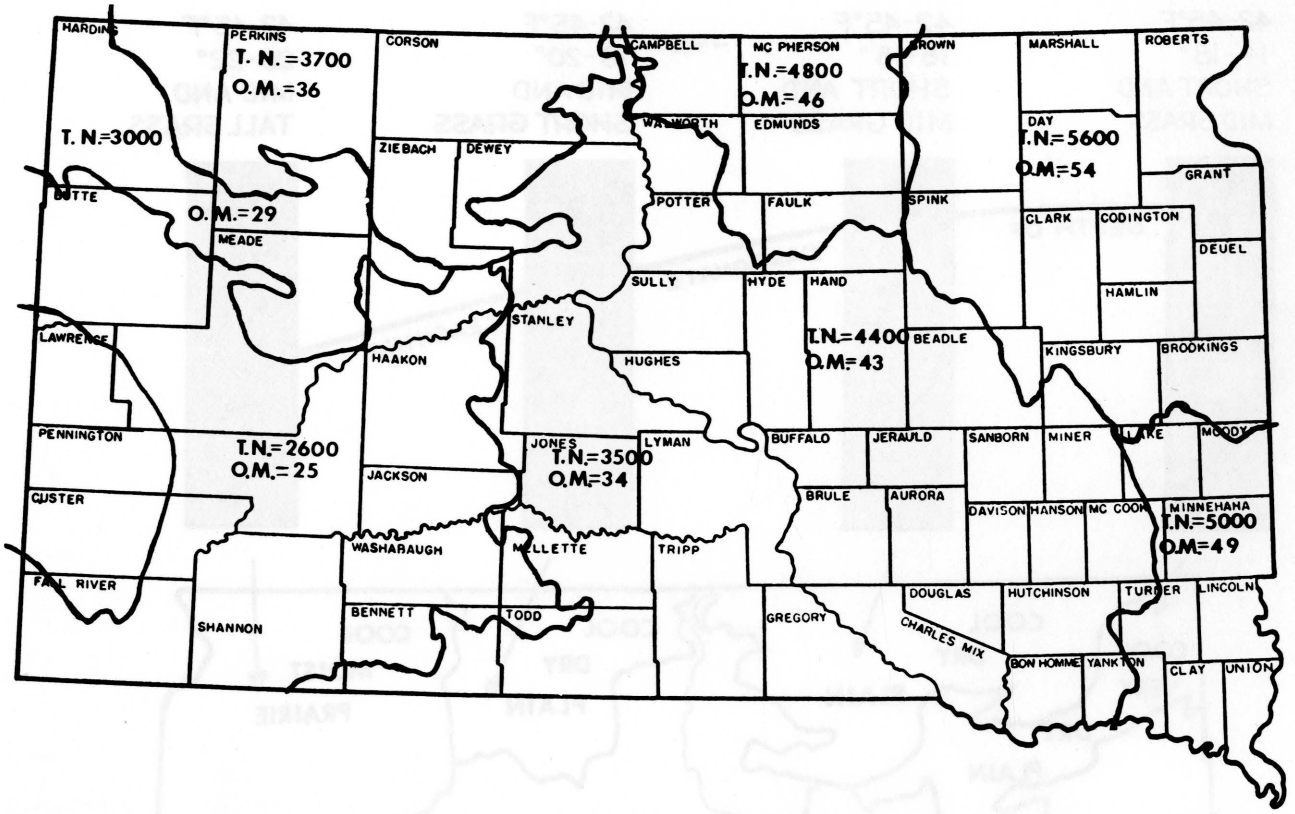


Figure 2. Approximate amounts per 6-inch acre furrow slice depth of total nitrogen (T.N.) and organic matter (O.M.) now present in the typical, well-drained soils of each grassland soil region of South Dakota. (T.N. is in pounds and O.M. in tons).

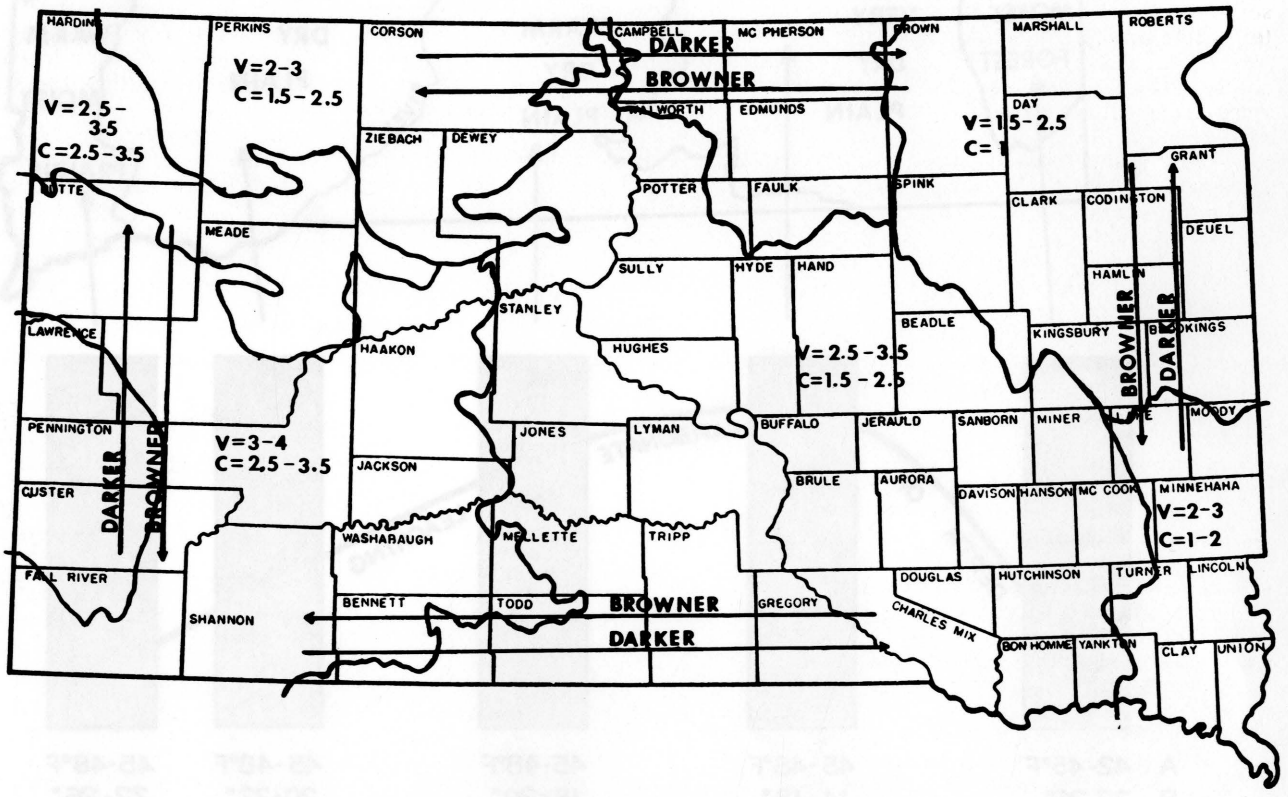


Figure 3. Surface soil color differences among typical well-drained soils of each grassland soil region of South Dakota. V = Value of moist soil. C = Chroma of moist soil.

Chroma is a measure of the strength of color. (The notation for chroma consists of numbers beginning at 0 for neutral grays and increasing at equal intervals to a maximum of about 20 which is never really approached in soils.)

Value is a measure of the lightness of color. (The notation for value consists of numbers from 0 for absolute black to 10 for absolute white.)

2 Soil Forming Factors

The kind of soil that develops in any area is the result of interaction of five soil forming factors: climate, vegetation or organisms, parent material, relief, and time.

Climate controls the distribution of vegetation. Together climate and vegetation often are called the active factors of soil formation. This is because on gently undulating topography within a certain climatic and vegetative zone a characteristic or climax soil will develop unless parent material differences are great. Thus the tall and mid-grass prairie soils have developed across a variety of parent materials.

The factor of parent material exerts its influence on soils principally by determining their texture and to a great extent their mineralogical composition. In soil taxonomy, climate and vegetation tell what *order*, *suborder*, and *great group* a soil is in. Parent material, to a large extent, determines the soil's *family*, and *series* (Soil Survey Staff, 1975). For example, tall grass prairie soils developed from glacial till are classified in the Vienna series, while tall grass prairie soils developed in thin loess overlying glacial till are classified in the Kranzburg series.

The factor of relief exerts its greatest influence by determining what drainage a soil will have. Steep slopes have excessively drained, thin soils; flat or depressed topographic areas usually have poorly drained, thick soils. The mature, typical, well-drained grassland soils develop only on undulating relief where climate and vegetation are given full expression.

The factor of time in soil formation can be illustrated by comparing a soil on a flood plain which receives annual increments of alluvium with a soil on a terrace. The former is without horizons although it may have strata of contrasting alluvium, while the latter usually has an ABC horizon sequence. Actually much work needs to be done in South Dakota to assess the importance of time in soil formation.

Details of these five soil forming factors as they affect soil development in South Dakota will now be considered.

Climate

South Dakota, because of its inland position, has a continental climate with extremes of summer heat, winter cold, and rapid fluctuations of temperature. Temperatures during the winter months often drop to -20°F (metric equivalents of all English units of measurement used in this publication are given in the appendix) or lower while in the summer readings of 100°F or more are common in most areas of the state. Cold fronts moving across the state may cause temperatures to drop 40° to 60°F in 24 hours. The warmest recorded temperature in South Dakota was 120°F at Gann Valley on July 3, 1936 while the coldest was -58°F at McIntosh on February 17, 1936 (Spuhler, Lytle, and Moe, 1971). The average annual temperature is 46°F and ranges from 48°F in the south to less than 44°F in the north (see Figure 4).

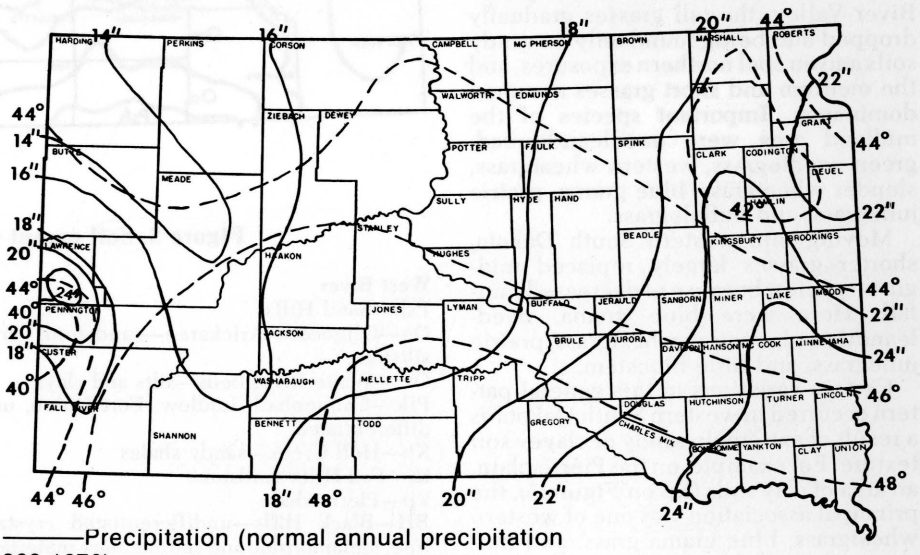
Annual precipitation ranges from 24 to 25 inches in the southeastern part to less than 14 inches in the northwestern part (see Figure 4). Most precipitation is in spring and early summer. Approximately 75% of the total annual precipitation falls when temperatures are ideal for plant growth. The fall, winter, and spring moisture falls mostly as frontal precipitation. It is the result of condensation as warm moist air from the Gulf of Mexico overrides heavier polar air masses. Much of the summer precipitation comes as short hard showers of the convectional thundershower type. In eastern South Dakota, June normally has the most thunderstorms; in western South Dakota most of them normally come in July.

Seasonal snowfall averages about 30 to 50 inches in the lower elevations of the state to over 100 inches in the Black Hills. Annual snowfall amounts vary widely. For example, in 1930-31 Canton in Lincoln County, only received 2.2 inches of snow but in 1961-62 recorded more than 100 inches. Highest annual snowfall recorded outside the Black Hills was 109.8 inches in 1936-37 at Aberdeen. In the Black Hills annual snowfalls in excess of 160 inches are common (Spuhler, Lytle, and Moe, 1971).

Average depth of frost penetration ranges from about 25 inches in southwestern South Dakota to 50 inches in the northeastern part. Depth of frost depends to a large degree on the amount and timing of snowfalls in relation to winter temperature extremes.

For the area excluding the Black Hills the average last-spring-frost date is about May 5 in the southeast to May 20 in the northwest. Average date for the first fall frost is September 15 in the northwest to October 5 in the southeast. Average length of time without killing frost varies from 120 days along the northern part of the state to 160 days in the southeastern part. The Black Hills area generally has shorter growing seasons than the rest of

Figure 4. Average annual precipitation and air temperature for South Dakota.



———Precipitation (normal annual precipitation 1900-1970)

— — — Average annual air temperature (1900-1970)

Source: National Weather Service, N.O.A.A.

the state, with average of frost-free days ranging from 110 to 130 days.

During cold seasons winds are from the northwest, and are from the southeast during the warm season. Annual average surface wind velocity for the state is 10 to 12 miles an hour.

The average number of clear days per year is 120 to 140. Partly cloudy days per year average 100 to 130 and cloudy days average 100 to 120. Normal annual number of hours of sunshine is about 2,850 in the southwestern part of the state to 2,700 in the northeastern part.

It is possible to evaluate the climatic factor in South Dakota in relation to that of the United States by classification according to a national scheme. Several schemes may be used, but the system of Thornthwaite (1948) classifies the climate of South Dakota as follows: (referring to Figure 1) Moist subhumid— eastern South Dakota (approximates the Cool Moist Prairie and the Warm Moist Prairie regions); Dry subhumid— central South Dakota (approximates the Cool Dry Plain and the Warm Dry Plain regions); and Semiarid— western South Dakota except for the Black Hills (approximates the Cool, Very Dry Plain and the Warm, Very Dry Plain regions). The Black Hills climate ranges from dry subhumid to humid.

Native Vegetation

Except for the Black Hills, which are timbered, and the river valleys where trees and brush grew, the native vegetation of South Dakota was originally grassland (Weaver, 1954; Weaver and Albertson, 1956).

Starting with the eastern border of the state and extending to the eastern edge of the James River Valley, the principal association was one of tall grasses. Big bluestem, sand dropseed, and switchgrass were present along with upland and lowland forbs.

Moving westward across the James River Valley, the tall grasses gradually dropped out, being found only on sandy soils and on cool northern exposures, and the medium and short grasses assumed dominancy. Important species of the midland area were needleandthread, green needlegrass, western wheatgrass, slender wheatgrass, blue grama, prairie junegrass, and buffalograss.

Moving into western South Dakota, shorter grasses largely replaced midgrass species, because of decreased rainfall. Here were blue grama, needleandthread, western wheatgrass, prairie junegrass, and little bluestem.

Certain variations in this general pattern occurred in western South Dakota as a result of extremely sandy or clayey soil texture. For example, on the Pierre plain, an area of clay soils (Kp on Figure 5), the principal association was one of western wheatgrass, blue grama grass, and buffalograss. In the sand hills (Psh on Figure 5) of southwestern South Dakota an important association was little bluestem, prairie sandreed, and needleandthread.

Parent Material

The kinds of soil parent material in South Dakota are shown in Figure 5. This map was generalized from maps by Flint (1955) and Rothrock (1943).

As this map illustrates, soils of the state have developed from a large variety of materials. They include ancient crystalline rocks in the central Black Hills, sedimentary rocks including shale, sandstone, and limestone in western South Dakota, and glacial materials of several ages in eastern South Dakota. Additional parent materials include loess, alluvium, and colluvial materials formed from upland deposits. As soil development is extremely slow on crystalline rocks and as few South Dakota soils have been recognized as having been developed from them, they will not be further discussed.

Sedimentary Rocks. Sedimentary rocks formed by consolidation and cementation of sand, silt, clay and other clastic material, and the precipitation from solution of the carbonates of calcium and magnesium. All of this took place on the floors of ancient seas.

The sands formed sandstone, the silts and clays formed siltstone and shale, and the basic carbonates formed limestone. Few of these rocks in South Dakota are pure—instead they are calcareous sandstones, sandy limestones, and so on. The principal sedimentary rock parent materials include: (1) Pierre shale of the central part of the West River area; (2) upper Cretaceous sandstones and sandy shales of the northern part of the West River area; and (3) Tertiary sandstones and siltstones of the southern part of the West River area.

The *Pierre shale* area is sometimes called the "gumbo region" because of the plastic clay which weathers from the shale. Strata of the Pierre shale are soft and easily eroded. They generally are not butte-formers, rather they weather into soft rounded hills and ridges with convex tops. The Pierre clay and Samsil clay are soil series developed from Pierre shale.

Some sedimentary beds in the Pierre Shale area (the Pierre, Niobrara, and Morrison formations) occasionally have high amounts of selenium associated with them (Kubota and Allaway, 1972). These three geologic formations are not uniformly seleniferous throughout their range of occurrence. High selenium levels in plants grown in soils which have developed from seleniferous

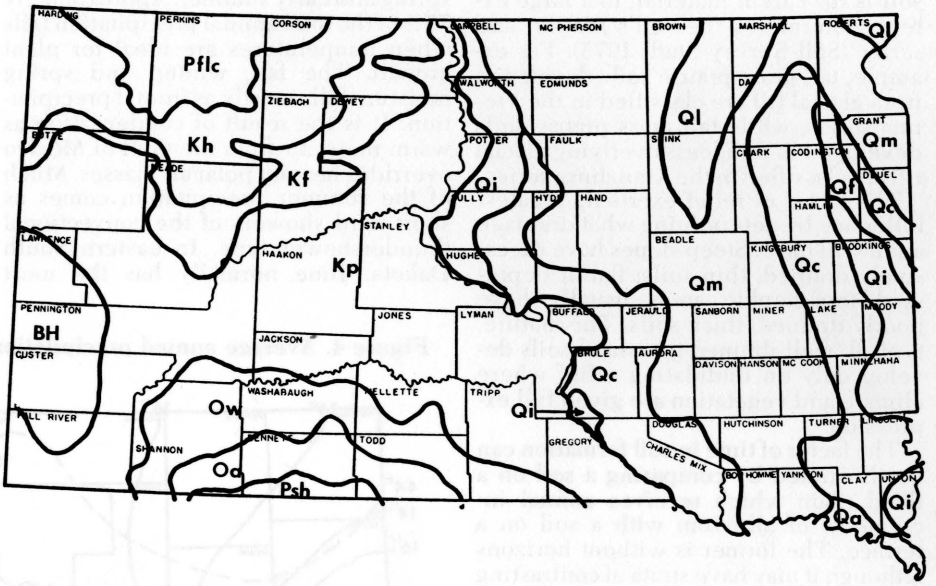


Figure 5. Soil parent materials in South Dakota.

West River

Psh—Sand Hills
Oa—Oligocene-Arickaree—sandstone and siltstone
Ow—White River beds—silts and clays
Pflc—Cannonball, Ludlow, Fort Union, undifferentiated
Kh—Hell Creek—sandy shales
Kf—Fox Hills sandstone
Kp—Pierre shale
BH—Black Hills—undifferentiated crystalline, metamorphic and sedimentary materials

East River

Qa—Alluvium
Ql—Glacial Lake Basin—silts, clays, sands
Qm—Late Wisconsin glacial drift—loam till
Qc—Late Wisconsin glacial drift—loam till, patchy silts (Stagnant ice moraine)
Qt—Early Wisconsin glacial drift—loam till, thin loess
Qi—Early Wisconsin glacial drift—usually thick loess

sedimentary beds can cause harmful effects to livestock and humans.

Upper Cretaceous sandstones and sandy shales of northwestern South Dakota give rise to a great variety of soil textures. The sandstones weather to sandy soils and the shales which contain admixtures of silts and sands are parent materials for sandy loams, loams, clay loams, silty clay loams, silty clays, and clays. The dominant textures are sandy loams and loams. Morton silt loam, Ralph loam, and Vebar sandy loam are soil types mapped in this area.

Tertiary sandstones and siltstones of southwestern and south central South Dakota form sandy and silty soils. The sandy materials on the south are an extension of the Nebraska Sand Hills. Going north the materials progressively have higher silt and clay increments. Some of the strata in this area and also some of those of the Upper Cretaceous area in northwestern South Dakota form benches, plateaus, and buttes because they are more resistant than other associated beds to weathering, erosion, and stream cutting.

Pleistocene Geology. Pleistocene is the name given to events of glaciation. Glacier ice entered the state from the northeast or north and flowed south and west, the western margin of glaciation being the Missouri River. As the ice moved over the preglacial surface it filled valleys, planed off hills, forced the cutting of new valleys, piled up large ridges, and otherwise changed the preglacial topography.

The character of the rocks of the preglacial surface determined, to a large extent, the composition of the glacial deposits formed from them. This is because most glacial deposits consist of altered rocks of local origin.

Glacial deposits cover South Dakota east of the Missouri River. Geologic evidence (Flint, 1955) consisting of a boulder line of glacial stones shows that an early glacier pushed into western South Dakota 30 to 50 miles west of the present course of the Missouri River. Subsequent geologic erosion has removed this West River glacial drift except for scattered boulders and a few isolated patches of glacial till. Soil parent materials in this belt principally are sedimentary in origin.

Glacial deposits are divided physically in to four groups: till, outwash, glacial lake deposits, and ice contact stratified drift. All are present in eastern South Dakota as soil parent materials.

Till, which is the most abundant, is a mixture of all size particles. It is thought to have been deposited from the under part of the flowing ice. Barnes, Houdek, and Vienna are soil series developed from till.

Outwash was deposited by melt water as it flowed away from the ice and consists principally of mixed gravel and sand, usually crossbedded. Ordinarily the outwash material is overlain by alluvium, as in the case of the Fordville soils; or loess, as in the case of the Estelline soils.

Glacial lake deposits, called lacustrine materials, consist of parallel-bedded silt and clay with small admixtures of sand. They were formed in depressions or basins temporarily blocked by glaciers and filled with ponded water. The Beotia, Harmony, Sinai, and Aberdeen are soil series developed in these deposits.

Ice contact stratified drift accumulated upon or against melting glacier ice. It occurs as knobs or small convex hills usually in rough terrain. In South Dakota the Sioux series, which is associated with the Buse series, is an example.

Loess and Other Wind-deposited Sediments. *Loess* is a nonglacial deposit of wind blown and deposited particles of silt size. The loess in South Dakota came from mixing of silt from nonglacial deposits to the west with silt which was blown out or deflated from outwash bodies and even from the till itself as the glaciers melted. The loess may consist of thin veneers to deposits 30 or more feet in thickness. Moody, Nora, Keith, and Trent are soil series developed in these deposits.

Strictly speaking, loess refers to particles of silt size. Sandy and silty clay loam materials, also carried and deposited by the wind are called respectively *eolian sand* and *eolian silty clay loam.* They also are important South Dakota soil parent materials. Distribution of these wind-deposited sediments is shown in Figure 5 along with other soil parent materials of South Dakota. (See definition of *soil separates* in Glossary for dimensions of soil particles).

Alluvium. Alluvium consists of stream-laid deposits of gravel, sand, silt, and clay, generally interbedded and almost always mixed. Generally, the alluvium of the West River is clayey in texture while that of the East River is mostly loamy.

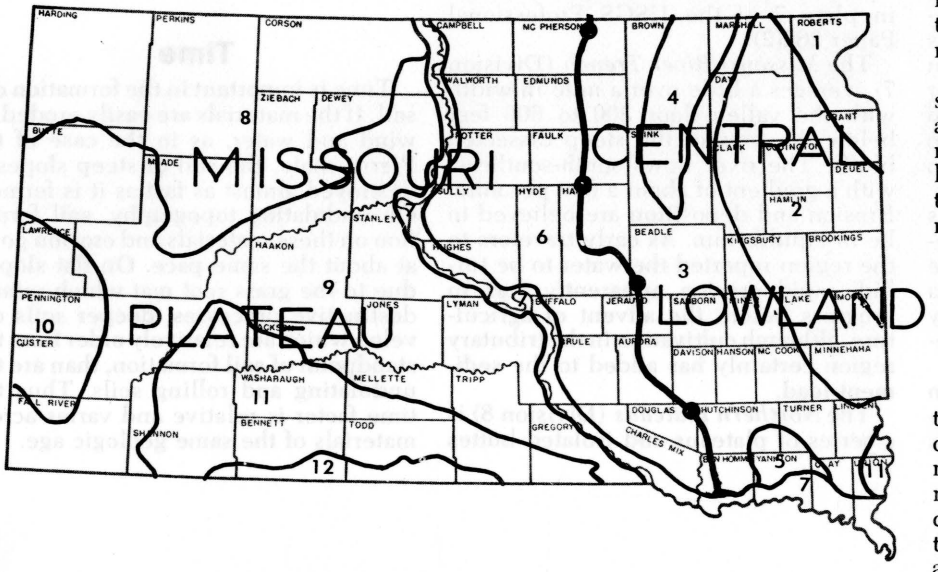


Figure 6. Physical divisions of South Dakota.

1. Minnesota River—Red River Lowland
2. Coteau des Prairies
3. James River Lowland
4. Lake Dakota Plain
5. James River Highland
6. Coteau du Missouri
7. Missouri River Trench
8. Northern Plateaus
9. Pierre Hills
10. Black Hills
11. Southern Plateaus
12. Sand Hills

Source: Flint, R. F. Prof. Paper 262, USGS, 1955.

Relief and the Physical Divisions

Relief. Relief, as used here, refers to the lay-of-the-land. It may be level, undulating, rolling, hilly, rough broken, or mountainous. It may be smooth with a network of small streams, or it may be choppy with many closed basins dotting the landscape. Relief usually varies from acre to acre so it is difficult to show on small-scale soil association maps. However any particular area usually is dominated by certain relief characteristics. For example, most of the Black Hills area is mountainous while most of the glacial Lake Dakota Plain in Spink and Brown Counties is level.

Physical Divisions of South Dakota. This section and the map (Figure 6) describe natural land forms of South

Dakota as classified by Fenneman (1938) and Rothrock (1953) and revised by Flint (1955). The most significant physical boundary is that separating the Central Lowland from the Missouri Plateau (heavier line on Figure 6). As can be noted from the soil association map, this line lies in the Cool Dry Plain and the Warm Dry Plain areas.

The *Minnesota River-Red River Lowland* (Division 1, Figure 6) is a broad, gently undulating, valley-like area with an elevation of 900 to 1,100 feet above sea level. Browns Valley, Minnesota, situated midway between Lake Traverse and Big Stone Lake, is the "East-West" continental divide between drainage to the Arctic Ocean and to the Gulf of Mexico. The northeastern slope of the Coteau des Prairies rises sharply nearly 1,000 feet to form the western limit of this lowland.

The *Coteau des Prairies* (Division 2) is a highland area between the Minnesota-Red River Lowland and the James River Lowland to the west. It slopes gently to the south and west. Its eastern and western slopes are steep at the northern end and taper off on the south. Elevations range from 2,000 feet above sea level on the north to about 1,600 on the south. It is drained to the south by the Big Sioux River, whose tributary streams enter mainly from the east. West of the Big Sioux River, the surface of the Coteau is dotted with lakes, while very few lakes occur east of the river.

The *James River Lowland* (Division 3) is a gently undulating plain lying considerably lower than the Coteau des Prairies on the east and the Coteau du Missouri on the west. The James River drains through the area from north to south and occupies a rather narrow steep sided valley. Elevations range from 1,300 to 1,400 feet above sea level.

The *Lake Dakota Plain* (Division 4) is the nearly level surface formed by deposition of sediment when glacial Lake Dakota was ponded with water. The area is sandy at the northern end and of a silty clay loam and silty clay texture elsewhere.

The *James River Highlands* (Division 5) consist of a group of three ridges located at the southern end of the James River Lowland. They are remnants of former stream divides. From east to west, these highlands are Turkey Ridge, James Ridge, and Yankton Ridge.

Turkey Ridge, the largest of the three, is more than 40 miles long, 10 miles wide, and stands more than 300 feet higher than the surrounding country. Below the mantle of glacial drift is bedrock consisting of the Niobrara chalk, overlain in places by the Sharon Springs member of the Pierre shale (Flint, 1955). These strata are exposed in the Canyon of Turkey Creek; other exposures are rare, as the drift mantle is 30 to 200 feet thick.

Yankton Ridge forms the northern bluff of the Missouri River Valley from Yankton westward for 15 miles. Below the drifts its core is Niobrara chalk, overlain by Pierre shale.

James Ridge, located west of the James River and a few miles above its mouth, is only 9 miles long, 1½ miles wide, and 100 to 260 feet high. Like the other two ridges, it is underlain by shale over chalk.

The *Coteau du Missouri* (Division 6) is part of the Missouri Plateau of the Great Plains province, separated from the main body of the Missouri Plateau by the Missouri River. This highland area is covered with glacial deposits and underlain by Pierre shale and older formations. Several broad shallow sags traverse the coteau, which mark positions of former stream valleys of eastern continuations of the Grand, Moreau, Cheyenne, Bad, and White Rivers. These sags are shown in plate 7 of the USGS Professional Paper 262(2).

The *Missouri River Trench* (Division 7) averages a little over a mile in width with the valley floor 300 to 600 feet below the tops of the steep dissected bluffs. The river flows south-southeast with a gradient of about a foot per mile. Erosion and deposition are believed to be in equilibrium. As early travelers to the region reported the water to be turbid, rapid erosion apparently was in progress before the advent of agriculture, although cultivation in the tributary region certainly has added to the sediment load.

The *Northern Plateaus* (Division 8) is a series of plateaus and isolated buttes underlain by the Fox Hills sandstone and younger Cretaceous strata. They range in elevation from 2,000 to over 3,000 feet above sea level.

The *Pierre Hills* (Division 9) consist of a series of smooth hills and ridges with rounded tops. The region is underlain by the Pierre shale formation and has lower elevations (1,800 to 2,800 feet) than the plateau country which rims it to the north and south.

The *Black Hills* (Division 10) is a region of mountainous terrain consisting of a series of upturned sedimentary strata, called hogbacks, arranged concentrically around a core of ancient crystalline rocks. Elevations range from 3,200 feet to above 7,000 feet.

The *Southern Plateaus* (Division 11) are divided into two regions. The large area to the southwest consists of a series of benches and buttes, underlain by Tertiary sandstones, siltstones, and shale. Elevations range from 2,800 to 3,600 feet. The Badlands comprise the northwestern part. The second area occurs in southeastern South Dakota principally in Union County. This is a stream-dissected highland underlain by a thick mantle of loess. Elevations range from 1,200 to 1,500 feet.

The *Sand Hills* (Division 12) is an extension of the Sand Hills region of Nebraska. It consists of a series of rounded hills interspersed with low, swampy areas, the whole region being underlain by eolian sand. Elevations range from 3,000 to 3,600 feet.

Time

Time is important in the formation of a soil. If the materials are easily eroded by wind and water, as in the case of the Pierre shale, the soil of steep slopes is destroyed almost as fast as it is formed. On undulating topography, soil formation on these materials and erosion go on at about the same pace. On flat slopes, due to the grass root mat which retards destructive processes, deeper soils develop which are relatively older from the standpoint of soil formation, than are the undulating and rolling soils. Thus the time factor is relative and varies across materials of the same geologic age.

3 Soil Formation, Morphology and Classification

Soil Formation

Soils develop through a series of changes. The starting point is freshly accumulated rock material. Weathering releases simple compounds which serve as food for bacteria and fungi. These simple forms of life lived and died by the millions. Their bodies decayed in the rock debris and thus organic matter began accumulating.

Gradually the developing soil was able to support higher forms of plant and animal life. The present accumulation of soil organic matter is due principally to the activity of these higher forms of plant life. As they grow, upper layers of the loose mass of parent materials slowly change as organic matter accumulates and leaching takes place. This development of layers is the beginning of the soil profile.

Soil Morphology

The morphological features of a soil, which can be seen on the wall of a fresh road cut, consist of a succession of layers or horizons in a vertical section down through the soil. In most soil profiles the horizons are separated by transitional zones, although some of the profiles have sharply defined boundaries between horizons.

Horizons. The uppermost layer is the A horizon, commonly called the surface soil; the second horizon is the B horizon, commonly called the subsoil; and the third is the C horizon, often called the parent material. The upper part of the C horizon of many soils is enriched with lime leached from the A and B horizons. This lime enriched layer is called the horizon of lime accumulation and is designated Cca; the symbol "ca" refers to a zone of calcium carbonate enrichment.

The major A, B, and C horizons may be subdivided by using Arabic numerals such as A1 and A2. The principal horizons, Arabic numerals, and symbols used in South Dakota are A1 (the horizon of maximum organic accumulation), A2 (a light-gray leached layer in claypan and forest derived soils), B2 (the horizon of maximum profile development), and Cca.

All of these horizons do not occur in all soils. Many soil profiles may have horizons other than those discussed. Consult the *Soil Survey Manual* for a more complete discussion on horizonation in soils (USDA-SCS Staff, 1951). The A and B horizons, the horizon of lime accumulation, and the upper part of the parent material ordinarily occur within a depth of 5 feet.

Formation Processes. The steps of soil formation include the accumulation of parent material, the addition of organic matter, and the differentiation of a soil profile. They occur in every soil. The processes operating in each of the three steps differ, however, from place to place. If the parent material is sandy, the soil developed in it has different properties than a soil developed in clay. Similarly, soils developed in different climatic regions or under different vegetation or topographic positions will not be the same.

The nature of soils is determined by the combined influences of climate, vegetation, parent materials, topography, and age (the time interval soils have been developing). These factors have been discussed in preceding pages. Climate and vegetation usually cause regional differences in soils, as between eastern and western South Dakota. Local differences such as those among the soils of a county are commonly due to differences in parent material, topography, and age.

Soil Classification

South Dakota has a great many different kinds of soils. To keep the characteristics and qualities of these soils in mind, it is necessary to group them systematically into a classification scheme. The classification of soils: (1) aids in remembering characteristics of individual soils, (2) clarifies relationships between soils, (3) aids in discovering new facts, (4) clarifies relationships between soils and their environment, and (5) aids in a person's ability to predict properties of unknown soil based on similar, known soils.

A new system of soil classification has been adopted in the United States called *Soil Taxonomy* (USDA-SCS Staff, 1975). It has replaced the 1938 Yearbook System of Soil classification (Baldwin, Kellogg, and Thorp, 1938; Kellogg, 1941). To assist in using the new system the following list of approximate 1938 equivalents for South Dakota is presented in Table 1.

There are six categories in *Soil Taxonomy* and they are in order of decreasing rank or increasing number: order, suborder, great group, subgroup, family, and series. The highest category of the system—order— differentiates soils by the presence or absence of diagnostic horizons or features that are characteristic of the kinds and intensities of soil forming processes and contrasting climates. All soils fit into one of 10 orders.

Suborders within a soil order are differentiated on the basis of important soil properties which influence genesis and plant growth. There are 47 suborders presently recognized. The large number of suborders is a result of differences in soil moisture, soil temperature, climatic and vegetative influences on soil genesis, and mineralogy.

At the great group level the entire soil profile, the horizonation present, and the most significant features of the entire profile are considered. Soil great groups are subdivisions of suborders and there are 185 great groups currently recognized in the United States. The great group category combines soils which have close profile similarities in the kinds of horizons, the arrangement of horizor the degree of expression of horizons, soil moisture regimes, soil temperature regimes, base status, calcium content, iron content, gypsum content, and other salt content.

Each great group is divided into three kinds of subgroups. These are: (1) the central concept of the great group (Typic); (2) soil properties which intergrade to or are transitional toward other orders, suborders, or great groups; and (3) subgroups with properties that are not representative of any other order, suborder, or great group. There are about 970 known subgroups in the United States.

The next lower category of the system is the soil family. Soil families are separated within a subgroup on the basis of similar physical and chemical properties that influence plant growth, land management decisions, and engineering purposes. Soil properties such as texture, mineralogy, soil reaction, soil temperature regime, thickness of soil penetrable by roots, thickness of horizons, and the area's precipitation pattern are used as criteria to differentiate soil families. In the United States about 4,500 soil families are recognized.

At the lowest level of *Soil Taxonomy* is the soil series. Soil series contain the least variation in soil properties while soil orders contain the most. The soils comprising an individual soil series are nearly homogeneous, their range of properties is limited, and they have similar interpretations. Soil series are separated on the basis of observable and mappable soil properties such as color, texture, structure, horizon arrangement and thickness, mineralogy, moisture and temperature regimes, consistence, and horizon presence and expression. There are at least 10,500 soil series recognized in the United States and over 510 in South Dakota.

The higher the category of classification, the fewer precise statements that can be made for the unit. For most farm management work, the soil series is the most useful unit. However, the higher categories, especially the subgroups, to be discussed in the following pages, have use in helping to clarify regional relationships among soils.

Table 1. Approximate equivalents in *Soil Taxonomy* and the Revised 1938 Yearbook Systems of soil classification for soils in South Dakota.

1938 Yearbook System Great Soil Groups	Soil Taxonomy Great Groups and Other Taxa Mostly or Partly Included
Alluvial Soils	Fluvaquentic and fluventic subgroups of Mollisols; great groups of Fluvents; entic subgroups of Haplustolls, Fluvaquents; great groups of Psamments, Haplaquents, and Hapludolls.
Brown soils	Aridic subgroups of Arigustolls, Haplustolls, and Argiborolls.
Calcisols	Calciborolls, Calciustolls.
Calcium Carbonate Solonchak	Calciaquolls, Aquic Calciustolls.
Chernozem soils	Mesic families of typic and udic subgroups of Argiustolls and Haplustolls; udic and pachic subgroups of Argiborolls, Haplustolls, and Haploborolls; Vermiborolls.
Chestnut soils	Mesic families of aridic subgroups of Argiustolls and Haplustolls; typic and aridic subgroups of Argiborolls, Haplustolls, and Haploborolls.
Gray Wooded soils	Eutroboralfs.
Grumusols	Vertic subgroups of Argiborolls, Haploborolls, Haplustolls, and Argiustolls; Ustertic Camborthids.
Humic Gley soils	Argiaquolls, Haplaquolls, Fluvaquents, Calciaquolls.
Lithosols	Lithic subgroups and shallow families of Entisols, Afisols, Aridisols, and Mollisols.
Planosols	Argialbolls.
Regosols	Great groups of Psamments, subgroups of Orthents other than lithic; entic subgroups of Haplustolls and Psammaquents.
Solodized Solonetz soils	Natric great groups of Alfisols, Aridisols, and Mollisols.
Solonchak soils	Salorthidic Haplustoll and Salorthids.
Soloths	Argialbolls.

4 Regional Distribution of Soils

The typical, well-drained soils of South Dakota reflect the subhumid and semiarid climates and the original tall, mid-, and short grass or forest vegetation of the state. Most soils in the state are well-drained, they have the same general sequence of horizons, and they generally are uniform over relatively large geographic areas.

Also within each major soil subgroup region are other soils which lack B horizons and are not well-drained. These include the thin soils formed on steep slopes, sandy parent material, or unstable alluvium; the highlime soils; soils influenced by high sodium contents; soils formed in highly calcareous parent material, and poorly drained soils. The distribution of the major soil subgroups is shown in Figure 7.

Soil Subgroups

Soil boundaries due to changes in soil parent material or topography generally are distinct while boundaries due to climate and vegetation differences are gradual over a geographic area. The delineated areas are characterized by modal individuals which have a defined range of soil characteristics. When a new soil is to be classified it is classed with the modal individual which it most resembles. The soil lines on Figure 7 delineate and show the principal geographic range of areas of important modal soils.

Cool, Moist Forest (Typic Boralfs). These soils have developed under a humid climate (an annual precipitation of 20 to 25 inches and an average annual air temperature between 40-45° F.); a native vegetation of pine and spruce; parent materials which include limestone, sandstone, and local alluvium from igneous, sedimentary, and metamorphic rocks; and a topography which is undulating to mountainous.

Typical well drained soil profile horizons usually present include O, A1, A2, B&A, B2t, B3, and C. The O horizon is organic in nature and thin (½ to 4 inches thick). The O horizon is composed of fresh forest litter, partially decayed but still distinguishable as to origin, and well decayed litter which is undistinguishable as to origin. The A1 horizon is a mineral horizon and is thin (up to 5 inches) or absent. The A2 horizon is gray (10YR 6/2 dry, 10YR 4/2 moist),[3] weak medium platy in structure, and ranges in thickness from 2 to 20 inches.

Between the A2 and B2t horizons is a transitional horizon, B&A, about 4 inches thick, which is weak medium prismatic in structure. Each prism is coated with gray material from the A2 horizon but is brown, like the B2t horizon, beneath the gray coating. The B2t horizon is brown (7.5 YR 5/6 dry, 7.5 YR 4/6 moist) and has coarse prismatic structure parting to medium subangular blocky structure. Most of the blocks are of moderate grade and all are coated with thick shiny clay films on all surfaces. This horizon is 10 to 30 inches thick.

Sometimes a B3 horizon is present in which the structure grade is weak. This horizon is a transitional horizon between the B2t and the C horizons. It gradually grades into the parent material. Although the reaction of the profile is acidic, base saturation is over 50%. Where the parent material is calcareous, free carbonates may occur in the B3 horizon.

Cool Very Dry Plain (Aridic Borolls). These soils have developed under a cool semi-arid climate (an annual precipitation of 12 to 16 inches and an average annual air temperature between 42-45° F.); native vegetation of short and midgrasses; parent materials which include sandstones, sandy shales, shales, silty shales, and siltstones; and a topography which is undulating to strongly sloping with buttes and mesas.

Typical well drained soil profile horizons usually present include A1, B2(t)*, B3ca, Cca, and C. The A1 horizons are thin, about 4 to 8 inches if not plowed. They are brown (10YR 4/2 dry, 10YR 3/2 moist) and have weak fine granular structure. The cooler conditions that prevail in this region have resulted in slower oxidation of the organic matter and consequently darker surface soil colors when compared to the soils of the Warm, Very Dry Plain. When soils are plowed, the upper part of the B2(t) horizon is mixed with the A1 horizon in the plow layer.

The B2(t) horizon is brown (10YR 5/3 dry, 10YR 4/3 moist) with medium pris-

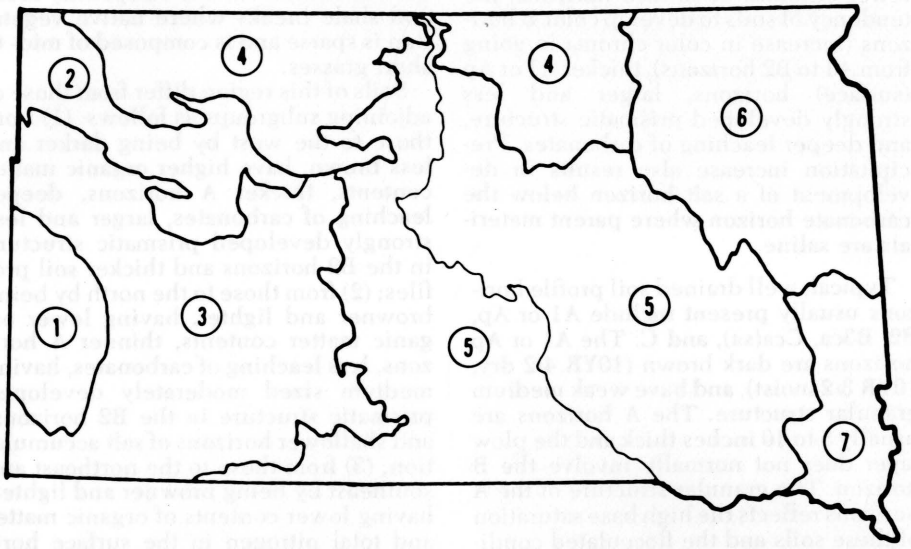


Figure 7. Soil zones of South Dakota.

1. Cool, Moist Forest (Typic Boralfs)
2. Cool, Very Dry Plain (Aridic Borolls)
3. Warm, Very Dry Plain (Aridic Ustolls)
4. Cool, Dry Plain (Typic Borolls)
5. Warm, Dry Plain (Typic Ustolls)
6. Cool, Moist Prairie (Udic Borolls)
7. Warm, Moist Prairie (Udic Ustolls)

[3] See Munsel Color notation in Glossary (Appendix).

* Parentheses indicate the feature may or may not be present.

matic structure of a moderate grade. The thickness of this horizon ranges from 6 to 17 inches. Some of the prisms may be covered with organic coatings and thin to moderate clayfilms.

Between the B2(t) and the Cca horizons is a transitional horizon, B3ca, about 3 to 12 inches thick, which has weak medium prismatic structure. The B3ca horizon is brownish gray (2.5Y 6/2 dry, 2.5Y 5/2 moist) and contains free carbonates in disseminated and soft concretionary form. The calcium carbonate ($CaCO_3$) equivalent usually exceeds 15%, and usually these horizons have at least 5% more $CaCO_3$ equivalent than the underlying C horizons.

The parent materials, C horizons, usually are calcareous. However, there usually is a zone of $CaCO_3$ accumulation at the top of the parent material, Cca. This is a result of leaching activity which removed the calcium carbonate from the overlying profile horizons and redeposited them forming a Cca horizon.

Warm, Very Dry Plain (Aridic Ustolls). These soils have developed under a warm, semi-arid climate (an annual precipitation of 14 to 17 inches and an average annual air temperature between 44-47° F.); native vegetation of short and mid-grasses; parent materials which include shales, siltstones, and sandstones; and a topography which is gently undulating to rolling in the shale areas and undulating to strongly sloping with buttes and plateaus in the siltstone and sandstone areas.

Typical well drained soil profile horizons usually present include Ap(1), B2(t), B3ca(sa), Cca, and C. The Ap(1) horizons usually are 3 to 7 inches thick. The plow layer, Ap, usually does involve the upper part of the B horizons. The A horizons are brown (10YR 5/2 dry, 10YR 4/2 moist) and have weak medium granular structure. Although annual precipitation for this region and the Cool, Very Dry Plain are the same, it is less effective in this region due to higher annual temperatures. Consequently, soils have supported shorter stands of grasses that have left smaller residues of organic matter. This, coupled with the higher annual temperatures which increase organic matter oxidation, results in the low soil organic matter contents in the soils of the Warm, Very Dry Plain Region as indicated in Figure 2.

The B2(t) horizon is pale brown (10YR 6/3 dry, 10YR 5/3 moist) with moderate medium prismatic or weak medium subangular blocky structure. The thickness of this horizon ranges from 7 to 24 inches. Some of the structural units may be covered with thin to moderate clayskins and organic coatings.

The B3ca(sa), a transitional horizon between B2(t) and Cca horizons, is about 3 to 15 inches thick and has weak medium subangular blocky or weak medium prismatic structure. The B3ca(sa) horizon is pale brown (10YR 6/3 dry; 10YR 5/3 moist) and contains free carbonates in disseminated and soft concretionary form. The calcium carbonate ($CaCO_3$) equivalent usually exceeds 15%, and usually these horizons have at least 5% more $CaCO_3$ equivalent than the underlying C horizons. Where the parent materials are saline, salts occur in these horizons in concentrations of 0.25% or higher and are designated by the "sa" symbol. The Cca horizon has massive structure, resembles the B3ca in carbonate content, and is gray (7.5YR 7/2 dry; 7.5YR 6/2 moist).

Cool Dry Plain (Typic Borolls). Soils in this subgroup have developed under a cool dry subhumid climate (an annual precipitation of 15 to 19 inches and an average annual air temperature between 42-45° F.); native vegetation of mid- to short grasses; parent materials which include sandy shales, shales, sandstones, and siltstones west of the Missouri River and loess or Late Wisconsin glacial drift east of the Missouri River; and a topography which is gently undulating to rolling with buttes and mesas in the areas west and gently undulating to undulating in the area east of the Missouri River. Adjacent to the Missouri River there are steep hilly areas and shale breaks where the native vegetation is sparse and is primarily composed of mid- to short grasses.

Soils in this subregion have developed in a more humid environment when compared to the Cool, Very Dry Plain subgroup. This increase in annual precipitation from the west edge of the Cool Dry Plain to the east edge of the region causes increases in surface organic matter contents, darker color values and lower chromas of surface horizons, the tendency of soils to develop color B horizons (increase in color chroma in going from A1 to B2 horizons), thicker A1 or Ap (surface) horizons, larger and less strongly developed prismatic structure, and deeper leaching of carbonates. Precipitation increase also results in development of a salt horizon below the carbonate horizon where parent materials are saline.

Typical, well drained soil profile horizons usually present include A1 or Ap, B2, B3ca, Cca(sa), and C. The A1 or Ap horizons are dark brown (10YR 4/2 dry, 10YR 3/2 moist), and have weak medium granular structure. The A horizons are usually 5 to 10 inches thick and the plow layer does not normally involve the B horizon. The granular structure of the A horizons reflects the high base saturation of these soils and the flocculated condition of the clays.

The B2 horizon is brown (10YR 5/3 dry, 10YR 4/3 moist) with weak to moderately developed coarse prismatic structure. The thickness of this horizon ranges from 6 to 20 inches. Some of the prisms may have a thin clayfilm coating. The B2 horizons often do contain more clay than A1 horizons however not enough to warrant the use of the "t" symbol in most profiles. Soil profiles west of the Missouri River are more likely to have the "t" associated with the B2 horizon.

Between the B2 and the Cca(sa) is a transitional horizon, B3ca, about 5 to 15 inches thick, which has weak coarse prismatic structure. These horizons contain free carbonates in disseminated and soft concretionary form. The $CaCO_3$ equivalent usually exceeds 15% and ordinarily the "ca" horizons have at least 5% more $CaCO_3$ equivalent than the underlying C horizons. The B3ca horizon is grayish brown (2.5Y 5/2 dry, 2.5Y 4/2 moist).

Cca(sa) horizons have massive or very weak coarse prismatic structure and often are saline; in all other respects they resemble the B3ca horizons. The saline layer is found deeper in soils of this subgroup when compared to soils of the Cool, Very Dry Plain.

Warm Dry Plain (Typic Ustolls). In this subgroup the soils have developed under a warm dry subhumid climate (an annual precipitation of 17 to 24 inches and an average annual air temperature between 44° and 49° F.); native vegetation of mid- to short grasses; parent materials which include sands, sandstone, siltstone, silts, shale, and clays west of the Missouri River and loess, Late Wisconsin glacial drift, and Missouri River alluvium east of the Missouri River; and a topography which is gently undulating to rolling in the areas west and nearly level to strongly undulating in the areas east of the Missouri River. Adjacent to the Missouri River are steep, hilly areas and shale breaks where native vegetation is sparse and is composed of mid- to short grasses.

Soils of this region differ from those of adjoining subgroups as follows: (1) from those to the west by being darker and less brown, have higher organic matter contents, thicker A horizons, deeper leaching of carbonates, larger and less strongly developed prismatic structure in the B2 horizons and thicker soil profiles; (2) from those to the north by being browner and lighter, having lower organic matter contents, thinner A horizons, less leaching of carbonates, having medium sized moderately developed prismatic structure in the B2 horizons, and shallower horizons of salt accumulation; (3) from those to the northeast and southeast by being browner and lighter, having lower contents of organic matter and total nitrogen in the surface horizons, shallower horizons of calcium carbonate and salt accumulation, having lesser tendency for chroma to increase with depth, and greater tendency for clay to accumulate in the B2 horizons. In the southern part of this subgroup, near the

mouth of the James River the substrata is usually saline while in other areas it is usually nonsaline unless affected by a high water table.

Typical, well-drained soils of this subgroup normally have the following soil profile horizons: Ap or A1, B2(t), B3ca(sa), and C. The Ap (eastern part of the region) or the A1 (western part of the region) horizons are dark gray (10YR 4/1 dry, 10YR 2/1 moist), and have weak medium granular to weak medium subangular blocky structure. The A horizons are usually 5 to 12 inches thick and the plow layer does not normally involve the B horizon unless moderate to severe erosion has occurred. The granular structure of the A horizons reflects the high base saturation of these soils and the flocculated condition of the clays. There are no free carbonates and the soil reaction ranges from 6 to 7.

The B2(t) horizon averages 6 to 15 inches in thickness. Moist color values average 3 to 4, while moist chromas average 2. Structure is compound with moderate medium prisms breaking to moderate medium subangular blocks. Clayfilms are usually thin and continuous on all sides of the structural ped. Some of the B2 horizons in the typical well-drained soils of this subgroup have a considerable clay increase in the B horizon so the "t" symbol is used. Moist consistence is friable and the horizon is free of carbonates.

The B3ca(sa) horizon ranges from 6 to 15 inches in thickness and has a $CaCO_3$ equivalent of 15% to 20%. It usually has at least 5% more $CaCO_3$ than the underlying C horizon. The carbonates are in disseminated or soft concretionary form. The primary structure consists of weak coarse prisms and weak medium subangular blocks. In places where the parent material is saline this horizon usually contains soluble salts in excess of 0.25%. The B3ca (sa) horizon is light brownish gray (2.5Y 6/3 dry, 2.5Y 5/3 moist).

The Cca(sa) horizon is usually 15 or more inches thick. It resembles the B3ca(sa) horizon except for structure and clayfilms both of which are absent.

Cool Moist Prairie (Udic Borolls). In this subgroup the soils have developed under a cool moist subhumid climate (an annual precipitation of 19 to 23 inches and an average annual air temperature between 41° and 45° F.); native vegetation of tall grasses; parent materials which include glaciolacustrine sediments, early Wisconsin glacial drift, and late Wisconsin glacial drift; and a topography which is nearly level (the Lake Dakota Plain) to rolling (the Coteau des Prairies).

Soils of this subgroup (see Figure 7) have black surface horizons (moist Munsell value and chroma are 2/1). This surface soil color is one of the characteristics setting apart the typical, well-drained soils of this region from the typical, well-drained soils of the surrounding regions. To the west, southwest, and southeast the typical, well-drained soils are lighter in value and browner in chroma.

The relatively cool moist climate of this region has provided an environment which favors the accumulation of organic matter and retards its destruction. The Udic Ustoll soils of the Warm, Moist Prairie to the southeast have an environment favorable for organic matter accumulation. However, the warmer temperatures of this region favor a faster rate of organic matter destruction than prevails in the northern Cool, Moist Prairie. Soil subgroups to the west have drier environments and do not favor as fast an accumulation of organic matter although they have about the same temperatures and rate of destruction is about the same as for the Cool, Moist Prairie.

In addition to the color differences, the typical, well-drained soils of the Cool Moist Prairie area are differentiated from adjacent areas which adjoin on the west and the Typic Ustolls of the Warm, Dry Plain which adjoin them on the south by having (1) deeper-lying horizons of carbonate accumulation, (2) deeper-lying horizons of salt accumulation, and (3) higher contents of organic matter and total nitrogen in the surface horizons.

From the typical, well-drained soils of the Warm, Moist Prairie which adjoins it on the southeast these soils differ by having (1) shallower-lying horizons of carbonate accumulation, (2) higher contents of organic matter and total nitrogen in the surface horizons, (3) thinner B2 horizons, (4) less tendency for clay to accumulate in the B2 horizons, and (5) greater tendency for chroma to increase with depth.

Typical, well drained soils of the Cool, Moist Prairie usually have the following horizons: Ap, B2, B3ca, Cca, and C. Plowing is usually entirely within the Ap horizon. This surface horizon is about 5 to 8 inches thick and is black (moist value and chroma 2/1). Consistence is friable and the structure is granular, reflecting the high base saturation and the flocculated clays. There are no free carbonates and reaction ranges from 6 to 7.

The B2 horizon averages 8 to 16 inches in thickness. Moist color values average 3.5 while moist chromas average 2. Structure is compound with moderate coarse and medium prisms breaking to moderate medium blocks. On medium and fine textured soils, clayfilms usually are thin, continuous and moderately patchy on all sides of the prisms and blocks. Moist consistence is friable. Free carbonates are not present. The B2 horizon grades smoothly into the B3ca horizon.

The B3ca horizon is usually 8 inches or more in thickness. Structure is compound with weak medium prisms breaking to weak or moderate blocks. On medium or finer textured soils clayfilms are thin and either continuous or patchy. Moist consistence is friable. Carbonates are in disseminated form and in soft concretions. The $CaCO_3$ equivalent usually approaches a maximum of about 20%.

The Cca horizon usually extends to 5 feet or more. Except for structure and clayfilms, which usually are absent, it resembles the B3ca horizon.

Warm Moist Prairie (Udic Ustolls). In this subgroup the soils have developed under a warm, moist subhumid climate (an annual precipitation of 22 to 26 inches and an average annual air temperature between 45-49° F.); native vegetation of tall grasses; from parent materials which include early Wisconsin drift, late Wisconsin drift, and alluvium; and have a topography which is nearly level to rolling.

The environment under which the soils of this region have developed is relatively warm and moist. The relatively high humidity and rainfall have resulted in the vigorous growth of tall grasses which in turn has resulted in the accumulation of large amounts of organic matter. Relatively high temperatures have encouraged considerable biologic and chemical activity so organic matter destruction is fairly high. This results in a high rate of nitrogen release. The colors of the surface soils reflect this environment. They are less dark and more brown than the surface colors of the soils of the cooler northeast area but darker and less brown than the surface colors of the soils of the area to the west. Moreover, the depth of leaching of carbonates for the typical, well-drained soils in this region is greater than for the typical, well-drained soils of any of the adjacent subgroups.

Other soil characteristics attest to the conclusion that the soils of this subgroup are transitional to the Udolls or tall grass prairie soils. In some of the permeable loess-derived soils the horizon of carbonate enrichment lies below a leached C horizon at depths of 40 to 50 inches from the surface. This indicates a substantial increase in depth of leaching over that in the typical, well-drained soils of adjoining regions.

Carbonates in the soils of this region may occur as large, hard, knotty concretions. Carbonates rarely are found in this form in the soils of the adjoining regions. There is an increase in chroma in going from A to B horizons of about one Munsell unit in the typical, well-drained soils of this region. In the typical, well-drained soils of the adjoining northeast area, chroma usually increases one-half a unit or more in going from the A to the B horizon.

Typical, well-drained soils of the Warm, Moist Prairie usually have the following horizons: Ap, B2, B3(ca), C. The Ap horizon is about 7 inches thick and very dark grayish brown (moist

value/chroma = 2.5/1.5 to 3/2). The soil is friable and granular in structure. Base saturation is about 80% to 90%. Occasionally a part of the upper B horizon has been incorporated into the plow layer.

The B2 horizon is thick, averaging about 16 to 24 inches. It is usually dark grayish brown (moist value/chroma = 3/2). The structure is moderately developed medium prismatic which breaks to moderately developed blocky. Thin continuous and moderate patchy clayfilms coat all structural surfaces. No carbonates are present.

The B3(ca) horizon is about 12 inches thick and dark grayish brown to olive brown (moist value/chroma = 4/3). The structural aggregates are weak medium prisms having thin patchy clayfilms on the vertical surfaces. Carbonates occur in disseminated form and as hard and soft concretions. The $CaCO_3$ equivalent usually exceeds 15% and ordinarily is more than 5% higher than the $CaCO_3$ of the underlying C horizon.

The C(ca) horizon usually extends to 5 feet or more. It resembles the B3(ca) horizon except for structure and clayfilms which are absent.

Other Soils Found in Subgroup Areas

Within each major soil subgroup are other soils which are not mature and well-drained. These include the thin soils formed on steep slopes, sandy or unconsolidated parent material, bedrock, or alluvium; the high lime soils; soils influenced by high salt and/or sodium contents; soils formed in calcareous bedrock; and poorly drained soils.

Thin soils formed on bedrock. (Lithic Haploborolls, Lithic Haplustolls, Lithic Eutroboralfs, Lithic Torriorthents). Thin soils in this group have bedrock near the surface (within 18 inches), occur on steep slopes, and lack B horizons. In this environment, runoff is excessive so that little water has entered the profile to leach it and cause profile development, or to support the vegetative growth necessary to have produced much humus. Erosion aids in keeping the A horizons thin and total soil profiles shallow. Although less sensitive to their environments than the typical, well-drained soils, these thin soils nevertheless reflect the climatic and vegetative environments of the soil subgroup areas and change with them as do the typical, well-drained soils.

Thin soils formed in unconsolidated parent material. (Typic Ustorthents, Entic Hapustolls, Typic Ustipsamments, Entic Haploborolls, Typic Torripsamments). These thin soils occur on steep slopes of unconsolidated parent material such as glacial till, glacial outwash, or sand, and lack B horizons. In this environment, runoff is excessive so that little water has the opportunity to cause profile development, to leach the soil profile, or to support the vegetative growth necessary to produce a large amount of organic matter. Erosional activity causes the A horizons of these soils to be thin and the total soil profile to be thin and consist only of A and C horizons. Although less sensitive to their environments than the typical, well-drained soils, these thin soils nevertheless reflect the climatic and vegetative environments of the soil subgroup areas and change with them as do the typical, well-drained soils.

Thin alluvial soils. (Mollic Fluvaquents, Typic Ustifluvents, Aquic Udifluvents, Fluventic Hapludolls, Fluventic Haplustolls). Alluvial soils are young soils of flood plains which lack B horizons. Most of the soils developed from alluvium in South Dakota have B horizons and therefore are classified in the appropriate subgroups discussed earlier. Ordinarily, only the soils which receive increments of fresh alluvium every year or so are classed as alluvial soils.

High lime soils. (Calciaquolls, Aquic Calciustolls). This group of soils is set apart because of the presence of a strong carbonate horizon immediately below the A horizon. The $CaCO_3$ equivalent usually exceeds 15-20% for the zone of carbonate enrichment. Sometimes the A horizon itself is calcareous. The cause of the strong concentration of carbonates appears to be related to a parent material high in carbonates, e.g. the area around the rims of prairie potholes in the glaciated areas of eastern South Dakota. These soils are most extensive in the Cool Moist Prairie region, especially around the northern end of the Coteau des Prairies and in the northeast corner of the state.

Soils influenced by high salt or sodium contents. (Natriborolls, Natrargids, Natrustolls, Natriboralfs, Argialboll, Salorthidic Haplustolls). These soils are set apart because of high salt contents or they have been or are being influenced by high sodium contents.

Saline or salt affected soils (the Solonchaks in the 1938 system of soil classification). Salts present in these soils are chlorides and sulfates of sodium, potassium, magnesium, and calcium. Soils having high concentrations of $CaCO_3$ have been considered earlier under the high lime soils discussion. These salty soils develop in environments where drainage is poor and where excess salts are present. The salts are usually brought in by seepage, runoff, streams, or artesian water. High rates of evaporation and slow runoff or permeability result in the development of salt concentrations in excess of 0.25%. Although the salts keep the surface soil in good physical condition, their concentration usually is too great for the growth of economic plants.

Sodium-influenced claypan soils (the Solonetz, Solodized Solonetz and the Soloth in the 1938 system of soil classification). These soils appear to develop under drainage conditions that consist of alternate wetting and drying. Possibly freezing and thawing is a part of this environment. At any rate, the salts are removed and sodium ions are adsorbed on the soil colloids. When the sodium ions reach a concentration of about 12% or higher of the CEC the clay particles become deflocculated, resulting in a jellylike, strongly alkaline, impermeable B horizon which is also called a natric horizon. When the B horizon dries, the soil shrinks, hardens, and cracks, forming a columnar structure. Usually the tops of the columns are rounded. This is indicative of the first step that soils go through when sodium becomes a problem. These soils are called Solonetz soils.

It appears that while the deflocculation of the clay is taking place a gray horizon develops simultaneously over the dispersed B horizon. The development of this gray horizon is called solodization. Evidence indicates that at least the initial stages of the development of this gray horizon may simply be the result of removal of iron and manganese coatings from the soil grains, thus bleaching them by alternate oxidizing and reducing conditions brought about by the alternate wet-dry environment over an impermeable B horizon. As soon as the gray horizon is discernable the soil has reached the second category of sodium affected soils, called the Solodized Solonetz in the 1938 classification system or Natriboralfs, Natrustolls, and Natriborolls under the new taxonomic system.

Soils in this second category range all the way from those having only a sprinkle of gray dust on the column tops to those having a gray horizon several inches thick. Sodium usually makes up at least 12% of the exchangeable cations of the natric B horizons of the immaturely developed or thin surface of these sodium-affected claypan soils. There is usually twice as much exchangeable magnesium as exchangeable calcium in the natric B horizons. As the gray horizon thickens and the soil becomes more mature, nearly all of the exchangeable sodium is lost, although the exchangeable magnesium concentrations remain about twice the exchangeable calcium concentration. This fact has led some investigators to use the term "Magnesium Solonetz" for these soils.

As solodization continues the gray horizon thickens, apparently by hydrolysis of the clay minerals, at the expense of the B horizon until only a vestige of the latter remains. This final step represents the Soloth or Argialbolls. Salts of course, are absent in the A1, A2,

and B2 horizons of these soils. Moreover, in the B2 horizon, exchangeable sodium percentages are very low and calcium has replaced magnesium as the dominant exchangeable cation.

Sodium-influenced claypan soils may occur throughout the state on flats and in closed basins or depressions. They are more extensive in the James Valley and west than they are on the Coteau des Prairie.

Poorly drained soils (Argiaquolls, Haplaquolls, Fluvaquents and Calciaquolls). These soils occur in poorly drained depressions that dot the landscape east of the Missouri River. Rarely are they found west of these areas. Depressional soils west of the Missouri River usually are salt or sodium affected.

These poorly drained soils usually are free of soluble salts but not of carbonates. A rank vegetation induced by their wet environment has contributed much organic matter to their surface horizons. Due to poor aeration, certain chemicals may be formed which partially limit the activity of microorganisms which normally decompose vegetative residues. Hence, these soils have thick surface horizons high in humus. The lower horizons of these soils have reddish-gray mottled colors, called gley, caused by the alternate oxidizing and reducing conditions.

Soils formed in calcareous bedrock (Calciborolls, Calciustolls). These soils occur on nearly level to steep upland. They are formed in residuum derived from soft chalky siltstone mainly of the Niobrara formation. They have large amounts of calcium carbonate within 9 to 15 inches of the soil surface. Bedrock is usually encountered within a depth of 36 inches. Components of the bedrock determine to a large degree the chemical and physical properties of these soils. Because of abundance of calcium carbonate in the parent material and rather steep slopes, these soils usually do not have a B horizon. The common horizonation for these soils would be A, AC, Cca, and R. In the 1938 soil classification system these would have been called Calcisols.

5 Soil Associations of South Dakota

The pattern of soils for most of South Dakota is one of intermingled areas of two or more soil types. Individual areas, of one to many acres in size, form a patchwork. The soil changes locally with each change in relief or parent material and regionally with climate and vegetation. Large-scale maps such as those in soil survey reports show these individual patterns.

It is known, however, that certain combinations of soils occur in patterns that are repeated from township to township and in many cases from county to county. These combinations in their characteristic patterns can be shown on small-scale maps. They are called *soil associations*, and they are natural units of the landscape.

Soil associations have importance to farming in that the arrangement and kind of soil in an association governs its suitability for various systems of farming. The Moody-Trent association, for example, contains soils suitable for crops or pasture so that cash grain, dairy, or general farming all are included in the choices available to the farmer. On the other hand, the Pierre-Samsil association is adapted for range purposes so that this area is suitable for ranching.

Soil associations usually are named by placing together two or more names of included important soil series. In some cases a single series name is used, and sometimes a land type such as Badlands is used as a name. Not all soil series present are mentioned in the association name.

Following is a paragraph description of each soil association shown on Figure 8, the colored map (inside back cover). Table 2 lists the acreage and proportionate extent of the soil associations shown. Available data for the soils and their taxonomic classification are presented in the appendix.

A. Black Hills—Cool Moist Forest (Typic Boralf Area)

Central Core

1. **Rough Mountainous Land, Pre-Cambrian, steep.** The southern part of this association consists of bare rugged granite outcrops with steep-sided valleys in which the dominant vegetation is Ponderosa pine. The central and northern areas consist mainly of slate having strong relief with a sparse cover of Ponderosa pine. Soils, were present, are thin.
2. **Rolling Limestone Plateau.** This area has fairly deep wooded soils occurring under a thick growth of spruce and Ponderosa pine. The area is undulating between streams which are deeply incised in the limestone plateau.

Inner Hogback

3. **Rough Mountainous Land, limestone, steep.** This area encircles the Central Core and Limestone Plateau and consists of sedimentary rocks tilted inward toward the core. The radial drains that start in the Central Core occupy deep gorges which cross the area. The northern part of this area receives more precipitation and is cooler so supports mainly spruce while Ponderosa pine is the main vegetative cover over the remainder of the area. Much bare rock is exposed and the main area of deeper soils occurs in the valley bottoms at the upper reaches of the streams. Most of these alluvial soils are poorly drained.

Red Beds

4. **Spearfish-Nevee, Gently undulating.** Spearfish soils are loams on gently rolling to hilly uplands and on steep slopes bordering deeply entrenched streams and drainageways. The slope gradients range from 5% to about 40%. They are formed in residuum weathered from reddish colored gypsiferous siltstone, sandstone, and shale.

Nevee soils are silt loams on nearly level to moderately steep terraces, uplands, and alluvial fans. The slope gradients range from 2% to 15%. They are formed in silty alluvium weathered from reddish colored silty shales, siltstones, and sandstones.

Outer Hogback

5. **Butche-Canyon, steep.** Butche soils are stony loams on sloping to very steep upland slopes with gradients ranging to as much as 40%. They are formed in loamy material weathered from noncalcareous sandstones.

Canyon soils are loams on shoulders and crests of upland ridges, hills, and on tablelands. Slope gradients range from 2% to about 50%. They are formed in residuum from the underlying, limy sandstone bedrock. The depth to limy sandstone is about 12 inches.

B. Cool, Very Dry Plain (Aridic Boroll Area)

Nearly Level to Rolling Loamy Soils

6. **Rhame-Cabbart-Ralph, undulating to rolling uplands.** Rhame soils are fine sandy loams on gently undulating to rolling uplands. Slope gradients range from 1% to more than 15%. They are formed in mildly alkaline calcareous, residuum weathered from very soft sandstone.

Cabbart soils are loams which are gently rolling to steep and are on sedimentary uplands at elevations of 2,200 to 3,500 feet. They are formed in loam, silt loam, clay, or clay loam materials weathered from the underlying platy siltstone of Cretaceous or Tertiary Age.

Ralph soils are loams on nearly level, undulating, and rolling uplands. The slope gradients range from 0% to 9%. They are formed in silty material weathered from calcareous silty shales, siltstones, or fine grained sandstones.

Loamy and Sandy Soils with Some Claypan

7. **Twilight-Absher, strongly undulating.** Twilight soils are fine sandy loams on gently sloping to rolling uplands. The surfaces are convex and the slope gradients range from 2% to 15%. They are formed in residuum weathered from soft sandstone bedrock.

Absher soils are silty clays on nearly level to moderately sloping alluvial terraces and fans. Elevations range from 2,000 to 3,500 feet. They are formed in transported clayey materials from a wide source of geologic materials or residuum from sedimentary rocks.

Sandy Loams to Loamy Sands

8. **Fleak-Cabbart, rolling.** Fleak soils

are loamy fine sands on steep slopes, crests of hills, ridges, and valley sides. Slope gradients range from 3% to 50%. They are formed in calcareous very soft sandstones.

Cabbart soils are described in map unit 6.

9. **Rhame-Fleak, undulating.** Rhame soils are described in map unit 6 and Fleak soils are described in unit 8.

10. **Fleak-Rhame, strongly undulating.** Fleak soils are described in map unit 8 and Rhame soils in map unit 6.

Claypan Soils

11. **Absher, strongly undulating.** Absher soils are described in map unit 7.

12. **Sorum, undulating.** Sorum soils are fine sandy loams on nearly level to gently sloping terraces and alluvial fans. Slope gradients range from 0% to 6%. They are formed in moderately coarse textured alluvium.

C. Warm, Very Dry Plain (Aridic Ustoll Area)

Silty Soils

13. **Kadoka-Epping, strongly undulating.** Kadoka soils are silt loams on nearly level to moderately steep uplands with convex to smooth surfaces having slope gradients of 0% to 15%. They are formed in silty residuum weathered mainly from siltstone.

Epping soils are silt loams on uplands. The slopes gradients range from 0% to over 30%. They are formed in residuum weathered from siltstone which contains considerable material from volcanic ash.

14. **Kadoka-Huggins, strongly undulating.** See map unit 13 for a description of Kadoka soils.

Huggins soils are silt loams on nearly level to sloping uplands with slope gradients ranging from 0% to 9%. Soil surfaces are plane or slightly convex. They are formed in residuum weathered from siltstone.

15. **Keith-Colby, gently undulating.** Keith soils are silt loams on nearly level to steep uplands and terraces. Slope gradients typically are less than 6% and range from 0% to 18%. They are formed in loess.

Colby soils are silt loams on steep slopes. The slope gradients are typically between 3-15% but range to 30% on narrow ridge tops and eroded areas. They are formed in calcareous silty material that is usually loess and less commonly in old silty alluvium that lacks stratification in the upper 40 inches.

16. **Ralph-Cabbart-Regent, undulating.** Ralph and Cabbart soils described in map unit 6.

Regent soils are silty clay loams on long and plane or slightly convex slopes of upland plains. Slope gradients commonly are 2% to 4% but range to 25%. They are formed in residuum weathered from alkaline soft shales.

Loamy Soils with Some Claypan

17. **Cabbart-Absher, rolling.** Cabbart soils are described in unit 6 and Absher soils in unit 7.

Silty and Loamy High Terrace Soils

18. **Satanta, gently undulating.** Satanta soils are loams on nearly level to undulating to sloping uplands and high terraces. Slope gradients range from 0% to 9%. They are formed in loamy, eolian materials, or loamy alluvium that has been partially reworked by wind action.

19. **Ree, nearly level.** Ree soils are loams on terraces or uplands. Slopes are plane to slightly convex and range from 0% to 15%. They are formed mainly in loamy alluvial deposits.

Loamy Soils and Limestone and Sandstone Breaks

20. **Epping-Kadoka, rolling.** Both of these soils are described in mapping unit 13.

21. **Oglala-Canyon, strongly undulating.** Oglala soils are loams on slopes having moderate to steep gradients, plane to convex surfaces, and a dissected landscape having deeply entrenched drainageways. They occur on the mid and lower slopes having gra-

Table 2. Acreage and proportionate extent of soil associations, South Dakota.

Soil	Number	Acres	Percent
A	1	567,066	1.15
	2	192,309	.39
	3	803,754	1.63
	4	226,826	.46
	5	290,929	.59
B	6	606,514	1.23
	7	409,273	.83
	8	88,758	.18
	9	78,896	.16
	10	128,206	.26
	11	1,262,338	2.56
	12	167,654	.34
C	13	611,445	1.24
	14	216,964	.44
	15	305,722	.62
	16	315,584	.64
	17	93,689	.19
	18	350,101	.71
	19	167,654	.34
	20	197,240	.40
	21	714,996	1.45
	22	414,205	.84
	23	784,030	1.59
	24	2,647,951	5.37
	25	216,964	.44
	26	1,410,268	2.86
	27	685,410	1.39
	28	78,896	.16
	29	315,585	.64
	30	1,163,718	2.36
D	31	1,055,235	2.14
	32	177,516	.36
	33	73,965	.16
	34	152,861	.32
	35	1,676,543	3.40
	36	562,134	1.14
	37	197,240	.40
	38	192,309	.39
	39	389,549	.79
	40	103,551	.22
	41	197,240	.40
	42	1,227,821	2.49
	43	1,114,407	2.26
E	44	236,688	.48
	45	2,519,705	5.11
	46	1,499,026	3.04
	47	246,550	.48
	48	93,689	.19
	49	138,068	.28
	50	941,822	1.92
	51	192,309	.39
	52	665,686	1.35
	53	641,031	1.30
	54	2,283,056	4.63
	55	4,260,460	8.61
	56	399,412	.81
	57	123,275	.25
	58	665,686	1.35
	59	335,308	.68
	60	49,310	.10
	61	537,479	1.09
	62	626,238	1.27
	63	458,584	.93
F	64	335,308	.68
	65	295,860	.60
	66	88,758	.18
	67	162,723	.33
	68	147,930	.30
	69	1,686,404	3.42
	70	611,444	1.24
	71	98,620	.20
	72	310,653	.63
	73	261,343	.53
	74	887,582	1.80
	75	325,446	.66
	76	1,222,889	2.48
	77	695,272	1.42
G	78	532,548	1.08
	79	951,684	1.93
	80	498,031	1.01
	81	108,482	.22
	82	172,585	.35
	83	108,482	.22
	84	261,343	.53
Total		49,310,080	100.00

dients mostly of 9% to 21%, but include minor acreages of less than 9% slopes and greater than 21%. They are formed in residuum from the underlying soft fine grained sandstone which is typically found at a depth of 36 to 42 inches.

Canyon soils, described in unit 5.

Clay Soils from Shale

22. Pierre-Kyle, undulating. Pierre soils are clays on nearly level to steep uplands that have slight gilgai microrelief in some places. Slope gradient typically is 3% to 9%, but ranges from 0% to 25%. They are formed in residuum weathered from clay shales.

Kyle soils are clays on nearly level to sloping uplands and colluvial fans. Slopes are plane to convex and slope gradients range from 0% to 9%. They are formed in clay sediments derived from weathered calcareous clay shales.

23. Pierre-Lismas, strongly undulating. Pierre soils described in unit 22.

Lismas soils are clays that occupy hills and ridges of uplands. These soils are shallow and well drained with slope gradients of 4% to 35%. They are formed in residuum weathered from clay shales which are found at a depth of 5 to 18 inches.

24. Pierre-Samsil, undulating. Pierre soils are clays described in unit 22.

Samsil soils are clays on slope breaks of dissected shale plains. Slope gradients range from 2% to 45% or more. They are formed in residuum weathered from shale.

Clay Soils and Shale Breaks

25. Grummit-Snomo, hilly. Grummit soils are clays on moderately sloping to steep uplands. Slope gradients range from 2% to 40%. They are formed in clayey residuum weathered from acid shales.

Snomo soils are clays on gently sloping to moderately steep uplands. Slope gradients range from 2% to 20%. They are formed in transported material derived from acid shales.

26. Samsil-Pierre, rolling. Samsil soils are described in map unit 24 and Pierre soils in map unit 22.

Very Dense Clay Soils from Shale

27. Winler-Lismas, undulating. Winler soils are clays on very gently sloping to rolling uplands. Slopes are dominantly smooth, plane and 2% to 9% gradients. They are formed in clayey residuum weathered from clay shale.

Lismas soils are described in map unit 23.

Sandy Loams to Fine Sands

28 Tuthill-Richfield, gently undulating. Tuthill soils are fine sandy loams on smooth nearly level to rolling uplands, with convex to slightly concave surfaces. Slope gradients range from 0% to 15%. They are formed in sandy and loamy materials of mixed origin.

Richfield soils are silt loams on loess-mantled uplands. Slope gradients are dominantly less than 3% but some are as much as 6%. They are formed in silty eolian sediments ranging from 3 feet to more than 10 feet in thickness.

29. Valentine, undulating. Valentine soils are fine sands on nearly level to slightly hummocky to steep, hilly uplands. Slope gradient ranges from 0% to 60%. They are formed in eolian sand.

Badlands

30. Badlands, steep. Silty, clayey, and sandy deposits occurring as steep eroded badlands with many flat-topped grass-covered buttes. Soils are thin or absent in this area. Some pines and cedars can be found on north facing slopes.

D. Cool Dry Plain (Typic Boroll Area)

Loamy and Silty Soils

31. Morton-Cabba, gently undulating. Morton soils are silt loams on nearly level, undulating, and rolling plains. Slope gradient is commonly 1% to 6%, but in a few places it is more than 10%. They are formed in material weathered from soft calcareous silty shales, siltstones, and fine grained sandstones.

Cabba soils are cobbly clay loams on steep bench edges and steeply rolling uplands over limestones and siltstones of Tertiary Age. Soils are shallow with bedrock occurring at a depth of 12 to 20 inches. Slope gradients range from 5% to 25%.

32. Reeder-Cabba, undulating. Reeder soils are loams on nearly level undulating and rolling plains. Slope gradient typically is 1% to 15%. They are formed in material weathered from soft, calcareous, fine grained sandstones and silty shales.

Cabba soils are described in map unit 31.

33. Regent, undulating. Regent soils are described in map unit 16.

34. Temvik-Linton, gently undulating. Temvik soils are silt loams on nearly level to rolling upland plains. Slopes are dominantly plane or convex. Slope gradients typically are 1% to 5% but range to 15%. They are formed in a silty mantle overlying loam or clay loam glacial till.

Linton soils are silt loams on nearly level to hilly loess covered terraces and uplands. Slopes range from 1% to 25%. They formed in calcareous loess containing a large amount of silt and very fine sand.

35. Williams-Tonka, gently undulating. Williams soils are loams on nearly level to steep slopes of glacial till plains. Slopes commonly are less than 9% but range from 1% to 35%. They are formed in calcareous glacial till of mixed mineralogy.

Tonka soils are silt loams in closed basins and depressions in glacial till plains and glaciolacustrine areas. Slope gradient is less than 1%, and is plane or slightly concave. They are formed in local alluvium deposited over glacial till or glaciofluvial material.

Loamy Soils

36. Williams-Zahl, strongly undulating. Williams soils are described in map unit 35.

Zahl soils are loams on nearly level to steep slopes of glacial till plains, moraines, and valley sides. Slopes of 6% to 15% are most common, but range from 1% to 35%. They are formed in calcareous glacial till.

Soils with Sandy and Gravelly Substrata

37. Stady-Maddock, gently undulating. Stady soils are loams on nearly level stream terraces and glacial outwash valley terraces. Slopes are mainly 1% to 4%. They are formed in loamy alluvium over sand and gravel.

Maddock soils are loamy fine sands on sandy glaciolacustrine and delta plains, some of which have been wind worked. Slopes are smooth, undulating to rolling. Slope gradients range from 1% to 25%. They are formed in fine sands deposited by wind or water.

Sandy Loams and Loamy Sands

38. Vebar-Flasher, gently undulating. Vebar soils are fine sandy loams on nearly level to rolling uplands. Slopes are plain or convex. Slope gradients range from 2% to 15%. They are formed in residuum weathered from soft calcareous sandstone.

Flasher soils are loamy fine sands on crests of hills, ridges, and steep sides of valleys in uplands. Slope gradients range from 6% to 50%. They are formed in soft sandstone.

Friable and Claypan Soils

39. Niobell-Noonan, gently undulat-

ing. Niobell soils are loams on nearly level to undulating glacial till plains. Slope gradients commonly are less than 3%, but range from 1% to 9%. They are formed in firm loam or clay loam glacial till.

Noonan soils are loams having moderate claypans which occur on nearly level to gently rolling glacial till plains. Slope gradients commonly are less than 3%, but range from 1% to 9%. They are formed in firm loams or clay loam glacial till.

40. Regent-Rhoades, strongly undulating. Regent soils are described in unit 16.

Rhoades soils are loams having dense claypans which occur on nearly level to sloping upland plains, terraces, and concave swales. Slope gradients of 1% to 9% are most common. They are formed in stratified loamy and clayey material derived from saline-alkali soft shales.

Claypan Soils

41. Rhoades-Cabba, rolling. Rhoades soils are described in map unit 40 and Cabba in map unit 31.

42. Rhoades-Reeder, undulating. Rhoades soils are described in map unit 40.

Reeder soils are loams on nearly level undulating and rolling plains. Slope gradient typically is 1% to 15%. They are formed in material weathered from soft, calcareous fine grained sandstones and silty shales.

43. Rhoades-Vebar, undulating. Rhoades soils are described in map unit 40 and Vebar soils in unit 38.

E. Warm, Dry Plain (Typic Ustoll Area)

Silt Loam to Clay Loam Soils

44. Beadle, gently undulating. Beadle soils are loams on nearly level to sloping landscapes with slope gradients typically 0% to 6% and ranging from 0% to 9%. These soils are formed in firm clay loam glacial till.

45. Highmore-Eakin, gently undulating. Highmore soils are silt loams on nearly level to undulating uplands. Slopes are plane to convex and range from 0% to 9%, but most commonly are less than 2%. These soils are formed in silty glacial drift.

Eakin soils are silt-loams on nearly level to sloping plains. Slopes are smooth plane or convex. Slope gradients range from 0% to 9%. These soils are formed in a silty mantle overlying glacial till.

46. Houdek-Prosper, gently undulating. Houdek soils are loams on nearly level to moderately steep uplands on very gently undulating to rolling glacial till plains. Slope gradients typically are less than 6% but range from 0% to 15%. These soils are formed in friable, calcareous loam or clay loam glacial till.

Prosper soils are loams on level and gently sloping landscapes with slope gradients typically of 0% to 2% but ranging from about 0% to 6%. These soils are formed in loam or clay loam glacial till.

47. Kadoka-Huggins, undulating. Kadoka soils are described in map unit 13 and Huggins in map unit 14.

48. Lowry, gently undulating. Lowry soils are silt loams on nearly level to strongly sloping uplands and terraces. Slope gradients range from 0% to 15%, but typically are less than 6%. These soils formed in calcareous silty sediments of recent eolian origin.

49. Reliance, gently undulating. Reliance soils are silty clay loams on nearly level to moderately sloping loess covered table lands that are underlain by bedded shale, loamy sediments, or residuum. The surfaces are plane or convex. Slope gradients typically are less than 6%, but range to 15%. these soils are formed in silt loam or silty clay loam material with contrasting substrata typically below depths of 5 to 10 feet, but ranging to as shallow as 40 inches.

Loamy Soils

50. Clarno-Ethan, undulating. Clarno soils are loams on nearly level to rolling positions on till plains. Slopes are plane to convex with slope gradients from 0% to 15%. These soils are formed in friable, loam and clay loam glacial till.

Ethan soils are loams on upland till plains. Slopes typically are short and irregular and surfaces are convex. Slope gradients range from 2% to 25%. These soils are formed in loam and clay loam calcareous glacial till or silty drift.

51. Ethan-Clarno-Betts, strongly undulating. Ethan and Clarno soils are described in map unit 50.

Betts soils are loams on undulating to very steep uplands in rolling and hilly glacial moraines and side slopes of drainageways. Slope gradients range from 2% to 40%. These soils formed in calcareous loam or clay loam glacial till.

52. Glenham-Hoven-Java, undulating. Glenham soils are loams on nearly level to moderately steep glaciated uplands. Slope gradients range from 0% to 15%. These soils are formed in loam or clay loam glacial till.

Hoven soils are silt loams in closed depressions. Slope gradients are less than 2%. These soils are formed in local alluvium.

Java soils are loams on gently sloping to moderately steep slopes on glacial uplands. Slope gradients range from 2% to 25%. These soils are formed in friable, loam or clay loam glacial till.

Clayey Soils

53. Millboro-Lakoma, gently undulating. Millboro soils are silty clays on nearly level to rolling uplands. Slope gradients range from 0% to 15% and surfaces are plane or convex. These soils are formed in clayey material weathered from shale.

Lakoma soils are silty clays on gently sloping to moderately steep or hilly uplands. Slope gradients range from 2% to 25%. These soils are formed in residuum weathered from clay shales.

54. Opal-Promise, undulating. Opal soils are clays on nearly level to steep uplands. Slope gradients range from 0% to 25%, but typically are between 2% and 9%. These soils are formed in residuum or locally transported clay sediments weathered from clay shales.

Promise soils are clays on nearly level to moderately steep uplands, colluvial fans, and terraces. Slope gradients range from 0% to 15%. These soils formed in clay sediments weathered from clay shales.

Clayey Soils and Shale Breaks

55. Sansarc-Opal, rolling. Sansarc soils are clays on sloping to steep breaks in dissected shale plains. The slope gradients range from 0% to 40%. These soils are formed in clayey residuum weathered from shale.

Opal soils are described in map unit 54.

56. Sansarc-Shale Land, hilly. Sansarc soils are described in map unit 55.

Shale land includes rugged valley sides having slopes so steep that little soil has been able to develop over raw shale. Vegetation is sparse or absent and erosion of material can be severe.

Loamy Terrace Soils Moderately Deep and Deep Over Gravel

57. Enet-Delmont, nearly level. Enet soils are loams on nearly level, gently undulating, and gently rolling landscapes. The slope gradients are usually less than 4% but range from 0% to 9%. These soils are formed in loamy alluvium, 20

to 36 inches thick, over stratified sands and gravels from glacial melt water sediments.

Delmont soils are loams on nearly level to steep slopes of broad outwash plains and terraces. Slope gradients range from 0% to 25%. These soils are formed in loamy alluvium, 10 to 20 inches thick, over stratified sands and gravel.

Sandy Loams to Fine Sands

58. Anselmo-Tassel, undulating. Anselmo soils are fine sandy loams on upland and terrace slopes. Slope gradient ranges from 0% to 30%. These soils are formed in mixture of sandy or loamy aeolian material.

Tassel soils are fine sandy loams on gently to steeply sloping uplands, usually on the crests and shoulders of ridges and hills. Slope gradients range from 3% to 45%. These soils are formed in residuum from the underlying soft sandstone bedrock.

59. Blendon-Enet, gently undulating. Blendon soils are sandy loams on nearly level to gently sloping terraces and alluvial fans. Slopes are plane to concave with slope gradients of 0% to 6%. These soils are formed in sandy glacial meltwater deposits of mixed mineralogy.

Enet soils are described in soil map unit 57.

60. Doger-Elsmere, undulating. Doger soils are loamy fine sands on nearly level to gently sloping concave surfaces mostly in undulating and rolling landscapes. Slope gradients are mostly less than 3% but range from 0% to 6%. These soils are formed in mostly windworked materials of fine and loamy sand texture.

Elsmere soils are loamy fine sands in sandhill valleys or on terraces, and footslopes along streams flowing out of the sandhills. Slope gradient ranges from 0% to 2%. These soils formed in water and wind reworked sands.

61. Holt-Anselmo, undulating. Holt soils are fine sandy loams on nearly level to moderately steep table lands having convex surfaces. Slope gradients range from 0% to 15% but usually are less than 10%. These soils are formed in residuum weathered from moderately soft calcareous sandstone.

Anselmo soils are described in map unit 58.

Friable and Claypan Soils

62. Raber-Cavo-Peno, undulating. Raber soils are loams on nearly level to moderately steep uplands. Slope gradients range from 0% to 15%. Slopes are plane and convex.

These soils are formed in firm clay loam glacial till.

Cavo soils are loams having moderately developed claypans and occur on nearly level to gently sloping till plains. Slope gradients typically are less than 2% but range from 0% to 6%. These soils are formed in glacial till.

Peno soils are loams on gently undulating to rolling and moderately steep on glacial till plains. Typically, slopes are short and convex, and range from 2% to 15%. Peno soils are formed in firm clay loam glacial till.

Claypan Soils

63. Stickney-Beadle-Dudley, nearly level. Stickney soils are loams having weakly developed claypans and occur on the broad nearly level areas on glacial till plains. The soil surfaces are plane to convex. Slope gradients typically are 0% to 3% but range from 0% to 6%. These soils are formed in calcareous clay loam or loam glacial till.

Beadle soils are described in map unit 44.

Dudley soils are silt loams having moderately developed claypans and occur on plane to slightly concave surfaces. The slope gradients typically are 0% to 3%, but range from 0% to 6%. These soils are formed in calcareous glacial till on upland till plains and in upland swales.

F. Cool Moist Prairie (Udic Boroll Area)

Silty and Loamy Soils

64. Barnes-Williams, gently undulating. Barnes soils are nearly black loams on nearly level to hilly glacial till plains. Slope gradients typically are 2% to 6%, but range from 0% to 20%. These soils are formed in materials weathered from loamy glacial till.

Williams soils are very dark grayish brown loams on nearly level to steep slopes of glacial till plains. The slopes commonly are less than 9% but range from 1% to 35%. These soils are formed in calcareous glacial till of mixed mineralogy.

65. Beotia-Harmony, nearly level. Beotia soils are silt loams on nearly level to gently sloping lake plains having plane and convex surfaces. Slope gradients are mostly less than 4% but range from 0% to 6%. These soils are formed in laminated glaciolacustrine stratified deposits which are dominantly composed of silt and with thin lenses of sandy or clayey material.

Harmony soils are silty clay loams having weakly developed claypans occurring on nearly level lake plains. Slope gradients are less than 2%. These soils are formed in calcareous lacustrine deposits of stratified silt, fine sand, and silty clay.

66. Eckman-Gardena, nearly level. Eckman soils are loams on glacial lake plains. Slope gradients range from 1% to 10%. These soils are formed in calcareous stratified glaciolacustrine silt and very fine sand.

Gardena soils are silt loams with very thick surface horizons occurring on nearly level terraces, deltas, and glacial lake plains. Slope gradients commonly average between 1% and 3% and range from 0% to 9%. These soils formed in calcareous silt and very fine glaciolacustrine sediments.

67. Heimdal-Sisseton, gently undulating. Heimdal soils are loams on nearly level to hilly ground moraines in the till plains. Slope gradients typically average between 2% and 5%, but range from 0% to 25%. These soils are formed in calcareous loamy glacial till.

Sisseton soils are loams on undulating to rolling uplands. Slope gradients commonly are 3% to 15%, but range from 2% to 40%. These soils are formed in calcareous, loamy and silty drift.

68. Kranzburg, nearly level. Kranzburg soils are silty clay loams on glacial plains having gentle, smooth, and uniform slopes with surfaces plane or slightly convex. Slope gradients typically are less than 6%, but range from 0% to 9%. These soils are formed in 20-40 inches of silty material over clay loam glacial till.

69. Kranzburg-Brookings, gently undulating. Kranzburg soils are described in map unit 68.

Brookings soils are nearly black silty clay loams having thick surface horizons occurring on nearly level upland flats, and broad ridge tops and in swales on uplands. Slope gradients range from 0% to 6%. These soils formed in 20 to 40 inches of loess or silty materials over calcareous glacial till.

70. Poinsett-Waubay-Parnell, gently undulating. Poinsett soils are silt loams on nearly level to undulating uplands having plane to convex slopes with gradients of 0% to 9%. They are formed in calcareous silty glacial drift or outwash sediments.

Waubay soils are nearly black silt loams with thick surface horizons on level or nearly level till uplands, on flats, in slight depres-

sions and swales, and on lower slopes. The slopes are plane or concave with gradients of 0% to 3%. The soils are formed in calcareous silty glacial drift.

Parnell soils are thick black silty clay loams occurring in depressions in glacial moraines. Slope gradients are less than 1%. These soils are formed in moderately fine and fine-textured, water sorted sediments from glacial drift.

71. Singsaas, gently undulating. Singsaas soils are worm-worked silt loams on nearly level depressed upland drainageways to rolling ground moraines. Slope gradients range from 0% to 15%. These soils formed in clay loam glacial till or glacial till overlain by a thin mantle of silty material.

72. Vienna-Lismore, gently undulating. Vienna soils are silty clay loams on nearly level to hilly uplands having plane and slightly convex surfaces. Slope gradients typically are less than 6%, but range from 0% to 15%. These soils formed in silty material and calcareous loamy glacial till; the silty material ranges from 10 to 20 inches in thickness.

Lismore soils are silty clay loams on nearly level upland flats and in upland swales in glacial till plains. Slope gradients typically are less than 2%, but range to 6%. These soils are formed in 10 to 20 inches of silty mantle over glacial till.

Sandy Loams and Loamy Sands

73. Maddock-Hecla, gently undulating. Maddock soils are described in map unit 37.

Hecla soils are nearly black loamy fine sands on plane and convex surfaces of sandy lacustrine and glacial outwash plains and nearby sand-mantled till plains. Slope gradients typically are less than 3% and range from 0% to 6%. These soils are formed in reworked sands.

74. Buse-Forman, strongly undulating. Buse soils are loams on slightly to strongly convex-shaped slopes in glacial moraines. Slope gradients range from 4% to 50%. These soils are formed in calcareous loam or clay loam glacial till.

Forman soils are clay loams on nearly level to rolling glacial till plains. Slope gradients commonly are 1% to 4%, but range from 0% to 15%. These soils formed in calcareous loam or clay loam glacial till.

Loamy Soils with Sandy and Gravelly Substrata

75. Renshaw-Fordville-Sioux, undulating. Renshaw soils are loams on nearly level to steep outwash plains, glacial stream terraces, and terrace escarpments. Slope gradients typically are less than 6%, but range from 0% to 25%. These soils are formed in a thin layer of loamy alluvium, 10 to 20 inches thick, over thick beds of sand and gravel.

Fordville soils are loams on outwash plains and stream terraces. Slopes are plane to convex and slope gradients range from 1% to 9%. These soils are formed in loamy alluvium, 20 to 36 inches thick, over stratified sands and gravels.

Sioux soils are loams on nearly level to undulating outwash plains and terraces, terrace escarpments, and on knolls and ridgetops in undulating to steep glacial moraines. Slopes are plane or convex and gradients range from about 2% to 4%. These soils are formed in sand and gravel outwash.

Clayey Soils

76. Peever-Forman, gently undulating. Peever soils are heavy clay loams on nearly level to sloping uplands having plane and convex slopes. Slope gradients typically are less than 6%, but range from 0% to 9%. These soils are formed in firm clay loam glacial till.

Forman soils are clay loams on nearly level to rolling glacial till plains. Slope gradients commonly are 1% to 4%, but range from 0% to 15%. These soils are formed in calcareous loam or clay loam glacial till.

Claypan and Friable Soils

77. Harmony-Aberdeen-Beotia, nearly level. Harmony soils are described in map unit 65.

Aberdeen soils are silty clay loams having moderately developed claypans and occurring on nearly level lake plains. Slope gradients are less than 2%. These soils are formed in calcareous lacustrine desposits of silt, fine sand, and clay.

Beotia soils are described in map unit 65.

G. Warm Moist Prairie (Udic Ustoll Area)

Silty Soils

78. Egan-Wentworth-Clarno, undulating. Egan soils are silty clay loams on nearly level to undulating uplands. Slope gradients range from 0% to 9% and surfaces are convex to plane. These soils are formed in silty sediments that mantle clay loam glacial till or loamy stratified silty drift.

Wentworth soils are silty clay loams on nearly level to undulating uplands. Surfaces are plane to convex with slope gradients from 0% to 9%. These soils are formed in silty glacial drift.

Clarno soils are loams on nearly level to rolling positions on till plains. Slopes are plane to convex with slope gradients from 0% to 15%. These soils are formed in friable, loamy and clay loam glacial till.

79. Egan-Wentworth-Viborg, gently undulating. Egan and Wentworth soils are described in map unit 78.

Viborg soils are nearly black silty clay loams with thick surface horizons occurring on level to gently sloping areas in slight depressions, swales, and heads of drainageways. Surfaces are concave or plane and slope gradients typically are less than 3%, but range to 6%. These soils are formed in silty materials and clay loam glacial till or loamy drift.

80. Moody-Nora, undulating. Moody soils are silty clay loams on long, smooth plane and convex slopes in nearly level to rolling uplands. Slope gradients are mostly between 3% and 9%, but range from about 0% to 17%. These soils are formed in friable loess of silt loam texture.

Nora soils are silt loams on gentle to strongly sloping uplands having convex surfaces and slopes. Slope gradients range from 1% to 17%. These soils are formed in friable loess of silt loam texture.

81. Moody-Trent, gently undulating. Moody soils are described in map unit 80.

Trent soils are silty clay loams on plain or concave slopes in the upland; on flats, in slight depressions, and swales; and on very gentle lower slopes. Slope gradients are typically 1% and range from 0% to 2%. These soils are formed in friable calcareous loess.

82. Egan-Clarno, undulating. Egan and Clarno soils are described in map unit 78.

83. Nora-Moody-Crofton, strongly undulating. Nora and Moody soils are described in map unit 80.

Crofton soils are thin silt loams on convex slopes. The slope gradients range from 2% to 60%. These soils are formed in silty loess.

Clayey Soils

84. Luton-Lamo-Albaton, nearly level. Luton soils are silty clays on nearly level to flat low second bottoms or backswamp areas of the second bottom lands. These soils

are formed in deep clayey alluvial sediments.

Lamo soils are silty clay loams on nearly level flood plains. Slope gradients are 0% to 2%. These are formed in dark colored, calcareous alluvium.

Albaton soils are silty clays on nearly level bottomlands which are subject to flooding unless protected by dams or levees. These soils are formed in recent, calcareous, clayey alluvium more than 40 inches thick. The area of occurrence is several miles wide and borders the Missouri River channel, or channels of its tributary streams.

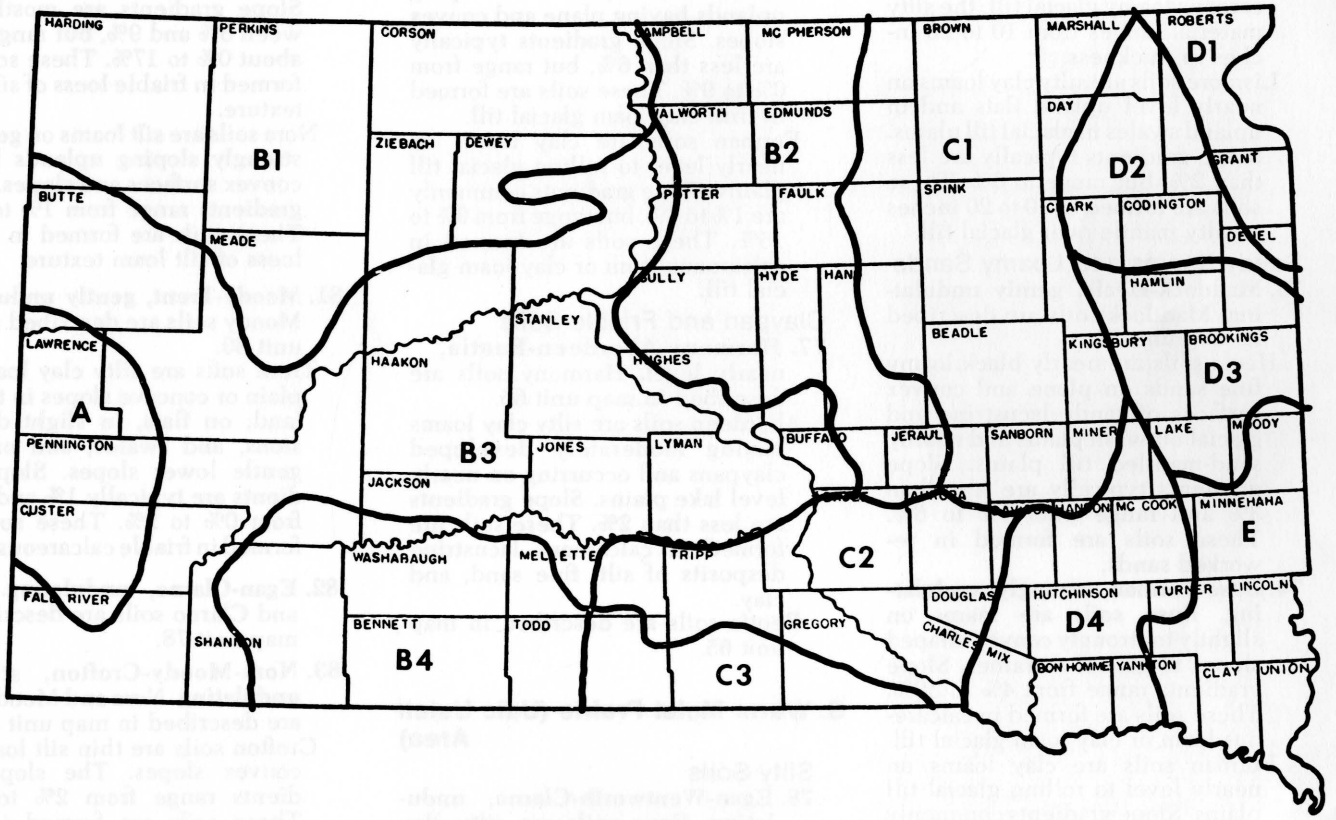


Figure 9. Crop adaptation areas of South Dakota.

A Black Hills
B1 Northwestern Tableland
B2 North Central Glacial Upland
B3 Pierre Plain
B4 Southwestern Tableland
C1 Northern James Valley
C2 South Central Upland
C3 South Central Tableland
D1 Northeast Lowland
D2 Northern Prairie Coteau
D3 Central Prairie Coteau
D4 Southern James Flatland
E Southeast Prairie Upland

6 Interpretation of Soils

Soil interpretation in this publication is confined to grouping soils to show land use patterns, relative yielding abilities, and soil management problems. For this purpose the state was divided into 13 interpretation or crop adaptation areas. These interpretation areas were arrived at by starting with the major soil regions presented in Chapter 1 and shown in Figures 1 and 7. Several of the major soil regions were subdivided in response to small, significant climatic and parent material variations within the region. The resulting map, Figure 9, shows the soil interpretation or crop adaptation areas of South Dakota. Yielding predictions for individual soil series appear in the Appendix.

Land Use Patterns

Principal crops grown. The approximate percentage of each crop planted in 1970-75 in each of the 13 interpretative areas is shown in Figures 10 through 23. The data are for percentages of total land and represent approximations (South Dakota Crop and Livestock Reporting Service, 1970-75). Data given are for corn, Figure 10; oats, Figure 11; barley, Figure 12; rye, Figure 13; flax, Figure 14; soybeans, Figure 15; durum wheat, Figure 16; other spring wheat, Figure 17; winter wheat, Figure 18; sorghum, Figure 19; alfalfa seed production, Figure 20; alfalfa hay, Figure 21; wild hay, Figure 22; and pasture, rangeland, or timber (Black Hills) Figure 23. Heavy lines in this series of Figures (10 through 23) separate areas of equal land use for the designated crop.

Percentages that are given in Figures 10 through 23 show that each of the interpretive areas reflects a land use pattern compatible with the classification of the soils of the area. Soils of the Southeast Prairie Upland (area E) are used mainly for corn, soybeans, and oats. Rangeland and wheat are the dominant land use for the soils in areas B1, B2, B3, and B4. The C and D areas are more general farm areas. Spring wheat along with pasture, corn, and oats were dominant in C1; grazing with sorghum, corn, spring grains, and winter wheat in C2; and grazing, sorghum, winter wheat, corn, and oats in C3. In D1 corn, oats, pasture, flax, and spring wheat are dominant; in D2 pasture, corn, oats, flax, and spring wheat rate in that order; in D3 corn, pasture, oats and flax lead; and in D4 corn, pasture, oats, and soybeans are dominant.

Farm information by county. Data for each county for 1975 are presented in Figures 24 and 28. Included are average size of farms and relative percentage rating per acre of unimproved land (based on 1967-74 sales data).

Generally the smallest farms are in the Southeast Prairie Upland with the largest farms in the Northwestern and Southwestern Tablelands (see Figure 24). Average farm size in South Dakota has been increasing by 13.9 acres per year over the last 46 years, from 439 acres in 1930 to 1,058 acres in 1975 (see Figure 25). The largest increase in farm size has occurred in the area west of the Missouri River (see Figure 26).

Since 1930 the number of farms has decreased from 84,300 to 43,000 in 1975 or an average loss of about 900 farms per year (see Figure 27). As average farm sizes increased in South Dakota the number of farms has decreased.

Farms may be given a rating based on the ability of the soil to produce important crops. Such a rating is given in Figure 28. Farms in the Southeast Prairie Upland have the highest percentage rating per acre of unimproved land while farms in Northwestern Tableland have the lowest (see Figure 28). The percentage rating falls off rapidly as one moves north and west of the Southeast Prairie Upland. This trend is closely related to average annual precipitation (see Figure 4).

Crop Yield Predictions

In Table 3, potential yields are given for corn, wheat, oats, barley, flax, sorghum, soybeans, rye, alfalfa hay, wild hay, and range for each soil association area. The potential yields were developed by checking the experiences of farmers plus the yield records from the soil experiment fields located around the state on a variety of soils. These potential yield figures show what yields can reasonably be expected. Improved management is defined as management where nutrient losses by cropping are made up by a fertilization program; loss of organic matter, nitrogen, and soil structure are reduced by growing legumes; and an effective soil moisture conservation program is followed.

The potential yield figures given are average yields a farmer can expect over a long period of years. In any one year, yields could be 20% above or below the potential; and in one year in three or four, they could fall outside of this range. This variation is caused by yearly fluctuations in the weather.

Soil Management Problems

Conserving moisture. One of the most serious soil management problems in South Dakota is moisture conservation. This problem is present in every region of the state, although it is most serious in regions B1-B4 (see Figure 9) or the Cool Very Dry Plain, the Cool Dry Plain, the Warm Very Dry Plain, and the Warm Dry Plain soil regions. Precipitation is light in these areas while evaporation and runoff losses are considerable, even with a close growing crop such as alfalfa on the land. Moisture losses under alfalfa amount to about 40% of the total annual rainfall in the Warm Moist Prairie soil region (region E on Figure 9) and about 50% in the Cool Dry Plain, the Warm Very Dry Plain, and the Warm Dry Plain soil regions. Moisture losses under corn or wheat are higher, ranging from 50% in the Warm Moist Prairie soil region to about 60% in the Cool Dry Plain, the Warm Very Dry Plain, and the Warm Dry Plain soil regions. (It is assumed that 7 acre-inches of moisture are necessary to produce 1 ton of alfalfa, and 1 acre-inch to produce 3 bushels of wheat or 5 bushels of corn. These figures are only approximations.)

The problem is to reduce moisture losses. It is probably impossible to raise moisture utilization above that achieved by alfalfa which covers the land the year around. However, if moisture utilization for other crops can even approach that achieved under alfalfa, yields in every region of the state could be substantially increased. For example in the Northern James Valley Area the average alfalfa yield for the period 1970-75 was 1.66 tons per acre. This uses each year 12 of the 19 inches of average annual precipitation. If in this same region corn and wheat could use 12 inches of the moisture annually received and other conditions were favorable, yields could be 60

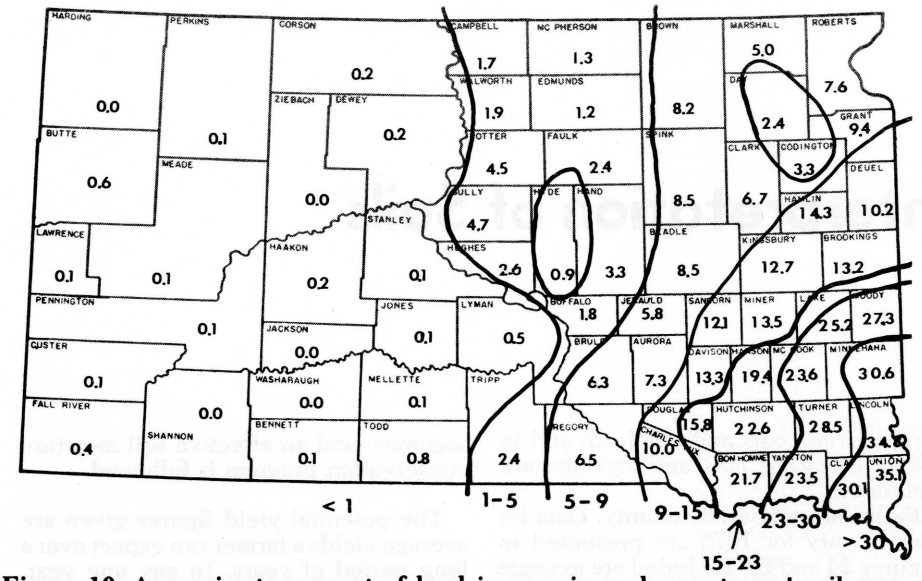


Figure 10. Approximate percent of land in corn in each county and soil area —1970-75.

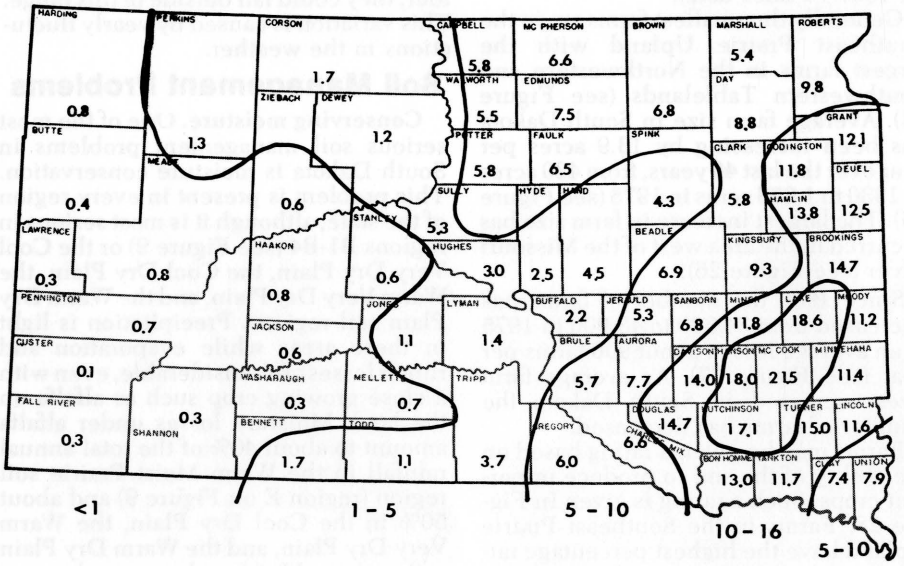
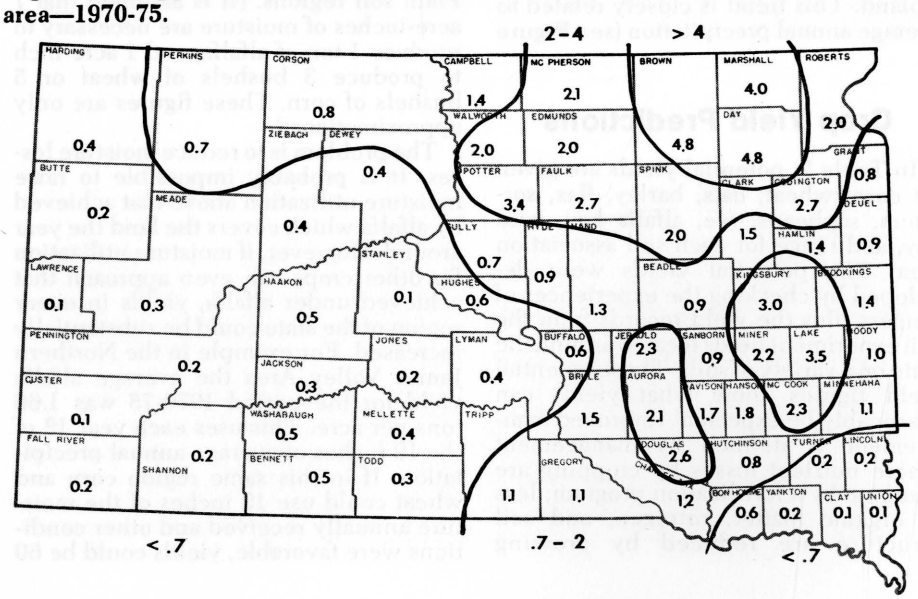


Figure 11. Approximate percent of land in oats in each county and soil area—1970-75.

Figure 12. Approximate percent of land in barley in each county and soil area—1970-75.



bushels for corn and 36 bushels for wheat. The 1970-75 approximate average yield for these crops for this area was 36 bushels for corn and 22 bushels for wheat. Each crop used only about 7 inches of moisture each year it was grown.

Moisture is lost mainly through runoff, evaporation, and transpiration by weeds. Runoff and evaporation occur when water does not soak into the soil where it falls. Texture of the soil has a great effect on how readily water soaks in. For example, sandy soils usually absorb more water than loams and clays. This is the reason corn, a deep rooted crop, does so well on sandy soils in the Northern James Valley. Sandy soils, however, have a severe wind erosion hazard and are low in nitrogen. Therefore to capitalize on the good moisture relations of sandy soils, it is necessary to provide nitrogen and an adequate cover to prevent erosion or these factors will limit production.

Finer textured soils than sand tend to puddle when raindrops splash on the bare surface. Thus the soil is sealed over and large moisture losses occur by runoff and evaporation and, in addition, soil losses by wind and water erosion can occur.

One way to increase the water intake of medium and fine textured soils is to increase the organic matter content. Organic matter acts as a sponge to absorb water. It also helps impart a favorable granular structure to the soil which will increase water intake. Moreover, nitrogen and phosphorus, both essential plant food elements, are present in organic matter. Added organic matter, therefore, will increase water intake, add essential nutrient elements, and decrease runoff, erosion, and evaporation losses.

Moisture losses through weed transpiration are serious. Weeds can decrease crop yields by as much as 60% (Reed and Hughes, 1970). One crop of pigeon grass (foxtail) will remove approximately 2 acre-inches of moisture from the soil. Weed control starts with planting clean seed. Once weeds are established there are cultural and chemical methods of control. Cultural methods which include use of good rotations and competing crops in most cases are effective.

Much research is in progress on decreasing soil moisture losses. Weed control and runoff reduction measures are, of course, aimed in this direction. In addition, much work is being done in an attempt to reduce evaporation losses. Generally water vapor is lost most rapidly where there is a vapor transfer to the soil surface of moisture held in the soil profile. Turbulent air at the soil surface removes the water vapor to maintain the flow. Ways of suppressing evaporation loss include (1) decreasing the turbulent transfer of water vapor to the at-

mosphere, and (2) decreasing the vapor transfer to the surface.

Ways used to decrease the turbulent transfer of water vapor include allowing stubble to stand, adding mulch material, and increasing surface roughness. None of these practices in field trials has yet suppressed evaporation to an important degree. It is known, for example, that heavy plant residues conserve heat and consequently turbulent transfer of water vapor to the atmosphere actually is increased.

Surface roughness was found often to increase turbulence. There may be a point where a little stubble on the ground may increase turbulence while more stubble may decrease it. Much research is needed in this area.

Practices used to decrease vapor transfer to the surface include use of certain tillage implements such as the rod weeder and stubble mulching machinery or the use of chemical additives of the soil stabilizer type.

Organic matter and nitrogen loss. A second important soil management problem is the continuing loss of organic matter and nitrogen from South Dakota soils. This problem was touched on briefly in discussing the importance of organic matter for increasing moisture absorption by soils.

Available data show that South Dakota soils have lost (in 70-90 years of cropping) from 25% to 35% of the organic matter and nitrogen originally present in the soils. Although it is not practical or necessary to maintain the amounts of these materials originally present in the soil, yet the losses are great enough to affect the tilth and fertility of the soil and hence crop yields.

Management measures and crop residues returned to the soil are the only means of adding organic matter, although nitrogen can be added in commercial preparations. Alfalfa can return to the soil as much as 80 pounds of nitrogen per acre when the second cutting of a 3-year stand is plowed under. A 40-bushel crop of corn will remove 80 pounds of nitrogen from the soil. This makes it obvious that it is difficult to maintain soil nitrogen at present levels by this method alone, even though only one good crop of corn is raised for every 3 years of alfalfa.

Under present farming systems the organic matter content of our soils will continue to decline. However, the rate of decline is slowing down as more resistant organic materials are encountered. Although nitrogen losses can be made up by commercial products, the effect of lower organic matter levels will further aggravate an already serious moisture conservation problem.

Soil nitrogen and organic matter losses are more serious in the more humid soil regions. This occurs because larger yields of crops in these areas have de-

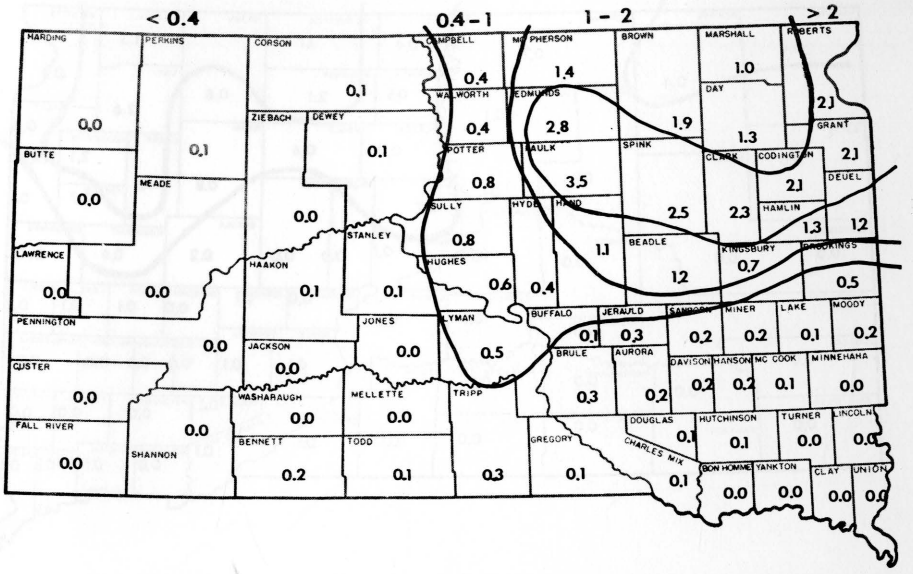


Figure 13. Approximate percent of land in rye in each county and soil area—1970-75.

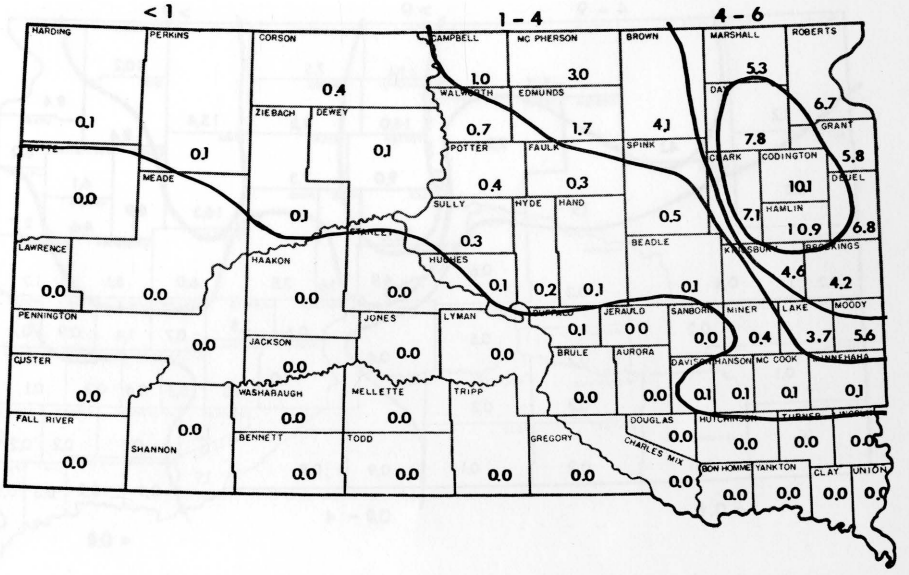
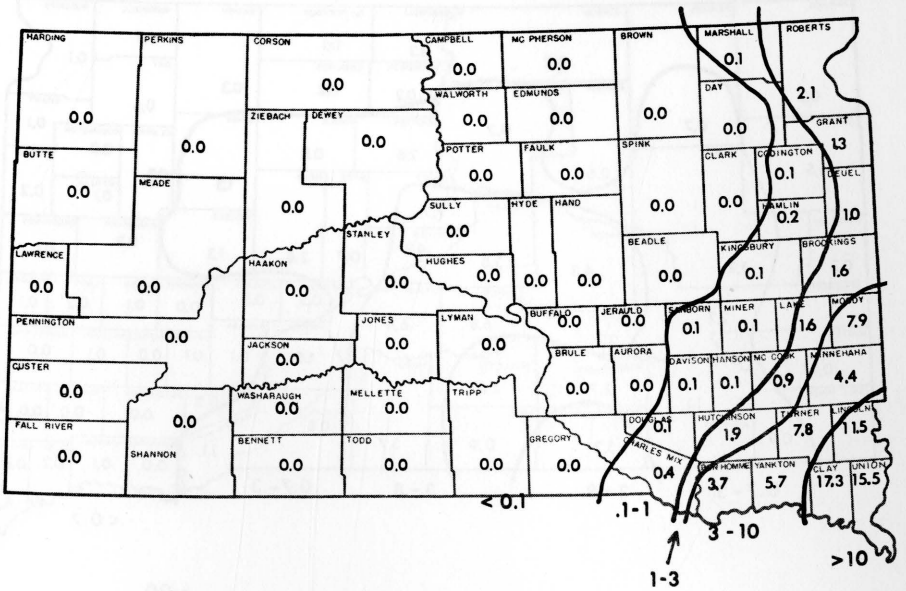


Figure 14. Approximate percent of land in flax in each county and soil area—1970-75.

Figure 15. Approximate percent of land in soybeans in each county and soil area—1970-75.



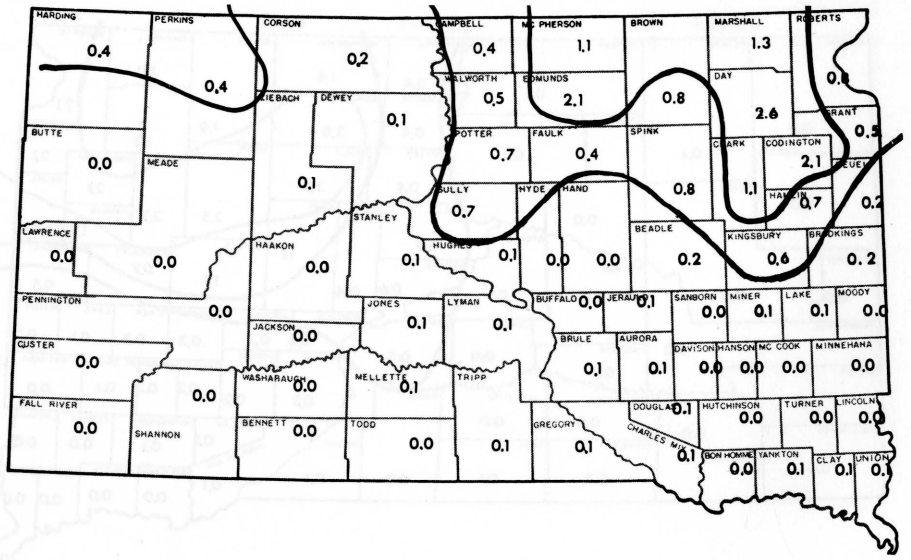


Figure 16. Approximate percent of land in durum wheat in each county and soil area—1970-75.

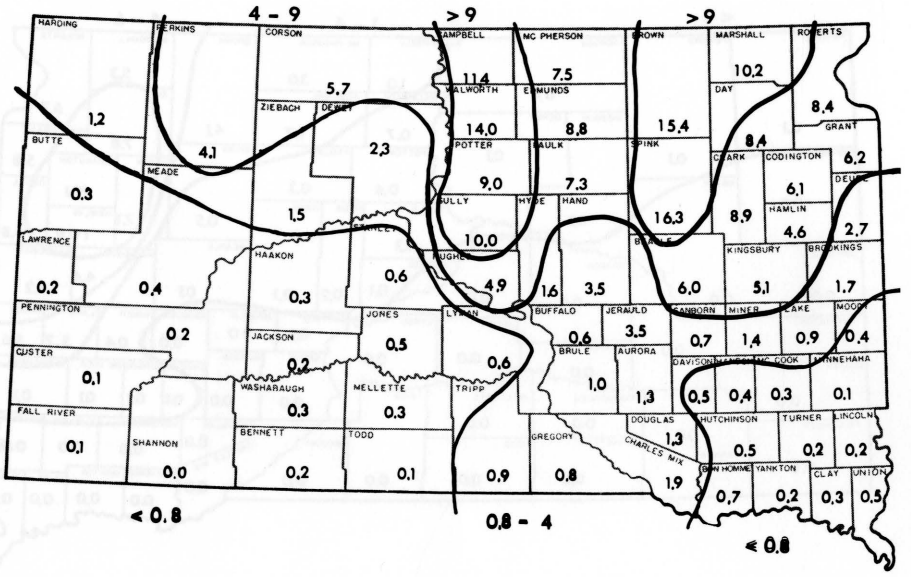
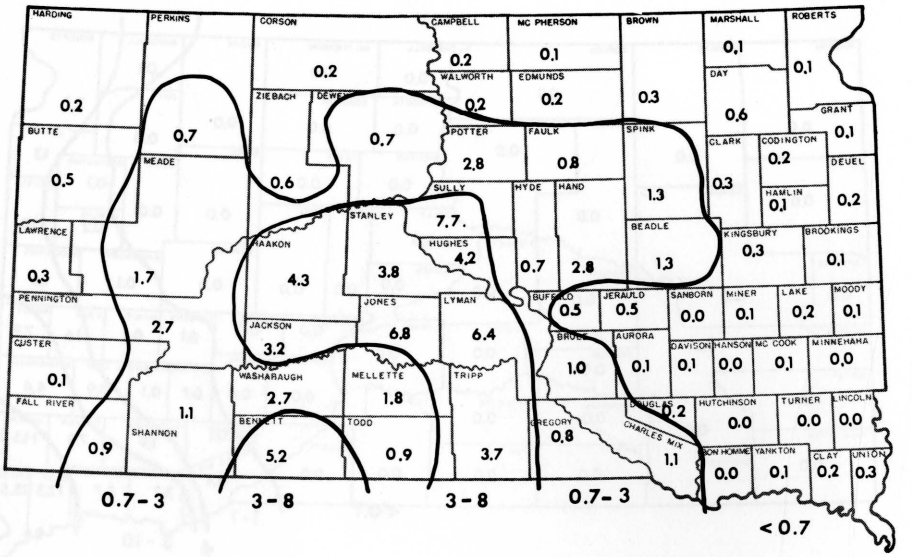


Figure 17. Approximate percent of land in other spring wheat in each county and soil area—1970-75.

Figure 18. Approximate percent of land in winter wheat in each county and soil area—1970-75.



pleted the more humid soils, although in total amounts of nitrogen and organic matter, these soils still rank above the soils of the drier areas.

Other soil nutrients. Except for phosphorus, amounts of nutrient elements including potassium, calcium, and magnesium apparently are present in adequate amounts in South Dakota soils at present. Soil reaction is usually slightly to moderately acid in the surface horizons of South Dakota soils, but because of the high base status of the surface soils and free $CaCO_3$ in the substrata, lime is not needed at present (Ward, et al. 1976).

Available phosphorus, however, is generally in short supply in certain areas of the state, especially for alfalfa. In the soils of the Warm Moist Prairie (Area E), available phosphorus is very low to medium. In other Major Soil Areas (see Figure 9) available phosphorus, based on a summary of soil tests at South Dakota State University ranks as follows: areas D1, D2, D3—very low to low; areas C2, C3—very low to medium; Northern area C1—low to high; areas B1, B2, B3, and B4—very low to high; and the Cool Moist Forest area—very low to high (Ward and Carson, 1975).

Generally within any region, calcareous soils have low levels of phosphorus availability. This is because the phosphorus combines with calcium to form a nearly insoluble compound. Soil tests are the best way to determine the phosphorus needs of a soil. Soil phosphorus can be maintained by the use of commercial fertilizer.

Wind and water erosion. Soil erosion by wind or water is a soil management problem in all regions of South Dakota. Susceptibility to erosion by wind depends largely upon soil texture. Research has shown that soils with a large percentage of sand-sized particles (2.0 to 0.05 mm) are most susceptible to blowing. These particles may be sand grains or clay or silt particles balled up into sand-sized grains.

Wind erosion is caused by a process called saltation. In this process the sand grains or sand-sized granules are blown several feet into the air and then driven with a high velocity into the soil. The impact of the grains upon the soil sprays soils up into the air. The fine individual silt and clay particles are taken up by the wind and blown out of the area. The sand-sized particles rise several feet into the air and again are driven back into the soil and the cycle is repeated.

As wind erosion hazard depends so much on soil texture, it is fairly easy to delineate the susceptible areas. They are shown accurately on county soil surveys and the sandy areas on the soil association maps generally delineate the susceptible areas.

Control measures for wind erosion center about keeping a close growing crop or crop residues on the land at all

times. Because it is difficult to establish cover on sandy soils during dry periods when it is needed the most, the safest procedure for sandy soils is to keep them in perennial vegetation. If these soils are used for grains or row crops, the residues should be returned and left on the soil surface or partly incorporated into the surface soil. If the soils are bare when wind erosion starts, the soil surface may be roughened and thrown up into ridges by tillage implements. These are "last ditch" control measures, however, and it should not be assumed that they will be too effective. A more complete description of conservation tillage methods can be found elsewhere (Williamson, et al. 1976).

Water erosion occurs when rain water falling on the soil surface runs off and takes with it soil particles in suspension. This erosion is affected by soil slope, texture, amount of organic matter, structure, and fertility status. These factors are more or less interrelated. A good soil management program for sloping soils might involve terrace or contour cultivation and a rotation that includes legumes and commercial fertilizer.

Terraces or contours tend to neutralize the slope factor and improve water intake and reduce the amount of water available for runoff and erosion. Legumes in the rotation and the addition of fertilizer increase the amount of organic matter and nutrient status. This improves the structure and hence the ability of the soil to absorb moisture.

Water erosion is serious on sloping lands, especially in eastern South Dakota. Certain soil associations lend themselves to contour erosion control measures, for example the Kranzburg-Brookings association. These soils have long, smooth slopes. Certain of the till soil associations, such as the Williams-Tonka association, have short, choppy slopes, difficult to contour.

Erosion control can best be accomplished on these soils by increasing the percentage of legumes and grasses in the cropping sequence. The added organic matter will increase the rate of water intake and decrease the amount of water available to runoff and erode.

(Table 3 and remaining figures continued on following pages.)

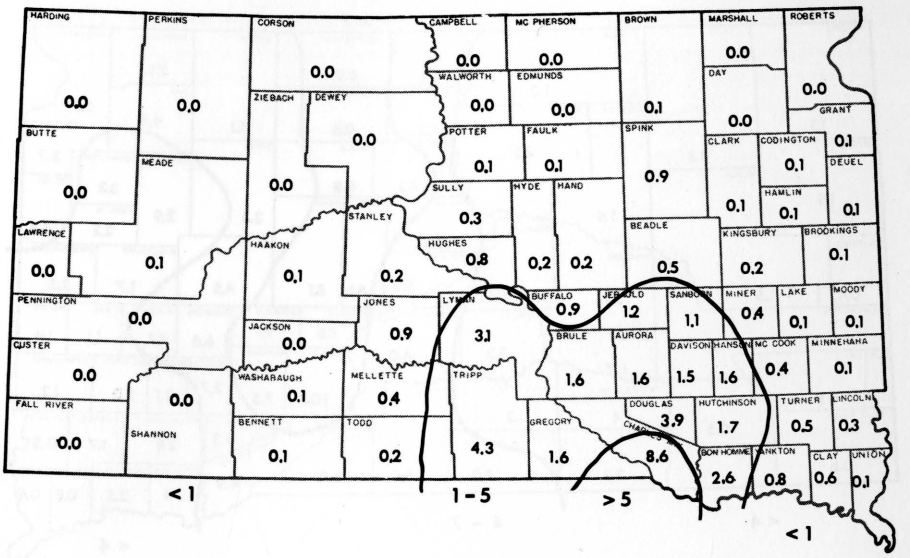


Figure 19. Approximate percent of land in sorghum in each county and soil area—1970-75.

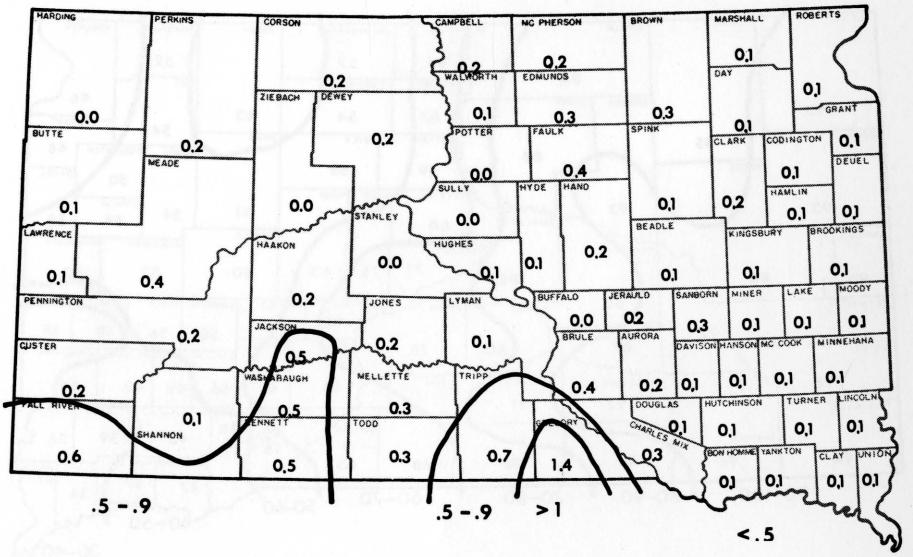
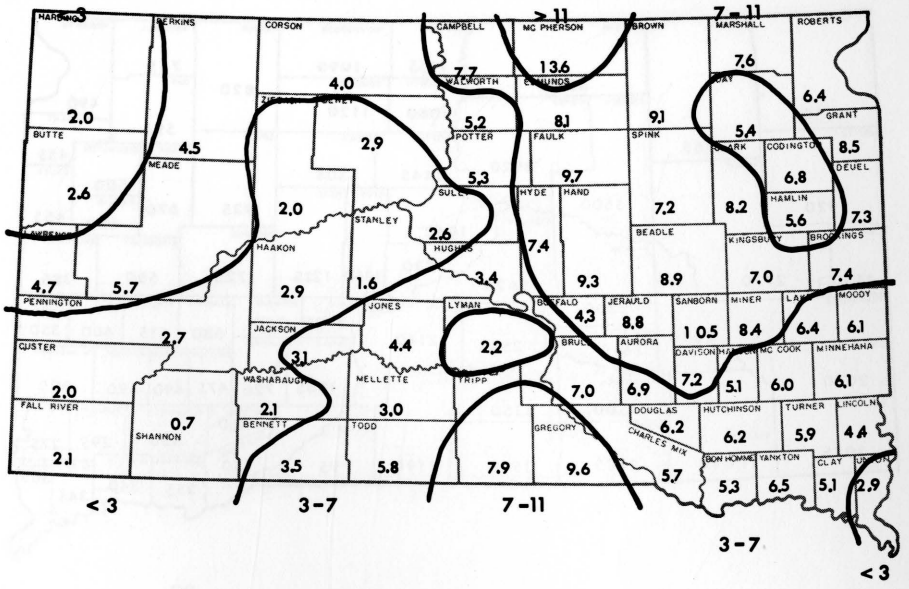


Figure 20. Approximate percent of land in alfalfa seed production in each county and soil area—1970-75.

Figure 21. Approximate percent of land in alfalfa hay in each county and soil area—1970-75.



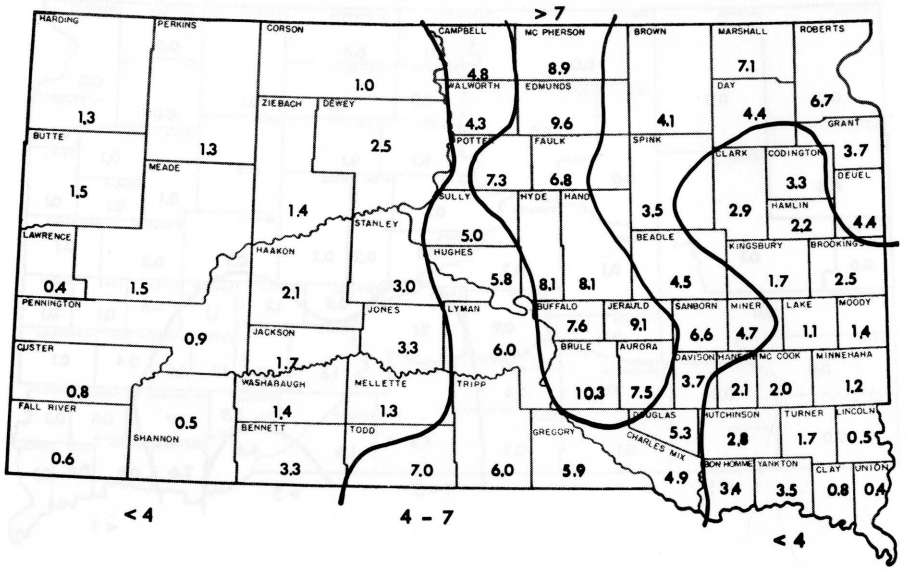


Figure 22. Approximate percent of land in wild hay in each county and soil area—1970-75.

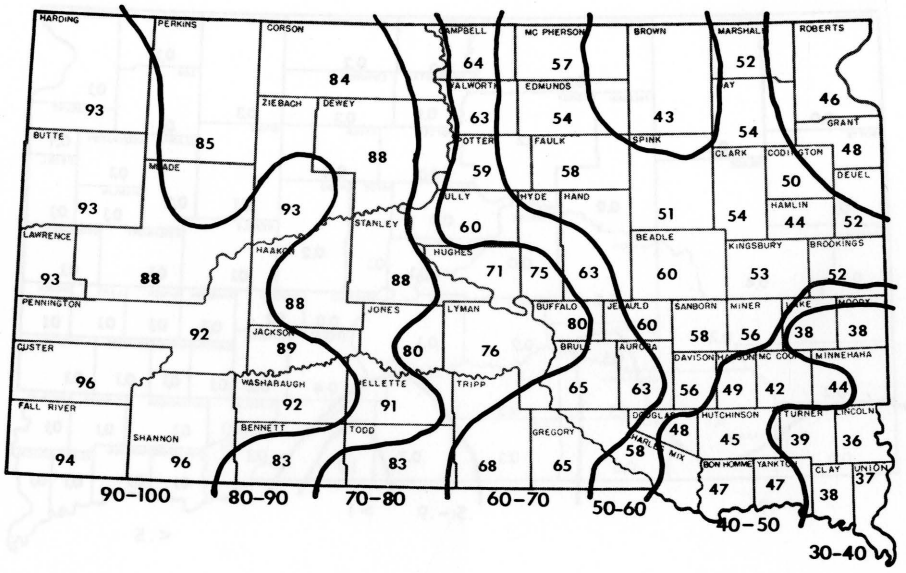


Figure 23. Approximate percent of land not accounted for in figures 10 through 22. Assumed to be in rangeland or pasture (timber for Black Hills) in each county and soil area—1970-75.

Figure 24. Average size of farms per county (acres)—1975.

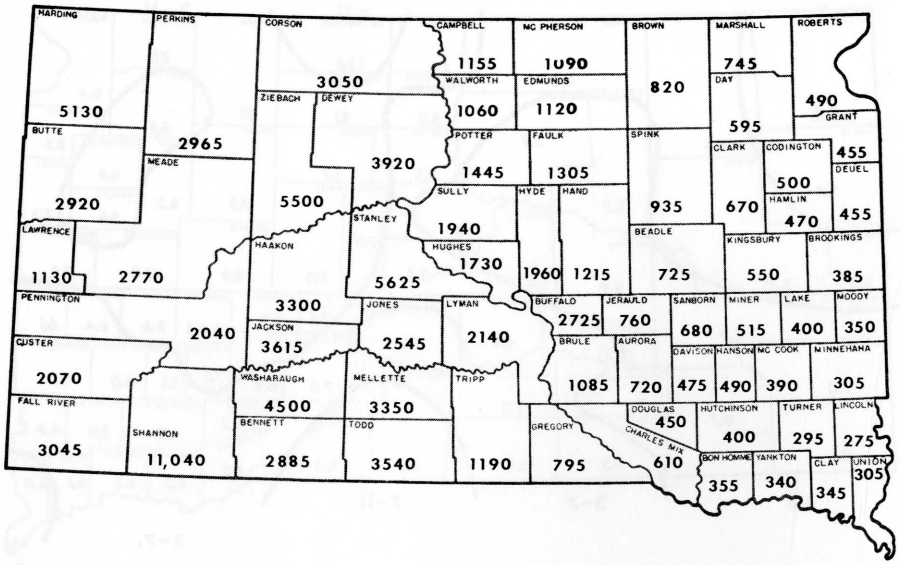
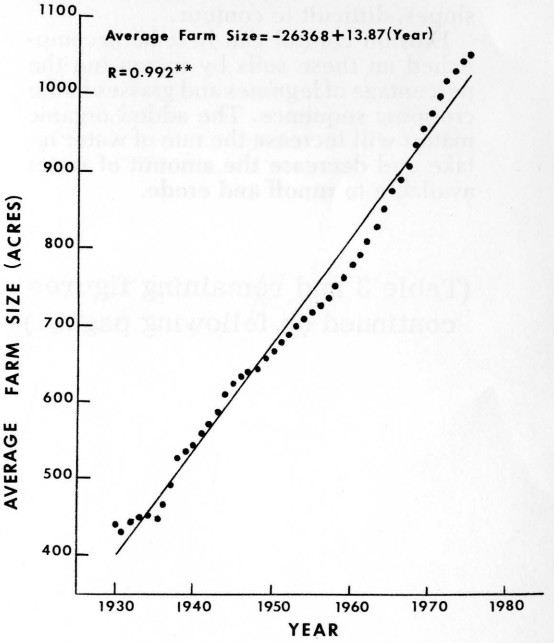


Figure 25. Average increase in farm size since 1930 in South Dakota.



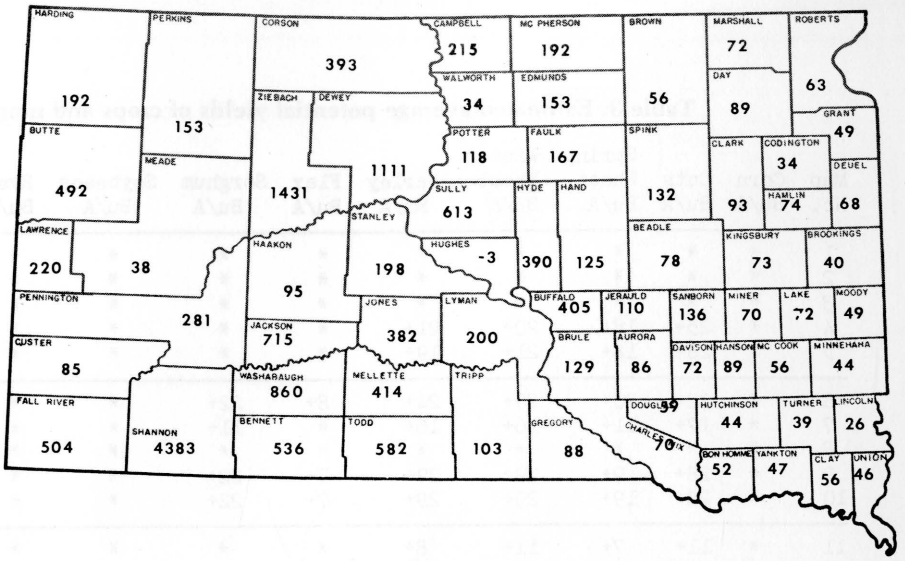


Figure 26. Average acreage increase in farm size per county from 1964 to 1975.

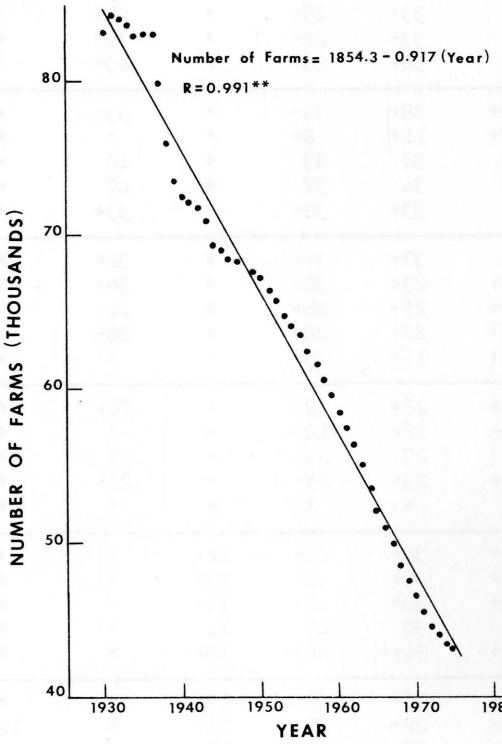


Figure 27. Decrease in number of South Dakota farms since 1930.

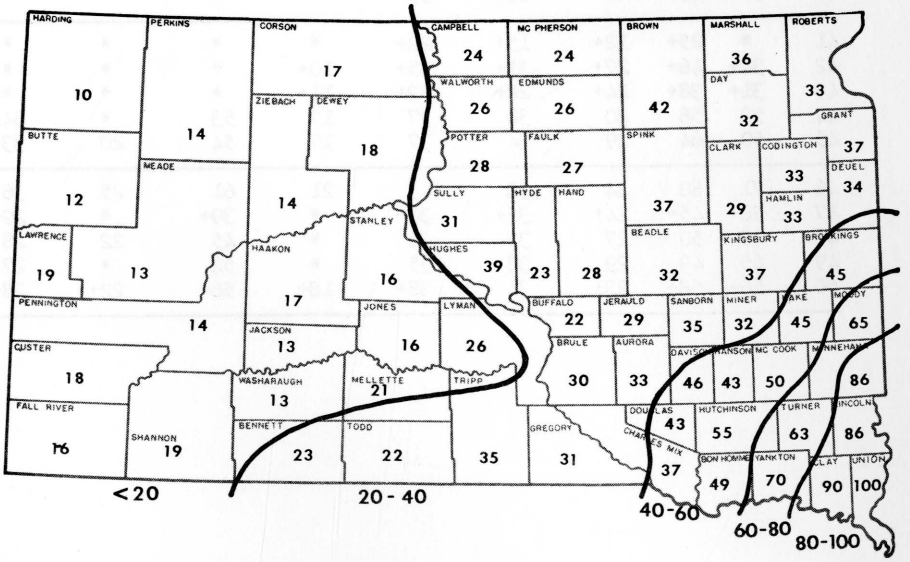


Figure 28. Average percentage rating per acre of unimproved land per county (1967-1974 sales data).

Table 3. Estimated average potential yields of crops and range with improved management.

Map No.	Corn Bu/A	Oats Bu/A	Spring Wheat Bu/A	Winter Wheat Bu/A	Barley Bu/A	Flax Bu/A	Sorghum Bu/A	Soybeans Bu/A	Rye Bu/A	Alfalfa hay T/A	Wild hay T/A	Native range AUM/A	Comparative Crop Ranking (%)
1	*	*	*	*	*	*	*	*	*	*	*	*	0+++
2	*	*	*	*	*	*	*	*	*	*	*	*	0
3	*	*	*	*	*	*	*	*	*	*	*	*	0
4	*	25+	18+	20+	21+	*	*	*	*	1.4+	.60+	.32	37
5	*	28+	18+	21+	19+	*	*	*	*	1.3+	.60+	.29	37
6	*	32+	20+	29+	24+	8+	22+	*	*	1.2+	.75	.33	41
7	*	17+	11+	16+	16+	*	11+	*	*	0.7+	.41	.20	24
8	*	*	*	*	*	*	*	*	*	*	.50	.22	11
9	*	28+	19+	29+	29+	7+	22+	*	*	1.2+	.68	.30	40
10	*	28+	19+	29+	29+	7+	22+	*	*	1.2+	.64	.28	39
11	*	11+	7+	11+	8+	*	*	*	*	0.4+	.30	.15	16
12	*	26	12	14	13	*	13	*	*	1.0	.56	.31	28
13	33+	44+	*	33+	29+	*	33+	*	*	1.3+	.68	.36	48
14	34+	44+	*	33+	28+	*	39+	*	*	1.2+	.68	.37	23
15	34+	43+	*	38+	26+	*	40+	*	28+	1.5+	.73	.38	52
16	*	43+	25+	38+	38+	*	33+	*	*	1.6+	.70	.32	62
17	*	11+	7+	11+	8+	*	*	*	*	0.4+	.38	.20	17
18	36	43	26	34	33	*	40	*	*	1.4	.70	.36	51
19	37	56	28	34	37	*	47	*	*	1.8	.90	.45	58
20	33+	44+	*	33+	30+	*	33+	*	*	1.3+	.73	.36	48
21	28+	41+	*	37+	31+	*	32+	*	*	1.5+	.78	.34	49
22	24+	32+	23+	29+	30+	*	36+	*	*	1.3+	.70	.35	45
23	18+	27+	19+	25+	26+	*	24+	*	*	1.1+	.53	.24	36
24	18+	30+	20+	28+	28+	*	26+	*	*	1.3+	.58	.26	42
25	*	13+	8+	15+	10+	*	*	*	*	0.6+	.40	.20	21
26	18+	30+	20+	28+	28+	*	26+	*	*	1.3+	.40	.24	37+++
27	5+	15+	14+	18+	18+	*	*	*	*	0.3+	.15	.19	21
28	28+	39	20	27	29	*	35	*	*	1.3	.74	.33	44
29	25+	23+	20+	23+	25+	*	25+	*	*	1.0+	.60	.41	37
30	*	*	*	*	*	*	*	*	*	*	*	*	0
31	33+	56+	27+	34+	44+	12+	*	*	*	1.8+	.75	.33	56
32	32+	50+	27+	30+	42+	13+	*	*	*	1.6+	.70	.31	53
33	31+	49+	27+	30+	42+	11+	*	*	*	1.6+	.72	.32	52
34	31	55	28	30	47	14	*	*	32	1.9	1.08	.47	61
35	38++	54++	30++	34++	46++	16++	*	*	34++	2.2++	1.20++	.78	68
36	32+	47+	23+	25+	40+	13+	*	*	30+	1.6+	.85	.41	53
37	35+	38+	19+	22+	31+	11+	*	12	28+	1.3+	.74	.42	45
38	31+	40+	24+	28+	35+	10+	*	*	*	1.4+	.60	.36	47
39	26	35	22	22	25	7	*	*	25	1.5	.60	.34	41
40	31+	42+	27+	29+	33+	*	*	*	*	1.5+	.53	.27	47
41	*	25+	12+	15+	22+	*	*	*	*	0.9+	.60	.26	31
42	34+	46+	27+	31+	35+	10+	*	*	*	1.7+	.78	.32	51
43	31+	38+	24+	28+	33+	11+	*	*	*	1.4+	.80	.34	47
44	52	56	30	30	37	17	53	*	34	2.8	1.00	.56	67
45	50	64	29	34	37	17	54	20	33	2.4	1.00	.60	67
46	71	80	34	30	43	21	61	25	36	3.0	1.20	.67	78
47	36+	45+	24+	35+	30+	*	39+	*	29+	1.3+	.85	.48	53
48	48	50	27	32	36	*	45	22	28	1.7	.80	.41	58
49	45	49	29	38	35	*	52	*	27	2.2	.85	.42	62
50	56+	58+	23+	34	38+	18+	56+	22+	28+	2.6+	1.07	.60	67

Table 3 (cont.)

Map No.	Corn Bu/A	Oats Bu/A	Spring Wheat Bu/A	Winter Wheat Bu/A	Barley Bu/A	Flax Bu/A	Sorghum Bu/A	Soybeans Bu/A	Rye Bu/A	Alfalfa hay T/A	Wild hay T/A	Native range AUM/A	Comparative Crop Ranking (%)
51	48+	52+	20+	28+	32+	16+	47+	*	26+	2.2+	.85	.53	58+++
52	30++	45++	22++	28++	30++	14++	36++	*	28++	1.7++	.80	.61	53
53	28	40	19	31	28	*	40	*	27	1.5	.71	.37	48
54	26+	45+	24+	32+	32+	*	42+	*	*	1.4+	.62	.35	49
55	23+	38+	19+	30+	23+	*	29+	*	*	1.4	.60	.28	41
56	*	*	*	*	*	*	*	*	*	*	*	.20	7
57	40	44	23	33	34	12	36	18	*	1.8	.90	.43	53
58	34+	42+	24+	34+	29+	*	38+	*	26+	1.9+	.75	.39	52
59	44	47	25	29	34	14	42	18	31	2.0	.85	.53	57
60	33+	40+	22+	33+	30+	*	42+	*	33+	2.0+	1.00	.84	59
61	32+	38+	24+	26+	31+	*	30+	*	*	1.6+	.80	.46	48
62	30+	38+	23+	28+	30+	14+	37+	*	27+	1.8+	.64	.41	50
63	52	60	30	*	38	15	48	22	30	2.4	.86	.47	61
64	58	68	33	*	48	16	*	23	36	2.6	.95	.52	68
65	60	69	34	33	36	19	46	22	38	2.7	.90	.53	70
66	79	86	37	*	59	19	*	27	44	2.8	1.10	.60	82
67	56	61	23	*	32	16	*	19	30	2.1	1.00	.56	59
68	78	81	38	*	60	21	*	27	46	3.0	1.15	.68	84
69	79	82	40	*	62	22	*	27	46	3.2	1.25	.80	88
70	75++	83++	34++	33+	48++	21++	*	27++	35++	3.1++	1.30	.90	83
71	74	76	37	*	42	20	*	26	32	2.9	1.15	.67	76
72	74	82	35	*	56	20	*	27	39	3.2	1.25	.90	83
73	35	42	18	28	31	11	*	14	30	1.8	.85	.52	50
74	57+	68+	31+	*	40+	16+	*	21+	36+	2.4+	.85	.59	66
75	28+	45+	21+	*	34+	10+	*	18+	28+	1.2+	.75	.49	46
76	67	73	32	38	35	17	35	20	43	2.7	1.05	.68	72+++
77	54	62	32	30	32	17	40	18	32	2.5	.85	.51	63
78	83+	82+	30+	*	61+	25+	68+	30+	47+	3.5+	1.80	.69	83
79	85	85	42	*	62	26	74	33	*	3.8	2.00	.75	97
80	76+	79+	39+	*	60+	21+	70+	32+	*	3.6+	1.80	.65	89
81	89	86	45	*	61	25	77	37	48	4.1	1.85	.70	100
82	80+	78+	38+	*	58+	24+	65+	28+	*	3.3	1.65	.67	87
83	68+	67+	29+	*	44+	20+	64+	27+	*	3.3	1.63	.62	77
84	72++	60++	27++	31++	52++	*	60++	29++	*	3.4++	2.35	1.20	87

[1] Yields were based on Soil Conservation Service and Crop Reporting Service data.

* Crop not adapted or not widely grown

\+ Only for more level or gently sloping areas

++ Only for areas not requiring improved drainage conditions

+++ Highest ranking soil association = 100%. Ranking is only for more level areas and those not requiring improved drainage. The ranking given is based on yields given in this table.

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Appendix A. Conversion Factors

To convert Column 1 into Column 2, multiply by	Column 1	Column 2	To convert Column 2 into Column 1, multiply by
		LENGTH	
0.6214	kilometer, km	mile, mi	1.6093
1.0936	meter, m	yard, yd	0.9144
0.3937	centimeter, cm	inches, in	2.540
0.010	centimeter, cm	meters, m	100.0
0.10	centimeter, cm	millimeters, mm	10.0
30.480	centimeter, cm	feet, ft	0.03281
1000.	kilometer, km	meters, m	0.001
		AREA	
0.3861	kilometers^2, km^2	miles^2, mi^2	2.5900
247.11	kilometers^2, km^2	acres	0.00405
2.4711	hectare, ha (0.01 km^2)	acres	0.4047
107639.1	hectare, ha (0.01 km^2)	square feet	9.290×10^{-6}
		VOLUME	
43560.	acre feet	cubic feet	2.2957×10^{-5}
0.000811	cubic meters, m^3	acre feet	1233.5
325851.56	acre feet	gallons	3.069×10^{-6}
1.0567	liter, l	quart (liquid), qt	0.9463
27154.29	acre inches	gallons	3.683×10^{-5}
1000.	liter, l	cubic centimeters, cm^3	0.001
		MASS	
1.1023	metric ton	ton (English)	0.9072
2.2046	kilogram, kg	pound, lb	0.4536
1000.	grams, g	kilograms, kg	0.001
62.4280	grams/cubic centimeter	pounds/cubic foot	0.01602
		YIELD or RATE	
0.446	metric ton/hectare	ton (U.S.)/acre	2.242
0.892	kilograms/hectare, kg/ha	pounds/acre, lb/acre	1.121
1.984	cubic feet/second	acre-feet/day	0.5040
1000.	grams/l, g/l	parts/million, ppm	0.001
1.00	milligrams/l, mg/l	parts/million, ppm	1.00
		TEMPERATURE	
1.8 x (°C)+32	Celsius (centigrade), °C	Fahrenheit, °F	(°F-32) x 0.556
		CHEMICAL CONVERSION FACTORS	
2.4973	Calcium (Ca)	Calcium Carbonate ($CaCO_3$)	0.4004
1.8487	Calcium (Ca)	Calcium Hydroxide ($Ca(OH)_2$)	0.5409
1.3992	Calcium (Ca)	Calcium Oxide (CaO)	0.7147
0.5604	Calcium Carbonate ($CaCO_3$)	Calcium Oxide (CaO)	1.7848
0.7401	Calcium Carbonate ($CaCO_3$)	Calcium Hydroxide ($Ca(OH)_2$)	1.3511
1.2159	Nitrogen (N)	Ammonia (NH_3)	0.8224
6.250	Nitrogen (N)	Crude protein	0.160
4.4267	Nitrogen (N)	Nitrate (NO_3)	0.2259
2.2912	Phosphorus (P)	Phosphorus (P_2O_5)	0.4365
1.2046	Potassium (K)	Potassium (K_2O)	0.8301
1.7	Organic Carbon	Organic Matter	0.59

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Appendix B. Soil classification key for soil series used in South Dakota (December 1, 1976).

Order	Suborder	Great Group	Subgroup	Temperature Zone	FAMILIES																								
					Sandy	Sandy Skeletal	Sandy Over Loamy	Coarse-Loamy	Coarse-Loamy Over Sandy or Sandy Skeletal	Coarse-Loamy Over Clayey	Coarse-Silty	Coarse-Silty Over Sandy or Sandy Skeletal	Coarse-Silty Over Clayey	Loamy	Loamy Skeletal	Fine	Fine Over Loamy-Skeletal	Fine-Loamy	Fine-Loamy Over Sandy or Sandy Skeletal	Fine-Silty	Fine-Silty Over Sandy or Sandy Skeletal	Very Fine	Clayey	Clayey-Skeletal	Clayey Over Sandy or Sandy Skeletal	Clayey Over Loamy	Mixed	Mixed Shallow
Alfisols *	Boralfs	Cryoboralfs	Typic	F													Trebor												
			Mollic	F												Stovho													
		Eutroboralfs	Typic	F												Citadel Virkula		Lakoa						Buska Grizzly Pactola				
			Mollic	F														Maitland											
	Aqualfs	Albaqualfs	Typic	F												Nishon													
		Natraqualfs	Typic	F														Glenross											
Aridisols	Argids	Haplargids	Ustollic	M												Baca Norrest													
		Natrargids	Borollic	F				Ladner								Absher Loburn Oburn		Archin Parchin											
			Ustollic	M												Arvada Hisle Wanblee Cedar-Butte													
			Aquic	M												Minatare													
	Orthids	Paleargids	Ustollic	M												Bidman Demar													
		Calciorthids	Ustollic	M														Redig											
		Camborthids	Borollic	F				Toby Twilight																					
			Ustollic	M												Bufton Razor		Zigweid		Gystrum		Snomo	Conata						
			Ustertic	M																		Kyle Larvie Pierre Swanboy Twotop Wasa Winler							
Entisols	Aquents	Fluvaquents	Mollic	M												Owego		Chaska								Onawa			
			Vertic	M												Albaton Forney													

Entisols *	Fluvents	Torrifluvents	Ustertic	F														Wolfpoint													
				M														Stetter													
			Ustic	F	Hanly			Glendive												Havre											
				M	Bankard			Glenberg										Lohmiller		Barnum Haverson		Sanson									
		Udifluvents	Typic	M				Carr																							
			Aquic	M						Waubonsie				Modale							Blake					Percival				
			Mollic	M							Haynie McPaul		Grable																	
		Ustifluvents	Typic	M	Inavale			Munjor																							
				F	Banks			Trembles								Winetti		Lohler		Havrelon											
			Mollic	F																Korchea											
				M																Nimbro											
			Vertic	M														Wendte					Stirk								
	Orthents	Torriorthents	Lithic Ustic	M											Butche Penrose Travessilla																
			Ustertic	M																		Broadhurst									
			Ustic	F											Blackhall Cabbart				Delphill		Scroggin			Yawdim Lisam						
				M		Schamber					Nevee Gypnevee Keota Mitchell				Canyon Epping Rekop Shingle Spearfish Tassel Enning	Imlay Nihill	Graner				Colby Manvel Minnequa			Chantier Epsie Grummit Lismas Midway Orella Samsil								
		Udorthents	Typic	F				Sisseton																							
				M																Steinauer											
		Ustorthents	Typic	F											Cabba Cohagen			Dimyaw		Zahill		Lantry			Wayden						
				M				Westover			Sully				Gavins			Gettys		Betts		Crofton			Bristow Okaton Sansarc						
	Psamments	Torripsamments	Typic	F																											Fleak
			Ustic	F																										Tusler Zeona	
				M																										Dwyer Valent	
		Udipsamments	Typic	F																										Serden	
				M																										Sarpy	

* Definitions of terms are presented in Appendix Tables B-2 thru B-6.

Appendix Table B-1. Soil Classification Key for Soil Series Used in South Dakota Continued.
(December 1, 1976)

Order	Suborder	Great Group	Subgroup	Temperature Zone	FAMILIES: Sandy	Sandy Skeletal	Sandy Over Loamy	Coarse-Loamy	Coarse-Loamy Over Sandy or Sandy Skeletal	Coarse-Loamy Over Clayey	Coarse-Silty	Coarse-Silty Over Sandy or Sandy Skeletal	Coarse-Silty Over Clayey	Loamy	Loamy-Skeletal	Fine	Fine Over Loamy Skeletal	Fine-Loamy	Fine-Loamy Over Sandy or Sandy-Skeletal	Fine-Silty	Fine-Silty Over Sandy or Sandy-Skeletal	Very Fine	Clayey	Clayey-Skeletal	Clayey Over Sandy or Sandy-Skeletal	Clayey Over Loamy	Mixed	Mixed Shallow
Entisols *	Psamments	Ustipsamments	Typic	F																							Yecross Seroco	Flasher
				M																							Duda Valentine	
			Aquic	M																							Els Ipage	
Inceptisols	Aquepts	Haplaquepts	Typic	F												McKenzie												
				M							Higgins									Elpam Saltine								
	Ochrepts	Eutrochrepts	Typic	F											Vanocker													
			Dystric	F											Hisega													
		Ustochrepts	Typic	M												Lakoma												
			Paralithic Vertic	M																		Dupree						
			Vertic	M												Boro												
Mollisols	Albolls	Argialboll	Typic	M												Scott												
			Argiaquic	F												Tonka												
				M												Fetonka												
	Aquolls	Argiaquoll	Typic	M												Chancellor Crossplain Worthing								Grat				
		Calciaquoll	Typic	F				Arveson			Borup							Vallers	Benoit Marysland	Colvin Regan								
				M	Orwet			Fedora										Harps										
			Aeric	F	Ulen			Fram Wyndmere			Glyndon							Antler Hamerly	Divide	Bearden								
				M														Davison	Storla	Firesteel Wakonda								
		Haplaquolls	Typic	F	Possum Hamar Venlo		Kratka	Tiffany										Flom		Hidewood								
				M	Loup			Gannett								Egas		Canisteo		Leshara								

Mollisols *																														
	Aquolls	Haplaquolls	Cumulic	F														Dovray Oldham		Marshdale	Volga	Lamoure Playmoor Rauville								
				M														Baltic Clamo James Nishna Zook				Badus Calco Lamo Salmo Whitewood								
			Vertic	F														Dimmick Grano Ludden												
				M														Erd Luton Macken Solomon						Kolls						
		Natraquolls	Typic	F				Stirum										Harriet Heil Ranslo Ryan												
				M														Durrstein Hoven Napa		Lute										
	Borolls	Argiborolls	Typic	F												Beaverton		Bearpaw Mondamin Regent Savage		Farnuf Felor Lefor Reeder Vida Williams Yegen		Farland Morton								
			Aquic	F														Doran												
			Aridic	F																Assinnboine Marmarth		Ralph								
			Pachic	F														Grail		Bowbells Flaxton										
			Pachic Udic	F														Harmony Sieche												
			Udic	F														Peever		Forman										
			Vertic	F														Ridgeview												
		Haploborolls	Typic	F				Tally Vebar	Manning		Linton							Moreau		Amor Max Shambo	Lehr Stady	Bryant Chama Sen Temvik								
			Aquic	F	Helca																									
			Aridic	F				Chinook Rhame													Chanta										
			Cumulic	F																Straw										
			Cumulic Udic	F																Lapraire		Ladelle								
			Entic	F	Lihen Telfer	Wabek														Zahl										

* Definitions of terms are presented in Appendix Tables B-2 thru B-6.

Appendix Table B-1. Soil Classification Key for Soil Series Used in South Dakota Continued.
(December 1, 1976)

Order	Suborder	Great Group	Subgroup	Temperature Zone	FAMILIES: Sandy	Sandy-Skeletal	Sandy Over Loamy	Coarse-Loamy	Coarse-Loamy Over Sandy or Sandy Skeletal	Coarse-Loamy Over Clayey	Coarse-Silty	Coarse-Silty Over Sandy or Sandy Skeletal	Coarse-Silty Over Clayey	Loamy	Loamy-Skeletal	Fine	Fine Over Loamy-Skeletal	Fine-Loamy	Fine-Loamy Over Sandy or Sandy Skeletal	Fine-Silty	Fine-Silty Over Sandy or Sandy Skeletal	Very-Fine	Clayey	Clayey-Skeletal	Clayey Over Sandy or Sandy Skeletal	Clayey Over Loamy	Mixed	Mixed Shallow
Mollisols *	Borolls	Haplo-borolls	Lithic	F										Kloten	Paun-saught													
			Pachic	F				Parshall			Mandan							Arnegard	Bowdle	Grassna								
			Pachic Udic	F				Embden Emrick Swenoda			Gardena					Sinai		Aastad Lismore Svea	Ford-ville Spotts-wood Vang	Beotia Brook-ings Overly Waubay	Athel-wold Estel-line							
			Uder-tic	F												Hattie Nutley												
			Udic	F	Ar-villa Sver-drup			Egeland Heimdal		Rentill	Eckman							Barnes Doland Edgeley Vienna	Brant-ford Renshaw	Great-Bend Kranz-burg Poinsett								
			Udor-then-tic	F	Mad-dock	Sioux	Dickey Towner				Zell							Buse										
			Vertic	F												Lawther												
		Natri-borolls	Typic	F				Desart Ekalaka								Daglum		Noonan										
			Aridic	F														Sorum										
			Glos-sic	F												Belfield		Niobell										
			Glos-sic Udic	F												Aberdeen Cresbard		Cathay										
			Leptic	F												Exline Rhodes		Miranda										
			Udic	F				Letcher								Cavour Nahon		Larson										
		Vermi-borolls	Hap-ludic	F														Singsass										
	Udolls	Haplu-dolls	Typic	M																Salix								
			Aquic	M												Lakeport										Blencoe		
			Cumu-lic	M																Judson Kennebec								
			Flu-ventic	M				Blyburg												Omadi								
	Ustolls	Argius-tolls	Typic	M				Holt								Beadle Kirley McClure Peno Raber Reliance		Glenham Houdek Ree Wewela	Canning Jansen	Agar Eakin High-more Paka	Akaska							

Mollisols *	Ustolls																													
		Argiustolls	Aridic	M				Manter Mawer							Murdo	Blackpipe Boneek Huggins Kube Nunn Richfield Savo		Ascalon Rosebud Satanta	Altvan Tuthill	Kadoka Keith Norka Vale	Weber		Shena						
			Pachic	M												Lane Onita		Keya Prosper Renner Woodly Woon-socket		Hall Mobridge Goshen									
			Vertic	M												Millboro Oko Okreek Witten													
		Calci-ustolls	Typic	M																Redstoe									
		Haplu-stolls	Typic	M				Anselmo Orton	O'neill		Lowry							Clarno Hand	Delmont Oahe	Homme									
			Aquic	M	Els-mere		Shue											Bridge-water											
			Aridic	M				Alice Chappell Jayem			Ogalala Tripp								Cheyenne	Ulysses									
			Cumu-lic	M														Bon St. Onge		Alcester Hord Roxbury									
			Entic	M	Doger Dunday	Meadin	Forest-burg	Ronson										Ethan Java											
			Fluva-quen-tic	M				Wann																					
			Flu-ventic	M	Boel			Cass			McCook		Dorna					Swint		Bridge-port									
			Lithic	M										Laporte															
			Pachic	M				Blendon Carthage Vetal								Benclare		Bonilla Davis Table-Mt.	Dimo Enet	Duroc Grace-ville Trent Viborg									
			Torr-ertic	M																		Metre							
			Torri-orth-entic	M	Dailey	Dix					Bridget					Buffing-ton				Tilford									
			Udic	M				Henkin								Corson Huntimer		Fland-reau Volin		Egan Moody Nora Went-worth	Demp-ster								
			Udor-then-tic	M	Thur-man	Talmo												Shindler											
			Vertic	M												Artesian Boyd Verdel						Opal Pro-mise							

* Definitions of terms are presented in Alpendix Tables B-2 thru B-6.

Appendix Table B-1. Soil Classification Key for Soil Series in South Dakota Continued.
(December 1, 1976)

Order	Suborder	Great Group	Subgroup	Temperature Zone	FAMILIES																							
					Sandy	Sandy-Skeletal	Sandy Over Loamy	Coarse-Loamy	Coarse-Loamy Over Sandy or Sandy Skeletal	Coarse-Loamy Over Clayey	Coarse-Silty	Coarse-Silty Over Sandy or Sandy Skeletal	Coarse-Silty Over Clayey	Loamy	Loamy-Skeletal	Fine	Fine Over Loamy Skeletal	Fine-Loamy	Fine-Loamy Over Sandy or Sandy Skeletal	Fine-Silty	Fine-Silty Over Sandy or Sandy Skeletal	Very Fine	Clayey	Clayey-Skeletal	Clayey Over Sandy or Sandy Skeletal	Clayey Over Loamy	Mixed	Mixed Shallow
Mollisols *	Ustolls	Natrustolls	Typic	M												Beckton Cavo Degrey Dudley Mosher Wortman		Whitelake										
			Glossic	M												Demky Stickney Walke												
			Lepric	M												Gayville Jerauld						Hurley						
		Paleustolls	Aridic	M												Dawes												
			Vertic																				Carter					

* Definitions of terms are presented in Appendix Table B-2 thru B-6.

Table B-2. Soil Orders: The names and their meanings*

Order Name	Formative Element	Principal Diagnostic Property(ies) - Definition
Alfisols	alf	Mineral soils; relatively low in organic matter; relatively high base saturation; an illuvial horizon of silicate clays; moisture available to mature a crop.
Aridisols	id	Mineral soils; relatively low in organic matter; inadequate moisture to mature a crop without irrigation in most years; some pedogenic horizons.
Entisols	ent	Mineral soils; weak or no pedogenic horizons, no deep wide cracks in most years.
Histosols	ist	Organic in more than half of upper 80 cm.
Inceptisols	ept	Mineral soils; some pedogenic horizons and some weatherable minerals; moisture available to mature a crop in most years; no horizon of illuvial clays; relatively low in either organic matter or base saturation, or in both.
Mollisols	oll	Mineral soils, thick dark surface horizon, relatively rich in organic matter; high base saturation throughout; no deep wide cracks in most years.
Oxisols	ox	Mineral soils; no weatherable minerals; inactive clays; no illuvial horizon of silicate clays.
Spodosols	od	Mineral soils; an illuvial horizon of amorphous aluminum and organic matter, with or without amorphous iron.
Ultisols	ult	Mineral soils; an illuvial horizon of silicate clays; low base saturation; moisture available to mature a crop in most years.
Vertisols	ert	Clayey soils; deep,wide cracks at some time in most years.

*Soil Survey Staff, Soil Taxonomy: A Basic System of Soil Classification For Making and Interpreting Soil Surveys, USDA Agriculture Handbook 436. 1975. p.87.

Table B-3. Formative Elements and Their Connotations of Suborders of Soils Found in South Dakota*

Formative Elements	Connation of Formative Element (simplified explanation)
alb	A nearly white (bleached) eluvial horizon near the surface, reflecting wetness.
aqu	A soil that is very wet or that has been artificially drained. Characteristics associated with wetness.
arg	A soil having an illuvial horizon of silicate clays. Presence of an argillic horizon.
bor	A cool or cold soil, mean annual soil temperature $<8^{o}C$.
fluv	Composed of recent alluvium, flood plain areas.
lept	Thin horizon.
ochr	A surface horizon that is either light in color or low in organic matter, or both.
orth	The most representative or true ones.
psamm	Sandy texture, sand, or loamy sand, to a depth of 1 m or more or to rock.
rend	A shallow (<50 cm deep) dark soil formed on highly calcareous parent material (>40% $CaCo_3$ equivalent).
torr	Inadequate moisture to mature a crop without irrigation.
ud	Moist but not wet; dry for short periods or not at all, humid climates.
ust	Dry for long periods but moist in a growing season for 90 days or more in most years; droughts common.

* Soil Survey Staff, Soil Taxonomy: A Basic System of Soil Classification For Making and Interpreting Soil Surveys, USDA Agriculture Handbook 436. 1975. p.88.

Table B-4. Formative Elements and Their Connotations of Great Groups of Soils Found in South Dakota*

First Formative Element	Connotation (simplified explanation)
alb.....	A nearly white eluvial horizon near the surface, reflecting wetness.
aqu.....	Characteristics associated with wetness.
arg.....	A soil having an illuvial horizon of silicate clays.
bor.....	A cool or cold soil, mean annual soil temperature $<8^{o}C$.
calc.....	A soil that is calcareous throughout and that has a horizon with an appreciable accumulation of lime.
camb.....	A soil having an altered but not illuvial B horizon.
cry.....	A soil that is relatively cold even in summer.
dys, dystr.....	Low base saturation.
eu, eutr.....	High base saturation.
gloss.....	Presence of gray eluvial tongues in an illuvial horizon of silicate clay.
hal.....	Wet and somewhat salty.
hapl.....	The simplest set of horizons.
hydr.....	Presence of excess water.
natr.....	Presence of significant amounts of exchangeable sodium or of magnesium and sodium.
ochr.....	A surface horizon that is either light in color or low in organic matter, or that is both.
pale.....	A soil having horizons that have more than normal development.
plac.....	Presence of a thin (a few mm) pan, cemented by iron or by iron and humus.
psamm.....	Sandy texture, a sand or loamy sand, to a depth of 1 m or more.
sal.....	Presence of a horizon with >2 percent salt.
torr.....	Inadequate moisture to mature a crop without irrigation.
ud.....	Moist but not wet, and dry for short periods or not at all.
ust.....	Dry for long periods but moist in a growing season for 90 days or more in most years; droughts common.
verm.....	Intensively mixed by animals, chiefly worms and their predators.
vitr.....	Large amounts of glass.

*Soil Survey Staff, Soil Taxonomy: A Basic System of Soil Classification for Making and Interpreting Soil Surveys, USDA Agriculture Handbook 436. 1975. p.89.

Table B-5. Adjectives Used in the Names of Extragrades and Their Meaning for South Dakota Soils*

Adjective	Meaning	Adjective	Meaning
aeric[1].....	Good aeration.	lithic.....	Hard rock within 50 cm of the surface.
arenic.....	Sandy eluvial horizons (sand or loamy sand), mostly between 50 cm and 1 m thick.	pachic.....	A thick dark surface horizon or epipedon.
cumulic.....	An overthickened epipedon (surface horizon) rich in humus.	paralithic.....	Presence of a shallow paralithic contact.
glossic.....	Tongued eluvial and illuvial horizons.		
grossarenic.....	Sandy eluvial horizons (sand or loamy sand) >1 m thick.		
leptic.....	Thin soil horizons.		

*Soil Survey Staff, Soil Taxonomy: A Basic System of Soil Classification For Making and Interpreting Soil Survey, USDA Agriculture Handbook 436. 1975. p.88.

Table B-6. Families: Modifiers That Express Particle-Size Classes in Names of South Dakota Soils*

	Class	Definition
1.	Fragmental.....	Stones, cobbles, gravel, and very coarse sand particles; too little fine earth to fill interstices >1 mm in diameter.
2.	Sandy-skeletal.....	Rock fragments 2mm or coarser make up 35 percent or more by volume; enough fine earth to fill interstices >1mm; the fraction <2mm is sandy as defined for particle-size class 5.
3.	Loamy-skeletal.....	Rock fragments make up 35 percent or more by volume; enough fine earth to fill interstices >1 mm; the fraction <2 mm is loamy as defined for particle-size class 6.
4.	Clayey-skeletal.....	Rock fragments make up 35 percent or more by volume; enough fine earth to fill interstices >1 mm; the fraction finer than 2 mm is clayey as defined for particle-size class 7.

Table B-6. Families: Modifiers That Express Particle-Size Classes in Names of South Dakota Soils* Continued

Class	Definition
5. Sandy	The texture of the fine earth is sand or loamy sand but not loamy very fine sand or very fine sand; rock fragments make up <35 percent by volume.
6. Loamy	The texture of the fine earth is loamy very fine sand, very fine sand, or finer, but the amount of clay[1] is <35 percent; rock fragments are <35 ercent by volume.
a. Coarse loamy	By weight, 15 percent or more of the particles are fine sand (diameter 0.25 to 0.1 mm) or coarser, including fragments up to 7.5 cm in diameter; <18 percent clay in the fine-earth fraction.
b. Fine-loamy	By weight, 15 percent or more of the particles are fine sand (diameter 0.25 to 0.1 mm) or coarser, including fragments up to 7.5 cm in diamter; 18 through 34 percent clay in the fine-earth fraction (<30 percent in Vertisols).
c. Coarse-silty	By weight, 15 percent of the particles are fine sand (diameter 0.25 to 0.1 mm) or coarser, including fragments up to 7.5 cm in diameter; <18 percent clay in the fine-earth fraction.
d. Fine-silty	By weight, <15 percent of the particles are fine sand (diameter 0.25 to 0.1 mm) or coarser, including fragments up to 7.5 cm in diamter; 18 through 34 percent clay in the fine-earth fraction (<30 percent in Vertisols).
7. Clayey	The fine earth contains 35 percent or more clay by weight, and rock fragments are <35 percent by volume.
a. Fine	A clayey particle-size class for soils having 35 through 59 percent clay in the fine-earth fraction (30 through 59 percent for Vertisols).
b. Very-fine	A clayey particle-size class for soils having 60 percent or more clay in the fine-earth fraction.

[1]Carbonotes of clay size are not considered to be clay but are treated as silt in all particle-size classes. If the ratio of 15-bar water to clay is 0.6 or more in half or more of the control section, for this purpose the percentage of clay is considered to be 2.5 times the percentage of 15-bar water.

*Soil Survey Staff, Soil Taxonomy: A Basic System of Soil Classification For Making and Interpreting Soil Surveys, USDA Agriculture Handbook 436. 1975. pp.383-389.

Appendix C. Classification of Soil Series Used in South Dakota (December 1, 1976).

USDA-SCS
HURON, SD

CLASSIFICATION OF SOIL SERIES USED IN SOUTH DAKOTA

12/1/76

SERIES	STATE	SUBGROUP	FAMILY
AASTAD	MN	PACHIC UDIC HAPLOBOROLLS	FINE-LOAMY, MIXED
ABERDEEN	SD	GLOSSIC UDIC NATRIBOROLLS	FINE, MONTMORILLONITIC
ABSHER	MT	BOROLLIC NATRARGIDS	FINE, MONTMORILLONITIC
AGAR	SD	TYPIC ARGIUSTOLLS	FINE-SILTY, MIXED, MESIC
AKASKA	SD	TYPIC ARGIUSTOLLS	FINE-SILTY OVER SANDY OR SANDY-SKELETAL, MIXED, MESIC
ALBATON	IA	VERTIC FLUVAQUENTS	FINE, MONTMORILLONITIC (CALCAREOUS), MESIC
ALCESTER	SD	CUMULIC HAPLUSTOLLS	FINE-SILTY, MIXED, MESIC
ALICE	NE	ARIDIC HAPLUSTOLLS	COARSE-LOAMY, MIXED, MESIC
ALTVAN	NE	ARIDIC ARGIUSTOLLS	FINE-LOAMY OVER SANDY OR SANDY-SKELETAL, MIXED, MESIC
AMOR	ND	TYPIC HAPLOBOROLLS	FINE-LOAMY, MIXED
ANSELMO	NE	TYPIC HAPLUSTOLLS	COARSE-LOAMY, MIXED, MESIC
ANTLER	ND	AERIC CALCIAQUOLLS	FINE-LOAMY, FRIGID
ARCHIN	SD	BOROLLIC NATRARGIDS	FINE-LOAMY, MIXED
ARNEGARD	ND	PACHIC HAPLOBOROLLS	FINE-LOAMY, MIXED
ARTESIAN	SD	VERTIC HAPLUSTOLLS	FINE, MONTMORILLONITIC, MESIC
ARVADA	WY	USTOLLIC NATRARGIDS	FINE, MONTMORILLONITIC, MESIC
ARVESON	MN	TYPIC CALCIAQUOLLS	COARSE-LOAMY, FRIGID
ARVILLA	ND	UDIC HAPLOBOROLLS	SANDY, MIXED
ASCALON	CO	ARIDIC ARGIUSTOLLS	FINE-LOAMY, MIXED, MESIC
ASSINNIBOINE	MT	ARIDIC ARGIBOROLLS	FINE-LOAMY, MIXED
ATHELWOLD	SD	PACHIC UDIC HAPLOBOROLLS	FINE-SILTY OVER SANDY OR SANDY-SKELETAL, MIXED
BACA	CO	USTOLLIC HAPLARGIDS	FINE, MONTMORILLONITIC, MESIC
BADUS	SD	CUMULIC HAPLAQUOLLS	FINE-SILTY, MIXED (CALCAREOUS), MESIC
BALTIC	SD	CUMULIC HAPLAQUOLLS	FINE, MONTMORILLONITIC (CALCAREOUS), MESIC
BANKARD	CO	USTIC TORRIFLUVENTS	SANDY, MIXED, MESIC
BANKS	ND	TYPIC USTIFLUVENTS	SANDY, MIXED, MESIC
BARNES	ND	UDIC HAPLOBOROLLS	FINE-LOAMY, MIXED
BARNUM	WY	USTIC TORRIFLUVENTS	FINE-LOAMY, MIXED (CALCAREOUS), MESIC
BEADLE	SD	TYPIC ARGIUSTOLLS	FINE, MONTMORILLONITIC, MESIC
BEARDEN	ND	AERIC CALCIAQUOLLS	FINE-SILTY, FRIGID
BEARPAW	MT	TYPIC ARGIBOROLLS	FINE, MONTMORILLONITIC
BEAVERTON	MT	TYPIC ARGIBOROLLS	LOAMY-SKELETAL, MIXED
BECKTON	WY	TYPIC NATRUSTOLLS	FINE, MONTMORILLONITIC, MESIC
BELFIELD	ND	GLOSSIC NATRIBOROLLS	FINE, MONTMORILLONITIC
BENCLARE	SD	PACHIC HAPLUSTOLLS	FINE, MONTMORILLONITIC, MESIC
BENOIT	MN	TYPIC CALCIAQUOLLS	FINE-LOAMY OVER SANDY OR SANDY-SKELETAL, FRIGID
BEOTIA	SD	PACHIC UDIC HAPLOBOROLLS	FINE-SILTY, MIXED
BETTS	SD	TYPIC USTORTHENTS	FINE-LOAMY, MIXED (CALCAREOUS), MESIC
BIDMAN	WY	USTOLLIC PALEARGIDS	FINE, MONTMORILLONITIC, MESIC
BLACKHALL	WY	USTIC TORRIORTHENTS	LOAMY, MIXED (CALCAREOUS), FRIGID, SHALLOW
BLACKPIPE	SD	ARIDIC ARGIUSTOLLS	FINE, MONTMORILLONITIC, MESIC
BLAKE	IA	AQUIC UDIFLUVENTS	FINE-SILTY, MIXED (CALCAREOUS), MESIC
BLENCOE	IA	AQUIC HAPLUDOLLS	CLAYEY OVER LOAMY, MONTMORILLONITIC, MESIC
BLENDON	SD	PACHIC HAPLUSTOLLS	COARSE-LOAMY, MIXED, MESIC
BLYBURG	NE	FLUVENTIC HAPLUDOLLS	COARSE-LOAMY, MIXED, MESIC
BON	SD	CUMULIC HAPLUSTOLLS	FINE-LOAMY, MIXED, MESIC
BONEEK	SD	ARIDIC ARGIUSTOLLS	FINE, MONTMORILLONITIC, MESIC
BONILLA	SD	PACHIC HAPLUSTOLLS	FINE-LOAMY, MIXED, MESIC
BORO	SD	VERTIC USTOCHREPTS	FINE, MONTMORILLONITIC, MESIC
BORUP	MN	TYPIC CALCIAQUOLLS	COARSE-SILTY, FRIGID
BOWBELLS	ND	PACHIC ARGIBOROLLS	FINE-LOAMY, MIXED
BOWDLE	SD	PACHIC HAPLOBOROLLS	FINE-LOAMY OVER SANDY OR SANDY-SKELETAL, MIXED
BOYD	SD	VERTIC HAPLUSTOLLS	FINE, MONTMORILLONITIC, MESIC
BRANTFORD	ND	UDIC HAPLOBOROLLS	FINE-LOAMY OVER SANDY OR SANDY-SKELETAL, MIXED
BRIDGEPORT	KS	FLUVENTIC HAPLUSTOLLS	FINE-SILTY, MIXED, MESIC
BRIDGET	NE	TORRIORTHENTIC HAPLUSTOLLS	COARSE-SILTY, MIXED, MESIC
BRISTOW	NE	TYPIC USTORTHENTS	CLAYEY, MIXED (CALCAREOUS), MESIC, SHALLOW
BROADHURST	SD	USTERTIC TORRIORTHENTS	VERY-FINE, MONTMORILLONITIC, ACID, MESIC
BROOKINGS	SD	PACHIC UDIC HAPLOBOROLLS	FINE-SILTY, MIXED
BRYANT	SD	TYPIC HAPLOBOROLLS	FINE-SILTY, MIXED
BUFFINGTON	NE	TORRIORTHENTIC HAPLUSTOLLS	FINE, MIXED, MESIC
BUFTON	NE	USTOLLIC CAMBORTHIDS	FINE, MIXED, MESIC
BUSE	MN	UDORTHENTIC HAPLOBOROLLS	FINE-LOAMY, MIXED
BUSKA	SD	TYPIC EUTROBORALFS	CLAYEY-SKELETAL, ILLITIC
BUTCHE	SD	LITHIC USTIC TORRIORTHENTS	LOAMY, MIXED, NONACID, MESIC
CABBA	MT	TYPIC USTORTHENTS	LOAMY, MIXED (CALCAREOUS), FRIGID, SHALLOW
CABBART	MT	USTIC TORRIORTHENTS	LOAMY, MIXED (CALCAREOUS), FRIGID, SHALLOW
CALCO	IA	CUMULIC HAPLAQUOLLS	FINE-SILTY, MIXED (CALCAREOUS), MESIC
CANISTEO	MN	TYPIC HAPLAQUOLLS	FINE-LOAMY, MIXED (CALCAREOUS), MESIC
CANNING	SD	TYPIC ARGIUSTOLLS	FINE-LOAMY OVER SANDY OR SANDY-SKELETAL, MIXED, MESIC
CANYON	NE	USTIC TORRIORTHENTS	LOAMY, MIXED (CALCAREOUS), MESIC, SHALLOW
CARR	KS	TYPIC UDIFLUVENTS	COARSE-LOAMY, MIXED (CALCAREOUS), MESIC
CARTER	SD	VERTIC PALEUSTOLLS	VERY-FINE, MONTMORILLONITIC, MESIC
CARTHAGE	SD	PACHIC HAPLUSTOLLS	COARSE-LOAMY, MIXED, MESIC
CASS	NE	FLUVENTIC HAPLUSTOLLS	COARSE-LOAMY, MIXED, MESIC
CATHAY	ND	GLOSSIC UDIC NATRIBOROLLS	FINE-LOAMY, MIXED
CAVO	SD	TYPIC NATRUSTOLLS	FINE, MONTMORILLONITIC, MESIC
CAVOUR	SD	UDIC NATRIBOROLLS	FINE, MONTMORILLONITIC
CEDAR BUTTE	SD	USTOLLIC NATRARGIDS	FINE, MONTMORILLONITIC, MESIC
CHAMA	MT	TYPIC HAPLOBOROLLS	FINE-SILTY, MIXED

SERIES	STATE	SUBGROUP	FAMILY
CHANCELLOR	SD	TYPIC ARGIAQUOLLS	FINE, MONTMORILLONITIC, MESIC
CHANTA	ND	ARIDIC HAPLOBOROLLS	FINE-LOAMY OVER SANDY OR SANDY-SKELETAL, MIXED
CHANTIER	SD	USTIC TORRIORTHENTS	CLAYEY, MONTMORILLONITIC (CALCAREOUS), MESIC, SHALLOW
CHAPPELL	NE	ARIDIC HAPLUSTOLLS	COARSE-LOAMY, MIXED, MESIC
CHASKA	MN	MOLLIC FLUVAQUENTS	FINE-LOAMY, MIXED (CALCAREOUS), MESIC
CHEYENNE	NE	ARIDIC HAPLUSTOLLS	FINE-LOAMY OVER SANDY OR SANDY-SKELETAL, MIXED, MESIC
CHINOOK	MT	ARIDIC HAPLOBOROLLS	COARSE-LOAMY, MIXED
CITADEL	SD	TYPIC EUTROBORALFS	FINE, MONTMORILLONITIC
CLAMO	SD	CUMULIC HAPLAQUOLLS	FINE, MONTMORILLONITIC, MESIC
CLARNO	SD	TYPIC HAPLUSTOLLS	FINE-LOAMY, MIXED, MESIC
COHAGEN	ND	TYPIC USTORTHENTS	LOAMY, MIXED (CALCAREOUS), FRIGID, SHALLOW
COLBY	KS	USTIC TORRIORTHENTS	FINE-SILTY, MIXED (CALCAREOUS), MESIC
COLVIN	ND	TYPIC CALCIAQUOLLS	FINE-SILTY, FRIGID
CONATA	SD	USTOLLIC CAMBORTHIDS	CLAYEY, MONTMORILLONITIC, MESIC, SHALLOW
CORSON	SD	UDIC HAPLUSTOLLS	FINE, MONTMORILLONITIC, MESIC
CRESBARD	SD	GLOSSIC UDIC NATRIBOROLLS	FINE, MONTMORILLONITIC
CROFTON	NE	TYPIC USTORTHENTS	FINE-SILTY, MIXED (CALCAREOUS), MESIC
CROSSPLAIN	SD	TYPIC ARGIAQUOLLS	FINE, MONTMORILLONITIC, MESIC
DAGLUM	ND	TYPIC NATRIBOROLLS	FINE, MONTMORILLONITIC
DAILEY	CO	TORRIORTHENTIC HAPLUSTOLLS	SANDY, MIXED, MESIC
DAVIS	SD	PACHIC HAPLUSTOLLS	FINE-LOAMY, MIXED, MESIC
DAVISON	SD	AERIC CALCIAQUOLLS	FINE-LOAMY, MESIC
DAWES	NE	ARIDIC PALEUSTOLLS	FINE, MIXED, MESIC
DEGREY	SD	TYPIC NATRUSTOLLS	FINE, MONTMORILLONITIC, MESIC
DELMONT	SD	TYPIC HAPLUSTOLLS	FINE-LOAMY OVER SANDY OR SANDY-SKELETAL, MIXED, MESIC
DELPHILL	MT	USTIC TORRIORTHENTS	FINE-LOAMY, MIXED (CALCAREOUS), FRIGID
DEMAR	SD	USTOLLIC PALEARGIDS	FINE, MONTMORILLONITIC, MESIC
DEMKY	SD	GLOSSIC NATRUSTOLLS	FINE, MONTMORILLONITIC, MESIC
DEMPSTER	SD	UDIC HAPLUSTOLLS	FINE-SILTY OVER SANDY OR SANDY-SKELETAL, MIXED, MESIC
DESART	ND	TYPIC NATRIBOROLLS	COARSE-LOAMY, MIXED
DICKEY	ND	UDORTHENTIC HAPLOBOROLLS	SANDY OVER LOAMY, MIXED
DIMMICK	ND	VERTIC HAPLAQUOLLS	FINE, MONTMORILLONITIC, FRIGID
DIMO	SD	PACHIC HAPLUSTOLLS	FINE-LOAMY OVER SANDY OR SANDY-SKELETAL, MIXED, MESIC
DIMYAW	MT	TYPIC USTORTHENTS	FINE, MONTMORILLONITIC (CALCAREOUS), FRIGID
DIVIDE	ND	AERIC CALCIAQUOLLS	FINE-LOAMY OVER SANDY OR SANDY-SKELETAL, FRIGID
DIX	NE	TORRIORTHENTIC HAPLUSTOLLS	SANDY-SKELETAL, MIXED, MESIC
DOGER	SD	ENTIC HAPLUSTOLLS	SANDY, MIXED, MESIC
DOLAND	MN	UDIC HAPLOBOROLLS	FINE-LOAMY, MIXED
DORAN	ND	AQUIC ARGIBOROLLS	FINE, MIXED
DORNA	SD	FLUVENTIC HAPLUSTOLLS	COARSE-SILTY OVER CLAYEY, MIXED, MESIC
DOVRAY	MN	CUMULIC HAPLAQUOLLS	FINE, MONTMORILLONITIC, FRIGID
DUDA	SD	TYPIC USTIPSAMMENTS	MIXED, MESIC
DUDLEY	SD	TYPIC NATRUSTOLLS	FINE, MONTMORILLONITIC, MESIC
DUNDAY	NE	ENTIC HAPLUSTOLLS	SANDY, MIXED, MESIC
DUPREE	SD	PARALITHIC VERTIC USTOCHREPTS	CLAYEY, MONTMORILLONITIC, MESIC, SHALLOW
DUROC	WY	PACHIC HAPLUSTOLLS	FINE-SILTY, MIXED, MESIC
DURRSTEIN	SD	TYPIC NATRAQUOLLS	FINE, MONTMORILLONITIC, MESIC
DWYER	WY	USTIC TORRIPSAMMENTS	MIXED, MESIC
EAKIN	SD	TYPIC ARGIUSTOLLS	FINE-SILTY, MIXED, MESIC
ECKMAN	ND	UDIC HAPLOBOROLLS	COARSE-SILTY, MIXED
EDGELEY	ND	UDIC HAPLOBOROLLS	FINE-LOAMY, MIXED
EGAN	SD	UDIC HAPLUSTOLLS	FINE-SILTY, MIXED, MESIC
EGAS	SD	TYPIC HAPLAQUOLLS	FINE, MONTMORILLONITIC (CALCAREOUS), MESIC
EGELAND	SD	UDIC HAPLOBOROLLS	COARSE-LOAMY, MIXED
EKALAKA	ND	TYPIC NATRIBOROLLS	COARSE-LOAMY, MIXED
ELPAM	SD	TYPIC HAPLAQUEPTS	FINE-SILTY, MIXED (CALCAREOUS), MESIC
ELS	NE	AQUIC USTIPSAMMENTS	MIXED, MESIC
ELSMERE	NE	AQUIC HAPLUSTOLLS	SANDY, MIXED, MESIC
EMBDEN	ND	PACHIC UDIC HAPLOBOROLLS	COARSE-LOAMY, MIXED
EMRICK	ND	PAHCIC UDIC HAPLOBOROLLS	COARSE-LOAMY, MIXED
ENET	SD	PACHIC HAPLUSTOLLS	FINE-LOAMY OVER SANDY OR SANDY-SKELETAL, MIXED, MESIC
ENNING	SD	USTIC TORRIORTHENTS	LOAMY, CARBONATIC, MESIC, SHALLOW
EPPING	NE	USTIC TORRIORTHENTS	LOAMY, MIXED (CALCAREOUS), MESIC, SHALLOW
EPSIE	MT	USTIC TORRIORTHENTS	CLAYEY, MONTMORILLONITIC (CALCAREOUS), MESIC, SHALLOW
ERD	SD	VERTIC HAPLAQUOLLS	FINE, MONTMORILLONITIC (CALCAREOUS), MESIC
ESTELLINE	SD	PACHIC UDIC HAPLOBOROLLS	FINE-SILTY OVER SANDY OR SANDY-SKELETAL, MIXED
ETHAN	SD	ENTIC HAPLUSTOLLS	FINE-LOAMY, MIXED, MESIC
EXLINE	SD	LEPTIC NATRIBOROLLS	FINE, MONTMORILLONITIC
FARLAND	ND	TYPIC ARGIBOROLLS	FINE-SILTY, MIXED
*FARMSWORTH	SD	TYPIC NATRUSTOLLS	FINE, MONTMORILLONITIC, MESIC
FARNUF	MT	TYPIC ARGIBOROLLS	FINE-LOAMY, MIXED
FEDORA	SD	TYPIC CALCIAQUOLLS	COARSE-LOAMY, MESIC
FELOR	SD	TYPIC ARGIBOROLLS	FINE-LOAMY, MIXED
FIRESTEEL	SD	AERIC CALCIAQUOLLS	FINE-SILTY, MESIC
FLANDREAU	SD	UDIC HAPLUSTOLLS	FINE-LOAMY, MIXED, MESIC
FLASHER	ND	TYPIC USTIPSAMMENTS	MIXED, FRIGID, SHALLOW
FLAXTON	ND	PACHIC ARGIBOROLLS	FINE-LOAMY, MIXED
FLEAK	ND	TYPIC TORRIPSAMMENTS	MIXED, FRIGID, SHALLOW
FLOM	MN	TYPIC HAPLAQUOLLS	FINE-LOAMY, MIXED, FRIGID
FORDVILLE	SD	PACHIC UDIC HAPLOBOROLLS	FINE-LOAMY OVER SANDY OR SANDY-SKELETAL, MIXED

SERIES	STATE	SUBGROUP	FAMILY
FORESTBURG	SD	ENTIC HAPLUSTOLLS	SANDY OVER LOAMY, MIXED, MESIC
FORMAN	ND	UDIC ARGIBOROLLS	FINE-LOAMY, MIXED
FORNEY	IA	VERTIC FLUVAQUENTS	FINE, MONTMORILLONITIC, NONACID, MESIC
FOSSUM	MN	TYPIC HAPLAQUOLLS	SANDY, MIXED, FRIGID
FRAM	ND	AERIC CALCIAQUOLLS	COARSE-LOAMY, FRIGID
GANNETT	NE	TYPIC HAPLAQUOLLS	COARSE-LOAMY, MIXED, MESIC
GARDENA	ND	PACHIC UDIC HAPLOBOROLLS	COARSE-SILTY, MIXED
GAVINS	SD	TYPIC USTORTHENTS	LOAMY, CARBONATIC, MESIC, SHALLOW
GAYVILLE	SD	LEPTIC NATRUSTOLLS	FINE, MONTMORILLONITIC, MESIC
GETTYS	SD	TYPIC USTORTHENTS	FINE, MONTMORILLONITIC (CALCAREOUS), MESIC
GLENBERG	CO	USTIC TORRIFLUVENTS	COARSE-LOAMY, MIXED (CALCAREOUS), MESIC
GLENDIVE	MT	USTIC TORRIFLUVENTS	COARSE-LOAMY, MIXED (CALCAREOUS), FRIGID
GLENHAM	SD	TYPIC ARGIUSTOLLS	FINE-LOAMY, MIXED, MESIC
GLENROSS	SD	TYPIC NATRAQUALFS	FINE-LOAMY, MIXED, FRIGID
GLYNDON	MN	AERIC CALCIAQUOLLS	COARSE-SILTY, FRIGID
GOSHEN	NE	PACHIC ARGIUSTOLLS	FINE-SILTY, MIXED, MESIC
GRABLE	IA	MOLLIC UDIFLUVENTS	COARSE-SILTY OVER SANDY OR SANDY-SKELETAL, MIXED (CALCAREOUS), MESIC
GRACEVILLE	SD	PACHIC HAPLUSTOLLS	FINE-SILTY, MIXED, MESIC
GRAIL	ND	PACHIC ARGIBOROLLS	FINE, MONTMORILLONITIC
GRANER	SD	USTIC TORRIORTHENTS	FINE, MONTMORILLONITIC, ACID, MESIC
GRANO	ND	VERTIC HAPLAQUOLLS	FINE, MONTMORILLONITIC (CALCAREOUS), FRIGID
GRASSNA	ND	PACHIC HAPLOBOROLLS	FINE-SILTY, MIXED
GRAT	SD	TYPIC ARGIAQUOLLS	CLAYEY OVER SANDY OR SANDY-SKELETAL, MONTMORILLONITIC, MESIC
GREAT BENT	SD	UDIC HAPLOBOROLLS	FINE-SILTY, MIXED
GRIZZLY	SD	TYPIC EUTROBORALFS	CLAYEY-SKELETAL, MIXED
GRUMMIT	SD	USTIC TORRIORTHENTS	CLAYEY, MONTMORILLONITIC, ACID, MESIC, SHALLOW
GYPNEVEE	WY	USTIC TORRIORTHENTS	COARSE-SILTY, GYPSIC, MESIC
GYSTRUM	WY	USTOLLIC CAMBORTHIDS	FINE-SILTY, GYPSIC, MESIC
HALL	NE	PACHIC ARGIUSTOLLS	FINE-SILTY, MIXED, MESIC
HAMAR	SD	TYPIC HAPLAQUOLLS	SANDY, MIXED, FRIGID
HAMERLY	ND	AERIC CALCIAQUOLLS	FINE-LOAMY, FRIGID
HAND	SD	TYPIC HAPLUSTOLLS	FINE-LOAMY, MIXED, MESIC
HANLY	ND	USTIC TORRIFLUVENTS	SANDY, MIXED, FRIGID
HARMONY	SD	PACHIC UDIC ARGIBOROLLS	FINE, MONTMORILLONITIC
HARPS	IA	TYPIC CALCIAQUOLLS	FINE-LOAMY, MESIC
HARRIET	ND	TYPIC NATRAQUOLLS	FINE, MIXED, FRIGID
HATTIE	MN	UDERTIC HAPLOBOROLLS	FINE, MONTMORILLONITIC
HAVERSON	CO	USTIC TORRIFLUVENTS	FINE-LOAMY, MIXED (CALCAREOUS), MESIC
HAVRE	MT	USTIC TORRIFLUVENTS	FINE-LOAMY, MIXED (CALCAREOUS), FRIGID
HAVRELON	ND	TYPIC USTIFLUVENTS	FINE-LOAMY, MIXED (CALCAREOUS), FRIGID
HAYNIE	IA	MOLLIC UDIFLUVENTS	COARSE-SILTY, MIXED (CALCAREOUS), MESIC
HECLA	SD	AQUIC HAPLOBOROLLS	SANDY, MIXED
HEIL	ND	TYPIC NATRAQUOLLS	FINE, MONTMORILLONITIC, FRIGID
HEIMDAL	ND	UDIC HAPLOBOROLLS	COARSE-LOAMY, MIXED
HENKIN	SD	UDIC HAPLUSTOLLS	COARSE-LOAMY, MIXED, MESIC
HIDEWOOD	MN	TYPIC HAPLAQUOLLS	FINE-SILTY, MIXED, FRIGID
HIGGINS	SD	TYPIC HAPLAQUEPTS	COARSE-SILTY, GYPSIC, MESIC
HIGHMORE	SD	TYPIC ARGIUSTOLLS	FINE-SILTY, MIXED, MESIC
HISEGA	SD	DYSTRIC EUTROCHREPTS	LOAMY-SKELETAL, MICACEOUS, FRIGID
HISLE	SD	USTOLLIC NATRARGIDS	FINE, MONTMORILLONITIC, MESIC
HOLT	SD	TYPIC ARGIUSTOLLS	COARSE-LOAMY, MIXED, MESIC
HOMME	SD	TYPIC HAPLUSTOLLS	FINE-SILTY, MIXED, MESIC
HORD	NE	CUMULIC HAPLUSTOLLS	FINE-SILTY, MIXED, MESIC
HOUDEK	SD	TYPIC ARGIUSTOLLS	FINE-LOAMY, MIXED, MESIC
HOVEN	SD	TYPIC NATRAQUOLLS	FINE, MONTMORILLONITIC, MESIC
HUGGINS	SD	ARIDIC ARGIUSTOLLS	FINE, MONTMORILLONITIC, MESIC
HUNTIMER	SD	UDIC HAPLUSTOLLS	FINE, MONTMORILLONITIC, MESIC
HURLEY	SD	LEPTIC NATRUSTOLLS	VERY-FINE, MONTMORILLONITIC, MESIC
IMLAY	SD	USTIC TORRIORTHENTS	LOAMY-SKELETAL, MIXED (CALCAREOUS), MESIC, SHALLOW
INAVALE	NE	TYPIC USTIFLUVENTS	SANDY, MIXED, MESIC
IPAGE	NE	AQUIC USTIPSAMMENTS	MIXED, MESIC
JAMES	SD	CUMULIC HAPLAQUOLLS	FINE, MONTMORILLONITIC (CALCAREOUS), MESIC
JANSEN	NE	TYPIC ARGIUSTOLLS	FINE-LOAMY OVER SANDY OR SANDY-SKELETAL, MIXED, MESIC
JAVA	SD	ENTIC HAPLUSTOLLS	FINE-LOAMY, MIXED, MESIC
JAYEM	CO	ARIDIC HAPLUSTOLLS	COARSE-LOAMY, MIXED, MESIC
JERAULD	SD	LEPTIC NATRUSTOLLS	FINE, MONTMORILLONITIC, MESIC
JUDSON	IA	CUMULIC HAPLUDOLLS	FINE-SILTY, MIXED, MESIC
KADOKA	SD	ARIDIC ARGIUSTOLLS	FINE-SILTY, MIXED, MESIC
KEITH	NE	ARIDIC ARGIUSTOLLS	FINE-SILTY, MIXED, MESIC
KENNEBEC	IA	CUMULIC HAPLUDOLLS	FINE-SILTY, MIXED, MESIC
KEOTA	CO	USTIC TORRIORTHENTS	COARSE-SILTY, MIXED (CALCAREOUS), MESIC
KEYA	SD	PACHIC ARGIUSTOLLS	FINE-LOAMY, MIXED, MESIC
KIRLEY	SD	TYPIC ARGIUSTOLLS	FINE, MONTMORILLONITIC, MESIC
KLOTEN	ND	LITHIC HAPLOBOROLLS	LOAMY, MIXED
KOLLS	SD	VERTIC HAPLAQUOLLS	VERY-FINE, MONTMORILLONITIC (CALCAREOUS), MESIC
KORCHEA	ND	MOLLIC USTIFLUVENTS	FINE-LOAMY, MIXED (CALCAREOUS), FRIGID
KRANZBURG	SD	UDIC HAPLOBOROLLS	FINE-SILTY, MIXED
KRATKA	MN	TYPIC HAPLAQUOLLS	SANDY OVER LOAMY, MIXED, FRIGID
KUBE	SD	ARIDIC ARGIUSTOLLS	FINE, MONTMORILLONITIC, MESIC
KYLE	SD	USTERTIC CAMBORTHIDS	VERY-FINE, MONTMORILLONITIC, MESIC

SERIES	STATE	SUBGROUP	FAMILY
LADELLE	SD	CUMULIC UDIC HAPLOBOROLLS	FINE-SILTY, MIXED
LADNER	ND	BOROLLIC NATRARGIDS	COARSE-LOAMY, MIXED
LAKEPORT	IA	AQUIC HAPLUDOLLS	FINE, MONTMORILLONITIC, MESIC
LAKOA	SD	TYPIC EUTROBORALFS	FINE-LOAMY, MIXED
LAKOMA	SD	TYPIC USTOCHREPTS	FINE, MONTMORILLONITIC, MESIC
LAMO	NE	CUMULIC HAPLAQUOLLS	FINE-SILTY, MIXED (CALCAREOUS), MESIC
LAMOURE	SD	CUMULIC HAPLAQUOLLS	FINE-SILTY, MIXED (CALCAREOUS), FRIGID
LANE	SD	PACHIC ARGIUSTOLLS	FINE, MONTMORILLONITIC, MESIC
LANTRY	SD	TYPIC USTORTHENTS	FINE-SILTY, MIXED (CALCAREOUS), FRIGID
LAPORTE	CO	LITHIC HAPLUSTOLLS	LOAMY, MIXED, MESIC
LAPRAIRIE	ND	CUMULIC UDIC HAPLOBOROLLS	FINE-LOAMY, MIXED
LARSON	ND	UDIC NATRIBOROLLS	FINE-LOAMY, MIXED
LARVIE	SD	USTERTIC CAMBORTHIDS	VERY-FINE, MONTMORILLONITIC, MESIC
LAWTHER	ND	VERTIC HAPLOBOROLLS	FINE, MONTMORILLONITIC
LEFOR	ND	TYPIC ARGIBOROLLS	FINE-LOAMY, MIXED
LEHR	ND	TYPIC HAPLOBOROLLS	FINE-LOAMY OVER SANDY OR SANDY-SKELETAL, MIXED
LESHARA	NE	TYPIC HAPLAQUOLLS	FINE-SILTY, MIXED, MESIC
LETCHER	SD	UDIC NATRIBOROLLS	COARSE-LOAMY, MIXED
LIHEN	MT	ENTIC HAPLOBOROLLS	SANDY, MIXED
LINTON	ND	TYPIC HAPLOBOROLLS	COARSE-SILTY, MIXED
LISAM	ND	USTIC TORRIORTHENTS	CLAYEY, MONTMORILLONITIC (CALCAREOUS), FRIGID, SHALLOW
LISMAS	MT	USTIC TORRIORTHENTS	CLAYEY, MONTMORILLONITIC (CALCAREOUS), MESIC, SHALLOW
LISMORE	SD	PACHIC UDIC HAPLOBOROLLS	FINE-LOAMY, MIXED
LOBURN	SD	BOROLLIC NATRARGIDS	FINE, MONTMORILLONITIC
LOHLER	ND	TYPIC USTIFLUVENTS	FINE, MONTMORILLONITIC (CALCAREOUS), FRIGID
LOHMILLER	MT	USTIC TORRIFLUVENTS	FINE, MONTMORILLONITIC (CALCAREOUS), MESIC
LOUP	NE	TYPIC HAPLAQUOLLS	SANDY, MIXED, MESIC
LOWRY	SD	TYPIC HAPLUSTOLLS	COARSE-SILTY, MIXED, MESIC
LUDDEN	ND	VERTIC HAPLAQUOLLS	FINE, MONTMORILLONITIC (CALCAREOUS), FRIGID
LUTE	SD	TYPIC NATRAQUOLLS	FINE-LOAMY, MIXED, MESIC
LUTON	IA	VERTIC HAPLAQUOLLS	FINE, MONTMORILLONITIC, MESIC
MACKEN	SD	VERTIC HAPLAQUOLLS	FINE, MONTMORILLONITIC, MESIC
MADDOCK	ND	UDORTHENTIC HAPLOBOROLLS	SANDY, MIXED
MAITLAND	SD	MOLLIC EUTROBORALFS	FINE-LOAMY, MIXED
MANDAN	ND	PACHIC HAPLOBOROLLS	COARSE-SILTY, MIXED
MANNING	ND	TYPIC HAPLOBOROLLS	COARSE-LOAMY OVER SANDY OR SANDY-SKELETAL, MIXED
MANTER	CO	ARIDIC ARGIUSTOLLS	COARSE-LOAMY, MIXED, MESIC
MANVEL	CO	USTIC TORRIORTHENTS	FINE-SILTY, MIXED (CALCAREOUS), MESIC
MARMARTH	ND	ARIDIC ARGIBOROLLS	FINE-LOAMY, MIXED
MARSHDALE	CO	CUMULIC HAPLAQUOLLS	FINE-LOAMY, MIXED, FRIGID
MARYSLAND	MN	TYPIC CALCIAQUOLLS	FINE-LOAMY OVER SANDY OR SANDY-SKELETAL, FRIGID
MAWER	SD	ARIDIC ARGIUSTOLLS	COARSE-LOAMY, MIXED, MESIC
MAX	ND	TYPIC HAPLOBOROLLS	FINE-LOAMY, MIXED
MCCOOK	NE	FLUVENTIC HAPLUSTOLLS	COARSE-SILTY, MIXED, MESIC
MCCLURE	SD	TYPIC ARGIUSTOLLS	FINE, MONTMORILLONITIC, MESIC
MCKENZIE	ND	TYPIC HAPLAQUEPTS	FINE, MONTMORILLONITIC (CALCAREOUS), FRIGID
MCPAUL	IA	MOLLIC UDIFLUVENTS	COARSE-SILTY, MIXED (CALCAREOUS), MESIC
MEADIN	NE	ENTIC HAPLUSTOLLS	SANDY-SKELETAL, MIXED, MESIC
METRE	SD	TORRERTIC HAPLUSTOLLS	VERY-FINE, MONTMORILLONITIC, MESIC
MIDWAY	MT	USTIC TORRIORTHENTS	CLAYEY, MONTMORILLONITIC (CALCAREOUS), MESIC, SHALLOW
MILLBORO	SD	VERTIC ARGIUSTOLLS	FINE, MONTMORILLONITIC, MESIC
MINATARE	NE	AQUIC NATRARGIDS	FINE, MIXED, MESIC
MINNEQUA	CO	USTIC TORRIORTHENTS	FINE-SILTY, MIXED (CALCAREOUS), MESIC
MIRANDA	SD	LEPTHIC NATRIBOROLLS	FINE-LOAMY, MIXED
MITCHELL	NE	USTIC TORRIORTHENTS	COARSE-SILTY, MIXED (CALCAREOUS), MESIC
MOBRIDGE	SD	PACHIC ARGIUSTOLLS	FINE-SILTY, MIXED, MESIC
MODALE	IA	AQUIC UDIFLUVENTS	COARSE-SILTY OVER CLAYEY, MIXED (CALCAREOUS), MESIC
MONDAMIN	SD	TYPIC ARGIBOROLLS	FINE, MONTMORILLONITIC
MOODY	SD	UDIC HAPLUSTOLLS	FINE-SILTY, MIXED, MESIC
MOREAU	ND	TYPIC HAPLOBOROLLS	FINE, MONTMORILLONITIC
MORTON	ND	TYPIC ARGIBOROLLS	FINE-SILTY, MIXED
MOSHER	SD	TYPIC NATRUSTOLLS	FINE, MONTMORILLONITIC, MESIC
MUNJOR	KS	TYPIC USTIFLUVENTS	COARSE-LOAMY, MIXED (CALCAREOUS), MESIC
MURDO	SD	ARIDIC ARGIUSTOLLS	LOAMY-SKELETAL, MIXED, MESIC
NAHON	SD	UDIC NATRIBOROLLS	FINE, MONTMORILLONITIC
NAPA	SD	TYPIC NATRAQUOLLS	FINE, MONTMORILLONITIC, MESIC
NEVEE	SD	USTIC TORRIORTHENTS	COARSE-SILTY, MIXED (CALCAREOUS), MESIC
NIHILL	MT	USTIC TORRIORTHENTS	LOAMY-SKELETAL, MIXED,(CALCAREOUS, MESIC
NIMBRO	SD	MOLLIC USTIFLUVENTS	FINE-LOAMY, MIXED (CALCAREOUS), MESIC
NIOBELL	ND	GLOSSIC NATRIBOROLLS	FINE-LOAMY, MIXED
NISHNA	IA	CUMULIC HAPLAQUOLLS	FINE, MONTMORILLONITIC (CALCAREOUS), MESIC
NISHON	MT	TYPIC ALBAQUALFS	FINE, MONTMORILLONITIC, FRIGID
NOONAN	ND	TYPIC NATRIBOROLLS	FINE-LOAMY, MIXED
NORA	SD	UDIC HAPLUSTOLLS	FINE-SILTY, MIXED, MESIC
NORKA	CO	ARIDIC ARGIUSTOLLS	FINE-SILTY, MIXED, MESIC
NORREST	SD	USTOLLIC HAPLARGIDS	FINE, MONTMORILLONITIC, MESIC
NUNN	CO	ARIDIC ARGIUSTOLLS	FINE, MONTMORILLONITIC, MESIC
NUTLEY	SD	UDERTIC HAPLOBOROLLS	FINE, MONTMORILLONITIC
OAHE	SD	TYPIC HAPLUSTOLLS	FINE-LOAMY OVER SANDY OR SANDY-SKELETAL, MIXED, MESIC
OBURN	MT	BOROLLIC NATRARGIDS	FINE, MONTMORILLONITIC

SERIES	STATE	SUBGROUP	FAMILY
OGLALA	SD	ARIDIC HAPLUSTOLLS	COARSE-SILTY, MIXED, MESIC
OKATON	SD	TYPIC USTORTHENTS	CLAYEY, MONTMORILLONITIC (CALCAREOUS), MESIC, SHALLOW
OKO	SD	VERTIC ARGIUSTOLLS	FINE, MONTMORILLONITIC, MESIC
OKREEK	SD	VERTIC ARGIUSTOLLS	FINE, MONTMORILLONITIC, MESIC
OLDHAM	SD	CUMULIC HAPLAQUOLLS	FINE, MONTMORILLONITIC (CALCAREOUS), FRIGID
OMADI	NE	FLUVENTIC HAPLUDOLLS	FINE-SILTY, MIXED, MESIC
ONAWA	IA	MOLLIC FLUVAQUENTS	CLAYEY OVER LOAMY, MONTMORILLONITIC (CALCAREOUS), MESIC
O'NEILL	NE	TYPIC HAPLUSTOLLS	COARSE-LOAMY OVER SANDY OR SANDY-SKELETAL, MIXED, MESIC
ONITA	SD	PACHIC ARGUISTOLLS	FINE, MONTMORILLONITIC, MESIC
OPAL	SD	VERTIC HAPLUSTOLLS	VERY-FINE, MONTMORILLONITIC, MESIC
ORELLA	NE	USTIC TORRIORTHENTS	CLAYEY, MIXED (CALCAREOUS), MESIC, SHALLOW
ORTON	SD	TYPIC HAPLUSTOLLS	COARSE-LOAMY, MIXED, MESIC
ORWET	NE	TYPIC CALCIAQUOLLS	SANDY, MESIC
OVERLY	ND	PACHIC UDIC HAPLOBOROLLS	FINE-SILTY, MIXED
OWEGO	NE	MOLLIC FLUVAQUENTS	FINE, MONTMORILLONITIC, NONACID, MESIC
PACTOLA	SD	TYPIC EUTROBORALFS	CLAYEY-SKELETAL, MIXED
PAKA	NE	TYPIC ARGIUSTOLLS	FINE-SILTY, MIXED, MESIC
PARCHIN	SD	BOROLLIC NATRARGIDS	FINE-LOAMY, MIXED
PARSHALL	ND	PACHIC HAPLOBOROLLS	COARSE-LOAMY, MIXED
PAUNSAUGUNT	UT	LITHIC HAPLOBOROLLS	LOAMY-SKELETAL, MIXED
PEEVER	SD	UDIC ARGIBOROLLS	FINE, MONTMORILLONITIC
PENO	SD	TYPIC ARGIUSTOLLS	FINE, MONTMORILLONITIC, MESIC
PENROSE	CO	LITHIC USTIC TORRIORTHENTS	LOAMY, MIXED (CALCAREOUS), MESIC
PERCIVAL	IA	AQUIC UDIFLUVENTS	CLAYEY OVER SANDY OR SANDY-SKELETAL, MONTMORILLONITIC (CALCAREOUS), MESIC
PIERRE	SD	USTERTIC CAMBORTHIDS	VERY-FINE, MONTMORILLONITIC, MESIC
PLAYMOOR	SD	CUMULIC HAPLAQUOLLS	FINE-SILTY, MIXED (CALCAREOUS), FRIGID
POINSETT	SD	UDIC HAPLOBOROLLS	FINE-SILTY, MIXED
PROMISE	SD	VERTIC HAPLUSTOLLS	VERY-FINE, MONTMORILLONITIC, MESIC
PROSPER	SD	PACHIC ARGIUSTOLLS	FINE-LOAMY, MIXED, MESIC
RABER	SD	TYPIC ARGIUSTOLLS	FINE, MONTMORILLONITIC, MESIC
RALPH	SD	ARIDIC ARGIBOROLLS	FINE-SILTY, MIXED
RANSLO	SD	TYPIC NATRAQUOLLS	FINE, MONTMORILLONITIC, FRIGID
RAUVILLE	SD	CUMULIC HAPLAQUOLLS	FINE-SILTY, MIXED (CALCAREOUS), FRIGID
RAZOR	MT	USTOLLIC CAMBORTHIDS	FINE, MONTMORILLONITIC, MESIC
REDIG	SD	USTOLLIC CALCIORTHIDS	FINE-LOAMY, GYPSIC, MESIC
REDSTOE	SD	TYPIC CALCIUSTOLLS	FINE-SILTY, MIXED, MESIC
REE	SD	TYPIC ARGIUSTOLLS	FINE-LOAMY, MIXED, MESIC
REEDER	ND	TYPIC ARGIBOROLLS	FINE-LOAMY, MIXED
REGAN	ND	TYPIC CALCIAQUOLLS	FINE-SILTY, FRIGID
REGENT	ND	TYPIC ARGIBOROLLS	FINE, MONTMORILLONITIC
REKOP	WY	USTIC TORRIORTHENTS	LOAMY, GYPSIC, MESIC, SHALLOW
RELIANCE	SD	TYPIC ARGIUSTOLLS	FINE, MONTMORILLONITIC, MESIC
RENNER	SD	PACHIC ARGIUSTOLLS	FINE-LOAMY, MIXED, MESIC
RENSHAW	SD	UDIC HAPLOBOROLLS	FINE-LOAMY OVER SANDY OR SANDY-SKELETAL, MIXED
RENTILL	SD	UDIC HAPLOBOROLLS	COARSE-LOAMY OVER CLAYEY, MIXED
RHAME	ND	ARIDIC HAPLOBOROLLS	COARSE-LOAMY, MIXED
RHOADES	ND	LEPTIC NATRIBOROLLS	FINE, MONTMORILLONITIC
RICHFIELD	KS	ARIDIC ARGIUSTOLLS	FINE, MONTMORILLONITIC, MESIC
RIDGEVIEW	SD	VERTIC ARGIBOROLLS	FINE, MONTMORILLONITIC
RONSON	SD	ENTIC HAPLUSTOLLS	COARSE-LOAMY, MIXED, MESIC
ROSEBUD	NE	ARIDIC ARGIUSTOLLS	FINE-LOAMY, MIXED, MESIC
ROXBURY	KS	CUMULIC HAPLUSTOLLS	FINE-SILTY, MIXED, MESIC
RYAN	ND	TYPIC NATRAQUOLLS	FINE, MONTMORILLONITIC, FRIGID
SALIX	IA	TYPIC HAPLUDOLLS	FINE-SILTY, MIXED, MESIC
SALMO	SD	CUMULIC HAPLAQUOLLS	FINE-SILTY, MIXED (CALCAREOUS), MESIC
SALTINE	NE	TYPIC HAPLAQUEPTS	FINE-SILTY, MIXED, MESIC
SAMSIL	SD	USTIC TORRIORTHENTS	CLAYEY, MONTMORILLONITIC (CALCAREOUS), MESIC, SHALLOW
SANSARC	SD	TYPIC USTORTHENTS	CLAYEY, MONTMORILLONITIC (CALCAREOUS), MESIC, SHALLOW
SANSON	SD	USTIC TORRIFLUVENTS	FINE-SILTY, MIXED (CALCAREOUS), MESIC
SARPY	MO	TYPIC UDIPSAMMENTS	MIXED, MESIC
SATANTA	KS	ARIDIC ARGIUSTOLLS	FINE-LOAMY, MIXED, MESIC
SAVAGE	MT	TYPIC ARGIBOROLLS	FINE, MONTMORILLONITIC
SAVO	SD	ARIDIC ARGIUSTOLLS	FINE, MONTMORILLONITIC, MESIC
SCHAMBER	SD	USTIC TORRIORTHENTS	SANDY-SKELETAL, MIXED, MESIC
SCOTT	NE	TYPIC ARGIALBOLLS	FINE, MONTMORILLONITIC, MESIC
SCROGGIN	MT	USTIC TORRIORTHENTS	FINE-SILTY, MIXED (CALCAREOUS), FRIGID
SEN	ND	TYPIC HAPLOBOROLLS	FINE-SILTY, MIXED
SERDEN	ND	TYPIC UDIPSAMMENTS	MIXED, FRIGID
SEROCO	ND	TYPIC USTIPSAMMENTS	MIXED, FRIGID
SHAMBO	ND	TYPIC HAPLOBOROLLS	FINE-LOAMY, MIXED
SHENA	SD	ARIDIC ARGIUSTOLLS	CLAYEY, MIXED, MESIC, SHALLOW
SHINDLER	SD	UDORTHENTIC HAPLUSTOLLS	FINE-LOAMY, MIXED, MESIC
SHINGLE	WY	USTIC TORRIORTHENTS	LOAMY, MIXED (CALCAREOUS), MESIC, SHALLOW
SHUE	SD	AQUIC HAPLUSTOLLS	SANDY OVER LOAMY, MIXED, MESIC
SIECHE	SD	PACHIC UDIC ARGIBOROLLS	FINE, MONTMORILLONITIC
SINAI	SD	PACHIC UDIC HAPLOBOROLLS	FINE, MONTMORILLONITIC
SINGSAAS	SD	HAPLUDIC VERMIBOROLLS	FINE-LOAMY, MIXED
SIOUX	SD	UDORTHENTIC HAPLOBOROLLS	SANDY-SKELETAL, MIXED
SISSETON	SD	TYPIC UDORTHENTS	COARSE-LOAMY, MIXED (CALCAREOUS), FRIGID
SNOMO	SD	USTOLLIC CAMBORTHIDS	VERY-FINE, MONTMORILLONITIC, MESIC

SERIES	STATE	SUBGROUP	FAMILY
SOLOMON	KS	VERTIC HAPLAQUOLLS	FINE, MONTMORILLONITIC (CALCAREOUS), MESIC
SORUM	SD	ARIDIC NATRIBOROLLS	FINE-LOAMY, MIXED
SPEARFISH	SD	USTIC TORRIORTHENTS	LOAMY, MIXED (CALCAREOUS), MESIC, SHALLOW
SPOTTSWOOD	SD	PACHIC UDIC HAPLOBOROLLS	FINE-LOAMY OVER SANDY OR SANDY-SKELETAL, MIXED
ST. ONGE	SD	CUMULIC HAPLUSTOLLS	FINE-LOAMY, MIXED, MESIC
STADY	ND	TYPIC HAPLOBOROLLS	FINE-LOAMY OVER SANDY OR SANDY-SKELETAL, MIXED
STEINAUER	NE	TYPIC UDORTHENTS	FINE-LOAMY, MIXED (CALCAREOUS), MESIC
STETTER	SD	USTERTIC TORRIFLUVENTS	FINE, MONTMORILLONITIC, NONACID, MESIC
STICKNEY	SD	GLOSSIC NATRUSTOLLS	FINE, MONTMORILLONITIC, MESIC
STIRK	SD	VERTIC USTIFLUVENTS	VERY-FINE, MONTMORILLONITIC (CALCAREOUS), MESIC
STIRUM	ND	TYPIC NATRAQUOLLS	COARSE-LOAMY, MIXED, FRIGID
STORLA	SD	AERIC CALCIAQUOLLS	FINE-LOAMY OVER SANDY OR SANDY-SKELETAL, MESIC
STOVHO	SD	MOLLIC CRYOBORALFS	FINE, MONTMORILLONITIC
STRAW	MT	CUMULIC HAPLOBOROLLS	FINE-LOAMY, MIXED
SULLY	SD	TYPIC USTORTHENTS	COARSE-SILTY, MIXED (CALCAREOUS), MESIC
SVEA	ND	PACHIC UDIC HAPLOBOROLLS	FINE-LOAMY, MIXED
SVERDRUP	MN	UDIC HAPLOBOROLLS	SANDY, MIXED
SWANBOY	SD	USTERTIC CAMBORTHIDS	VERY-FINE, MONTMORILLONITIC, MESIC
SWENODA	SD	PACHIC UDIC HAPLOBOROLLS	COARSE-LOAMY, MIXED
SWINT	SD	FLUVENTIC HAPLUSTOLLS	FINE-LOAMY, MIXED, MESIC
TABLE MOUNTAIN	CO	PACHIC HAPLUSTOLLS	FINE-LOAMY, MIXED, MESIC
TALLY	MT	TYPIC HAPLOBOROLLS	COARSE-LOAMY, MIXED
TALMO	SD	UDORTHENTIC HAPLUSTOLLS	SANDY-SKELETAL, MIXED, MESIC
TASSEL	NE	USTIC TORRIORTHENTS	LOAMY, MIXED (CALCAREOUS), MESIC, SHALLOW
TELFER	ND	ENTIC HAPLOBOROLLS	SANDY, MIXED
TEMVIK	ND	TYPIC HAPLOBOROLLS	FINE-SILTY, MIXED
TETONKA	SD	ARGIAQUIC ARGIALBOLLS	FINE, MONTMORILLONITIC, MESIC
THURMAN	NE	UDORTHENTIC HAPLUSTOLLS	SANDY, MIXED, MESIC
TIFFANY	ND	TYPIC HAPLAQUOLLS	COARSE-LOAMY, MIXED, FRIGID
TILFORD	SD	TORRIORTHENTIC HAPLUSTOLLS	FINE-SILTY, MIXED, MESIC
TOBY	MT	BOROLLIC CAMBORTHIDS	COARSE-LOAMY, MIXED
TONKA	ND	ARGIAQUIC ARGIALBOLLS	FINE, MONTMORILLONITIC, FRIGID
TOWNER	ND	UDORTHENTIC HAPLOBOROLLS	SANDY OVER LOAMY, MIXED
TRAVESSILLA	NM	LITHIC USTIC TORRIORTHENTS	LOAMY, MIXED (CALCAREOUS), MESIC
TREBOR	SD	TYPIC CRYOBORALFS	FINE OVER LOAMY-SKELETAL, MIXED
TREMBLES	MT	TYPIC USTIFLUVENTS	COARSE-LOAMY, MIXED (CALCAREOUS), FRIGID
TRENT	SD	PACHIC HAPLUSTOLLS	FINE-SILTY, MIXED, MESIC
TRIPP	NE	ARIDIC HAPLUSTOLLS	COARSE-SILTY, MIXED, MESIC
TUSLER	MT	USTIC TORRIPSAMMENTS	MIXED, FRIGID
TUTHILL	SD	ARIDIC ARGIUSTOLLS	FINE-LOAMY OVER SANDY OR SANDY-SKELETAL, MIXED, MESIC
TWILIGHT	SD	BOROLLIC CAMBORTHIDS	COARSE-LOAMY, MIXED
TWOTOP	SD	USTERTIC CAMBORTHIDS	VERY-FINE, MONTMORILLONITIC, MESIC
ULEN	MN	AERIC CALCIAQUOLLS	SANDY, FRIGID
ULYSSES	KS	ARIDIC HAPLUSTOLLS	FINE-SILTY, MIXED, MESIC
VALE	SD	ARIDIC ARGIUSTOLLS	FINE-SILTY, MIXED, MESIC
VALENT	CO	USTIC TORRIPSAMMENTS	MIXED, MESIC
VALENTINE	NE	TYPIC USTIPSAMMENTS	MIXED, MESIC
VALLERS	MN	TYPIC CALCIAQUOLLS	FINE-LOAMY, FRIGID
VANG	ND	PACHIC UDIC HAPLOBOROLLS	FINE-LOAMY OVER SANDY OR SANDY-SKELETAL, MIXED
VANOCKER	SD	TYPIC EUTROCHREPTS	LOAMY-SKELETAL, MIXED, FRIGID
VEBAR	ND	TYPIC HAPLOBOROLLS	COARSE-LOAMY, MIXED
VENLO	ND	TYPIC HAPLAQUOLLS	SANDY, MIXED, FRIGID
VERDEL	NE	VERTIC HAPLUSTOLLS	FINE, MONTMORILLONITIC, MESIC
VETAL	SD	PACHIC HAPLUSTOLLS	COARSE-LOAMY, MIXED, MESIC
VIBORG	SD	PACHIC HAPLUSTOLLS	FINE-SILTY, MIXED, MESIC
VIDA	MT	TYPIC ARGIBOROLLS	FINE-LOAMY, MIXED
VIENNA	SD	UDIC HAPLOBOROLLS	FINE-LOAMY, MIXED
VIRKULA	SD	TYPIC EUTROBORALFS	FINE, MONTMORILLONITIC
VOLGA	SD	CUMULIC HAPLAQUOLLS	FINE-LOAMY OVER SANDY OR SANDY-SKELETAL, MIXED (CALCAREOUS), FRIGID
VOLIN	SD	UDIC HAPLUSTOLLS	FINE-LOAMY, MIXED, MESIC
WABEK	ND	ENTIC HAPLOBOROLLS	SANDY-SKELETAL, MIXED
WAKONDA	SD	AERIC CALCIAQUOLLS	FINE-SILTY, MESIC
WALKE	SD	GLOSSIC NATRUSTOLLS	FINE, MONTMORILLONITIC, MESIC
WANBLEE	SD	USTOLLIC NATRARGIDS	FINE, MIXED, MESIC
WANN	NE	FLUVAQUENTIC HAPLUSTOLLS	COARSE-LOAMY, MIXED, MESIC
WASA	SD	USTERTIC CAMBORTHIDS	VERY-FINE, MONTMORILLONITIC, MESIC
WAUBONSIE	NE	AQUIC UDIFLUVENTS	COARSE-LOAMY OVER CLAYEY, MIXED (CALCAREOUS), MESIC
WAUBAY	SD	PACHIC UDIC HAPLOBOROLLS	FINE-SILTY, MIXED
WAYDEN	ND	TYPIC USTORTHENTS	CLAYEY, MONTMORILLONITIC (CALCAREOUS), FRIGID, SHALLOW
WEBER	CO	ARIDIC ARGIUSTOLLS	FINE-SILTY OVER SANDY OR SANDY-SKELETAL, MIXED, MESIC
WENDTE	SD	VERTIC USTIFLUVENTS	FINE, MONTMORILLONITIC (CALCAREOUS), MESIC
WENTWORTH	SD	UDIC HAPLUSTOLLS	FINE-SILTY, MIXED, MESIC
WESTOVER	SD	TYPIC USTORTHENTS	COARSE-LOAMY, MIXED (CALCAREOUS), MESIC
WEWELA	SD	TYPIC ARGIUSTOLLS	FINE-LOAMY, MIXED, MESIC
WHITELAKE	SD	TYPIC NATRUSTOLLS	FINE-LOAMY, MIXED, MESIC
WHITEWOOD	SD	CUMULIC HAPLAQUOLLS	FINE-SILTY, MIXED, MESIC
WILLIAMS	ND	TYPIC ARGIBOROLLS	FINE-LOAMY, MIXED
WINETTI	UT	TYPIC USTIFLUVENTS	LOAMY-SKELETAL, MIXED (CALCAREOUS), FRIGID
WINLER	SD	USTERTIC CAMBORTHIDS	VERY-FINE, MONTMORILLONITIC, MESIC
WITTEN	SD	VERTIC ARGIUSTOLLS	FINE, MONTMORILLONITIC, MESIC

SERIES	STATE	SUBGROUP	FAMILY
WOLF POINT	MT	USTERTIC TORRIFLUVENTS	FINE, MONTMORILLONITIC (CALCAREOUS), FRIGID
WOODLY	SD	PACHIC ARGIUSTOLLS	FINE-LOAMY, MIXED, MESIC
WOONSOCKET	SD	PACHIC ARGIUSTOLLS	FINE-LOAMY, MIXED, MESIC
WORTHING	SD	TYPIC ARGIAQUOLLS	FINE, MONTMORILLONITIC, MESIC
WORTMAN	SD	TYPIC NATRUSTOLLS	FINE, MIXED, MESIC
WYNDMERE	ND	AERIC CALCIAQUOLLS	COARSE-LOAMY, FRIGID
YAWDIM	ND	USTIC TORRIORTHENTS	CLAYEY, MONTMORILLONTIC (CALCAREOUS), FRIGID, SHALLOW
YECROSS	SD	TYPIC USTIPSAMMENTS	MIXED, FRIGID
YEGEN	MT	TYPIC ARGIBOROLLS	FINE-LOAMY, MIXED
ZAHILL	MT	TYPIC USTORTHENTS	FINE-LOAMY, MIXED (CALCAREOUS), FRIGID
ZAHL	ND	ENTIC HAPLOBOROLLS	FINE-LOAMY, MIXED
ZELL	SD	UDORTHENTIC HAPLOBOROLLS	COARSE-SILTY, MIXED
ZEONA	SD	USTIC TORRIPSAMMENTS	MIXED, FRIGID
ZIGWEID	WY	USTOLLIC CAMBORTHIDS	FINE-LOAMY, MIXED, MESIC

*PROPOSED SERIES

INACTIVE--CAPUTA
LEOTA
OAK LAKE

DROPPED--ARLO
BOEL
BRIDGEWATER
LIVONA
SANBORN
TEVILO
ZOOK

Appendix D. Soil ratings developed by crop and grass yields for South Dakota.

In Appendix Table D-1 the soils of South Dakota are rated according to their potential productivity. The steps of the method used to calculate those ratings may be obtained from the Plant Science Department, South Dakota State University. A separate publication will describe in detail the methods used to evaluate each soil.* A brief explanation of the method follows.

Potential crop yields and range yields were taken from the publication *Predicted Yields for the Soils of South Dakota,* USDA Soil Conservation Service, Huron, SD, 1973. These data are for non-irrigated conditions.

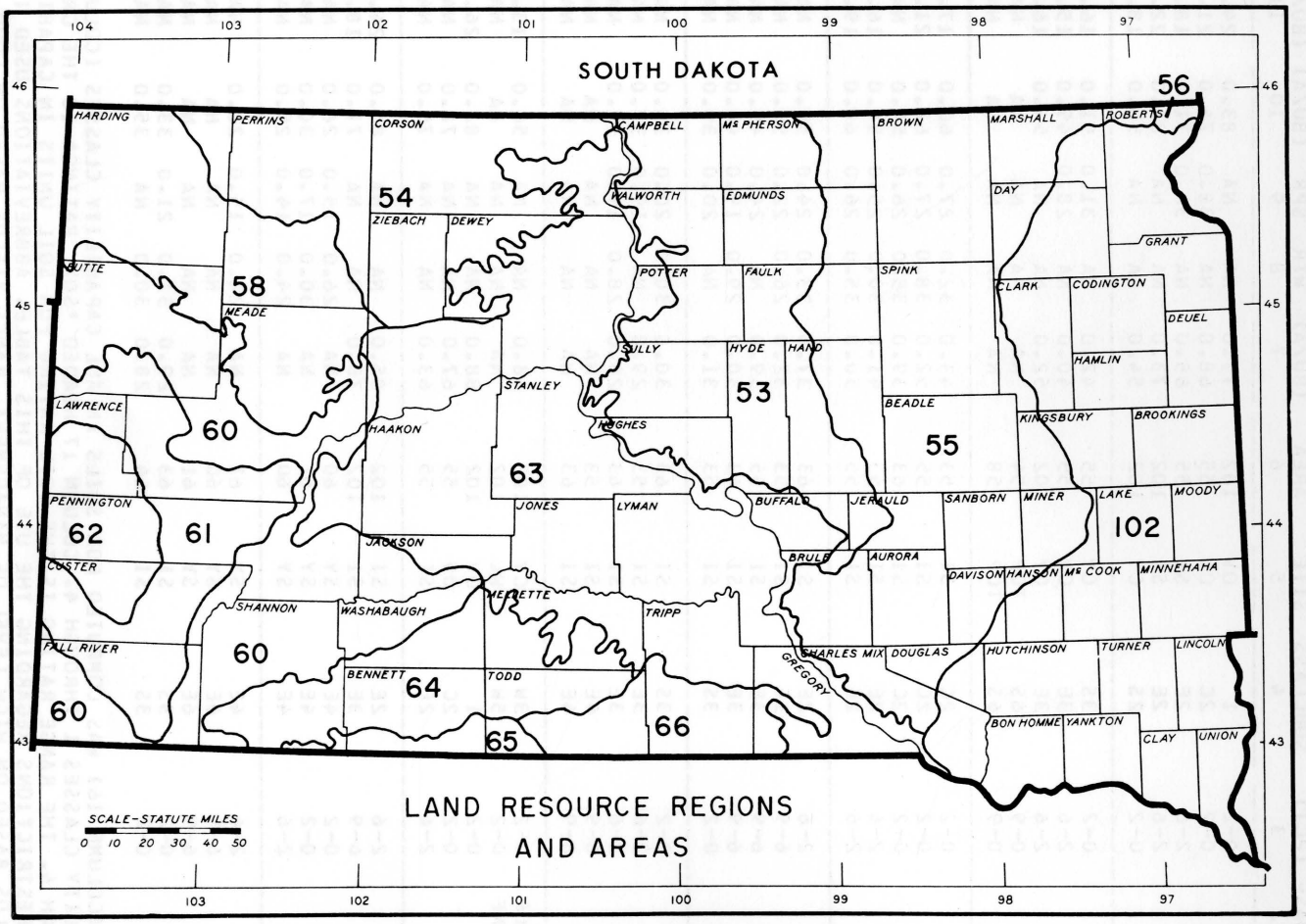
Comparative crop ratings were prepared for adapted crops for each soil unit. Thus the soil unit with the highest potential corn yield in the state was given a 100% rating and all other soils were given percentage ratings determined by their ability to produce corn compared to the 100% soil. Ratings were prepared for each adapted crop and a composite rating then was computed by adding the percentage ratings for each crop for each soil unit and assigning a 100% rating to the highest percentage total.

These ratings are general and their use is principally educational and for purposes of making broad comparisons. Detailed ratings for land evaluation in a county should be based upon detailed soil surveys done on large scale maps where acreages of each mapping unit have been determined. The ratings given in Appendix Table D-1 are for phases of individual soil series and not for soil mapping units which are found in detailed soil surveys.

A map locating the land resource areas (LRAs) of South Dakota is shown in Appendix Figure D-1. The LRA designation must be known if the following soil rating tables are to be used correctly.

* Malo, D. D. and F. C. Westin. 1978. *Rating South Dakota Soils According to Productivity,* Bulletin 657, Agricultural Experiment Station, South Dakota State University.

Appendix Figure D-1. South Dakota Land Resource Regions and Areas, February, 1965.



Central Feed Grains and Livestock Region
102 Loess, Till, and Sandy Prairies

Northern Great Plains Spring Wheat Region
53 Dark Brown Glaciated Plain
54 Rolling Soft Shale Plain
55 Black Glaciated Plains
56 Red River Valley of the North

Western Great Plains Range and Irrigated Region
58 Northern Rolling High Plains
60 Pierre Shale Plains and Badlands
61 Black Hills Footslopes
62 Black Hills
63 Rolling Pierre Shale Plains
64 Mixed Sandy and Silty Tableland
65 Nebraska Sand Hills
66 Dakota-Nebraska Eroded Tableland

Reference: Soils Memorandum SCS-49, National Resource Map, January, 1963.

APPENDIX TABLE D-1. RATINGS DEVELOPED FROM CROP AND RANGE YIELD ESTIMATES FOR SOUTH DAKOTA SOILS*

SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
AASTAD		0-2	1	OV	102	77.0	NA	NA	83.0	24.0	NA	24.0	3.3	1.25	55.9	78.9
AASTAD		0-2	2C	OV	55	68.0	NA	38.0	74.0	21.0	NA	NA	3.2	1.12	50.0	79.6
AASTAD		2-6	2E	SI	55	65.0	NA	36.0	71.0	18.0	NA	NA	3.0	0.64	28.6	74.2
AASTAD		2-6	2E	SI	102	73.0	NA	NA	81.0	22.0	NA	22.0	3.2	0.68	30.4	74.7
ABERDEEN		0-2	2S	CY	102	54.0	NA	NA	56.0	18.0	NA	19.0	2.7	0.66	29.5	58.5
ABERDEEN		0-2	3S	CY	55	42.0	NA	31.0	51.0	16.0	NA	NA	2.5	0.58	25.9	58.7
ABERDEEN		2-6	3E	CY	55	40.0	NA	28.0	49.0	15.0	NA	NA	2.4	0.54	24.1	55.1
ABERDEEN		2-6	3E	CY	102	52.0	NA	NA	54.0	16.0	NA	NA	2.6	0.62	27.7	57.7
ABSHER		0-9	6S	TCP	54	NA	NA	NA	NA	NA	NA	NA	NA	0.24	10.7	10.7
ABSHER		0-9	6S	TCP	58	NA	NA	NA	NA	NA	NA	NA	NA	0.15	6.7	6.7
AGAR		0-2	2C	SI	53	43.0	32.0	27.0	60.0	17.0	49.0	NA	2.1	0.50	22.3	59.6
AGAR		0-2	2C	SI	55	52.0	38.0	27.0	62.0	21.0	55.0	NA	2.1	0.54	24.1	66.2
AGAR		0-2	2C	SI	63	39.0	35.0	26.0	54.0	NA	49.0	NA	1.9	0.43	19.2	57.7
AGAR		2-6	2E	SI	53	41.0	30.0	25.0	56.0	16.0	46.0	NA	2.0	0.47	21.0	56.0
AGAR		2-6	2E	SI	55	50.0	35.0	26.0	60.0	19.0	54.0	NA	2.0	0.50	22.3	62.7
AGAR		2-6	2E	SI	63	37.0	33.0	24.0	50.0	NA	47.0	NA	1.9	0.39	17.4	54.6
AGAR		6-9	3E	SI	53	32.0	26.0	22.0	50.0	NA	39.0	NA	1.9	0.44	19.7	48.7
AGAR		6-9	3E	SI	55	39.0	NA	24.0	49.0	NA	44.0	NA	2.0	0.47	21.0	50.9
AGAR		6-9	3E	SI	63	30.0	29.0	19.0	44.0	NA	39.0	NA	1.6	0.36	16.1	46.0
AKASKA		0-2	3S	SI	53	31.0	NA	20.0	39.0	NA	35.0	NA	1.5	0.47	21.0	40.5
AKASKA		0-2	3S	SI	63	30.0	30.0	20.0	33.0	NA	NA	NA	1.4	0.39	17.4	43.5
AKASKA		2-6	3E	SI	53	29.0	NA	19.0	37.0	NA	34.0	NA	1.4	0.43	19.2	38.5
AKASKA		2-6	3E	SI	63	28.0	28.0	19.0	32.0	NA	NA	NA	1.3	0.36	16.1	41.0
AKASKA		6-9	4E	SI	53	NA	NA	NA	NA	NA	NA	NA	1.3	0.41	18.3	30.0
AKASKA		6-9	4E	SI	63	NA	NA	NA	NA	NA	NA	NA	1.2	0.34	15.2	27.7
ALBATON	DF	0-2	3W	CY	102	68.0	NA	NA	50.0	13.0	NA	27.0	3.3	1.13	50.5	63.5
ALBATON	DNF	0-2	5W	WL	102	NA	NA	NA	NA	NA	NA	NA	NA	1.00	44.7	44.7
ALCESTER		0-2	1	OV	102	88.0	NA	NA	82.0	26.0	84.0	37.0	4.2	1.15	51.4	94.2
ALCESTER		0-2	2C	OV	55	67.0	NA	NA	78.0	NA	NA	NA	3.5	1.02	45.6	79.3
ALCESTER		2-6	2E	SI	55	63.0	NA	NA	75.0	NA	NA	NA	3.4	0.54	24.1	76.0
ALCESTER		2-6	2E	SI	102	85.0	NA	NA	80.0	24.0	76.0	33.0	3.9	0.68	30.4	87.7
ALCESTER		6-9	3E	SI	102	78.0	NA	NA	71.0	18.0	70.0	26.0	3.3	0.65	29.0	74.8
ALICE		0-2	4E	SY	60	NA	26.0	15.0	26.0	NA	NA	NA	1.3	0.30	13.4	38.6
ALICE		0-2	4E	SY	61	NA	30.0	17.0	30.0	NA	NA	NA	1.5	0.32	14.3	44.3
ALICE		2-6	4E	SY	60	NA	24.0	14.0	25.0	NA	NA	NA	1.2	0.28	12.5	36.0
ALICE		2-6	4E	SY	61	NA	28.0	15.0	26.0	NA	NA	NA	1.4	0.30	13.4	40.3
ALICE		6-9	6E	SY	60	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
ALICE		6-9	6E	SY	61	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
ALTVAN		0-2	3S	SI	63	29.0	31.0	21.0	33.0	NA	28.0	NA	1.4	0.41	18.3	42.4
ALTVAN		0-2	3S	SI	64	28.0	30.0	NA	35.0	NA	24.0	NA	1.3	0.38	17.0	38.6

* A RANGE RATING (COLUMN 16) WAS COMPUTED FOR SOILS IN ALL CAPABILITY CLASSES (COLUMN 4). A CROP RATING WAS COMPUTED FOR SOILS IN CAPABILITY CLASSES 1 THROUGH 4. COLUMN 17 HEADED 'SOIL RATING' IS THE CROP RATING IF THE SOIL IS IN CAPABILITY CLASSES 1 THROUGH 4. THE RANGE RATING IS THE SOIL RATING FOR SOIL UNITS IN CAPABILITY CLASSES 5 THROUGH 7. SEE APPENDIX D DISCUSSION FOR RESTRICTIONS REGARDING THE USE OF THIS TABLE. ABBREVIATIONS USED IN THE TABLE ARE DEFINED AT THE END OF THE TABLE. CROP YIELDS BASED ON HIGH LEVEL OF MANAGEMENT, RANGE YIELDS BASED ON GOOD TO FAIR CONDITIONS. NA=CROP NOT ADAPTED OR WIDELY GROWN.

** COLUMN NUMBER

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SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
ALTVAN		0-2	4S	SI	60	18.0	26.0	18.0	25.0	NA	NA	NA	1.1	0.32	14.3	35.0
ALTVAN		0-2	4S	SI	61	20.0	28.0	NA	28.0	NA	NA	NA	1.2	0.33	14.7	35.4
ALTVAN		2-6	3E	SI	63	26.0	29.0	19.0	30.0	NA	25.0	NA	1.2	0.38	17.0	38.4
ALTVAN		2-6	3E	SI	64	25.0	28.0	NA	33.0	NA	22.0	NA	1.2	0.35	15.6	35.7
ALTVAN		2-6	4E	SI	60	17.0	24.0	17.0	24.0	NA	NA	NA	1.0	0.29	13.0	32.8
ALTVAN		2-6	4E	SI	61	19.0	25.0	NA	25.0	NA	NA	NA	1.1	0.30	13.4	32.1
ALTVAN		6-9	4E	SI	63	NA	22.0	15.0	24.0	NA	21.0	NA	1.0	0.38	17.0	32.2
ALTVAN		6-9	4E	SI	64	NA	24.0	NA	27.0	NA	16.0	NA	1.0	0.35	15.6	31.2
ALTVAN		9-15	6E	SI	63	NA	NA	NA	NA	NA	NA	NA	NA	0.34	15.2	15.2
ALTVAN		9-15	6E	SI	64	NA	NA	NA	NA	NA	NA	NA	NA	0.31	13.9	13.9
AMOR		2-6	2E	SI	54	32.0	29.0	25.0	43.0	NA	NA	NA	1.3	0.35	15.6	47.8
AMOR		2-6	3E	SI	58	NA	28.0	22.0	31.0	NA	NA	NA	1.2	0.31	13.9	44.9
AMOR		6-9	3E	SI	54	NA	25.0	21.0	36.0	NA	NA	NA	1.2	0.35	15.6	44.0
AMOR		6-9	4E	SI	58	NA	NA	NA	28.0	NA	NA	NA	1.1	0.27	12.1	28.2
ANSELMO		0-2	3E	SY	64	31.0	29.0	NA	39.0	NA	35.0	NA	1.5	0.40	17.9	43.2
ANSELMO		0-2	3E	SY	65	NA	NA	NA	36.0	NA	NA	NA	1.5	0.40	17.9	37.2
ANSELMO		0-2	3E	SY	66	35.0	NA	NA	44.0	NA	36.0	NA	2.0	0.46	20.6	43.6
ANSELMO		0-2	4E	SY	60	NA	23.0	NA	28.0	NA	NA	NA	1.2	0.30	13.4	36.5
ANSELMO		0-2	4E	SY	61	NA	25.0	NA	31.0	NA	NA	NA	1.3	0.35	15.6	39.8
ANSELMO		2-6	3E	SY	64	28.0	25.0	NA	36.0	NA	30.0	NA	1.4	0.37	16.5	38.5
ANSELMO		2-6	3E	SY	65	NA	NA	NA	34.0	NA	NA	NA	1.4	0.37	16.5	34.9
ANSELMO		2-6	3E	SY	66	33.0	NA	NA	39.0	NA	30.0	NA	1.9	0.43	19.2	39.3
ANSELMO		2-6	4E	SY	60	NA	21.0	NA	26.0	NA	NA	NA	1.0	0.27	12.1	32.7
ANSELMO		2-6	4E	SY	61	NA	23.0	NA	29.0	NA	NA	NA	1.2	0.35	15.6	36.9
ANSELMO		6-9	4E	SY	64	NA	23.0	NA	32.0	NA	26.0	NA	1.2	0.37	16.5	36.1
ANSELMO		6-9	4E	SY	65	NA	NA	NA	28.0	NA	NA	NA	1.1	0.34	15.2	28.2
ANSELMO		6-9	4E	SY	66	29.0	NA	NA	33.0	NA	24.0	NA	1.5	0.40	17.9	32.5
ANSELMO		6-15	6E	SY	60	NA	NA	NA	NA	NA	NA	NA	NA	0.24	10.7	10.7
ANSELMO		6-15	6E	SY	61	NA	NA	NA	NA	NA	NA	NA	NA	0.32	14.3	14.3
ANSELMO		9-15	6E	SY	64	NA	NA	NA	NA	NA	NA	NA	NA	0.34	15.2	15.2
ANSELMO		9-15	6E	SY	65	NA	NA	NA	NA	NA	NA	NA	NA	0.32	14.3	14.3
ANSELMO		9-15	6E	SY	66	NA	NA	NA	NA	NA	NA	NA	NA	0.38	17.0	17.0
ANSELMO		15-25	6E	SY	64	NA	NA	NA	NA	NA	NA	NA	NA	0.31	13.9	13.9
ANSELMO		15-25	6E	SY	65	NA	NA	NA	NA	NA	NA	NA	NA	0.30	13.4	13.4
ANSELMO		15-25	6E	SY	66	NA	NA	NA	NA	NA	NA	NA	NA	0.35	15.6	15.6
ANTLER		0-2	2E	SI	102	62.0	NA	NA	71.0	16.0	NA	20.0	2.4	0.59	26.4	61.3
ARCHIN		0-2	4S	CP	54	NA	23.0	18.0	31.0	NA	NA	NA	0.7	0.30	13.4	36.7
ARCHIN		0-2	4S	CP	58	NA	NA	17.0	28.0	NA	NA	NA	0.7	0.19	8.5	30.1
ARCHIN		2-9	6E	CP	54	NA	NA	NA	NA	NA	NA	NA	NA	0.28	12.5	12.5
ARCHIN		2-9	6S	CP	58	NA	NA	NA	NA	NA	NA	NA	NA	0.13	5.8	5.8

* A RANGE RATING (COLUMN 16) WAS COMPUTED FOR SOILS IN ALL CAPABILITY CLASSES (COLUMN 4). A CROP RATING WAS COMPUTED FOR SOILS IN CAPABILITY CLASSES 1 THROUGH 4. COLUMN 17 HEADED 'SOIL RATING' IS THE CROP RATING IF THE SOIL IS IN CAPABILITY CLASSES 1 THROUGH 4. THE RANGE RATING IS THE SOIL RATING FOR SOIL UNITS IN CAPABILITY CLASSES 5 THROUGH 7. SEE APPENDIX D DISCUSSION FOR RESTRICTIONS REGARDING THE USE OF THIS TABLE. ABBREVIATIONS USED IN THE TABLE ARE DEFINED AT THE END OF THE TABLE. CROP YIELDS BASED ON HIGH LEVEL OF MANAGEMENT, RANGE YIELDS BASED ON GOOD TO FAIR CONDITIONS. NA=CROP NOT ADAPTED OR WIDELY GROWN.

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SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
ARNEGARD		0-2	2C	OV	53	50.0	NA	31.0	69.0	20.0	NA	NA	3.1	0.94	42.0	69.9
ARNEGARD		0-2	2C	OV	54	40.0	37.0	30.0	55.0	NA	NA	NA	2.1	0.83	37.1	61.9
ARNEGARD		0-2	3C	OV	58	30.0	36.0	24.0	44.0	NA	NA	NA	1.9	0.75	33.5	52.9
ARNEGARD		2-6	2E	SI	53	46.0	NA	28.0	66.0	19.0	NA	NA	3.1	0.52	23.2	66.2
ARNEGARD		2-6	2E	SI	54	36.0	35.0	26.0	51.0	NA	NA	NA	1.9	0.40	17.9	56.3
ARNEGARD		2-6	3E	SI	58	28.0	33.0	22.0	42.0	NA	NA	NA	1.7	0.36	16.1	48.8
ARVADA		0-6	6S	TCP	54	NA	NA	NA	NA	NA	NA	NA	NA	0.24	10.7	10.7
ARVADA		0-6	6S	TCP	60	NA	NA	NA	NA	NA	NA	NA	NA	0.11	4.9	4.9
ARVADA		0-6	6S	TCP	61	NA	NA	NA	NA	NA	NA	NA	NA	0.12	5.4	5.4
ARVESON	DNF	0-2	5W	SB	55	NA	NA	NA	NA	NA	NA	NA	NA	1.25	55.9	55.9
ARVESON	DNF	0-2	5W	SB	102	NA	NA	NA	NA	NA	NA	NA	NA	1.44	64.3	64.3
ARVILLA		0-2	3S	SWG	102	29.0	NA	NA	36.0	13.0	NA	NA	1.2	0.50	22.3	35.9
ARVILLA		0-2	3E	SWG	55	NA	NA	15.0	32.0	11.0	NA	NA	1.0	0.33	14.7	33.8
ARVILLA		2-6	3E	SWG	55	NA	NA	14.0	30.0	10.0	NA	NA	1.0	0.33	14.7	31.7
ARVILLA		6-9	4E	SWG	55	NA	NA	NA	NA	NA	NA	NA	NA	0.28	12.5	12.5
ARVILLA		9-25	6E	SWG	55	NA	NA	NA	NA	NA	NA	NA	NA	0.26	11.6	11.6
ASCALON		0-2	4E	SY	60	NA	23.0	NA	29.0	NA	NA	NA	1.2	0.30	13.4	36.9
ASCALON		0-2	4E	SY	61	NA	25.0	NA	31.0	NA	NA	NA	1.4	0.35	15.6	40.6
ASCALON		2-6	4E	SY	60	NA	NA	NA	28.0	NA	NA	NA	1.1	0.27	12.1	28.2
ASCALON		2-6	4E	SY	61	NA	NA	NA	30.0	NA	NA	NA	1.3	0.32	14.3	31.6
ASCALON		6-15	6E	SY	60	NA	NA	NA	NA	NA	NA	NA	NA	0.24	10.7	10.7
ASCALON		6-15	6E	SY	61	NA	NA	NA	NA	NA	NA	NA	NA	0.29	13.0	13.0
ASSINNIBOINE		0-2	4E	SY	58	NA	21.0	15.0	25.0	NA	NA	NA	1.2	0.30	13.4	35.0
ASSINNIBOINE		2-6	4E	SY	58	NA	NA	14.0	22.0	NA	NA	NA	1.1	0.28	12.5	28.4
ASSINNIBOINE		6-9	6E	SY	58	NA	NA	NA	NA	NA	NA	NA	NA	0.26	11.6	11.6
ATHELWOLD		0-2	1	OV	102	90.0	NA	NA	82.0	25.0	NA	31.0	3.3	1.20	53.6	85.7
BACA		0-2	3S	CY	60	NA	28.0	19.0	28.0	NA	NA	NA	1.4	0.31	13.9	43.3
BACA		0-2	3S	CY	61	NA	31.0	23.0	32.0	NA	NA	NA	1.5	0.37	16.5	49.2
BACA		2-6	4E	CY	60	NA	25.0	17.0	25.0	NA	NA	NA	1.2	0.29	13.0	38.4
BACA		2-6	4E	CY	61	NA	28.0	21.0	29.0	NA	NA	NA	1.4	0.33	14.7	44.9
BADUS	DF	0-2	2W	OV	102	60.0	NA	NA	62.0	16.0	43.0	23.0	2.8	1.10	49.2	60.3
BADUS	DNF	0-2	4W	OV	102	NA	NA	NA	NA	NA	NA	NA	NA	1.10	49.2	49.2
BALTIC	DF	0-2	3W	WL	102	61.0	NA	NA	65.0	16.0	47.0	23.0	3.0	0.90	40.2	62.6
BALTIC	DNF	0-2	5W	WL	102	NA	NA	NA	NA	NA	NA	NA	NA	0.90	40.2	40.2
BANKARD		0-2	6E	SA	60	NA	NA	NA	NA	NA	NA	NA	NA	0.35	15.6	15.6
BANKARD		0-2	6E	SA	64	NA	NA	NA	NA	NA	NA	NA	NA	0.42	18.8	18.8
BANKARD		0-2	6E	SA	65	NA	NA	NA	NA	NA	NA	NA	NA	0.42	18.8	18.8
BANKARD		0-2	6E	SA	66	NA	NA	NA	NA	NA	NA	NA	NA	0.48	21.4	21.4
BANKS		0-2	6E	SA	53	NA	NA	NA	NA	NA	NA	NA	NA	0.48	21.4	21.4
BANKS		0-2	6E	SA	54	NA	NA	NA	NA	NA	NA	NA	NA	0.40	17.9	17.9

* A RANGE RATING (COLUMN 16) WAS COMPUTED FOR SOILS IN ALL CAPABILITY CLASSES (COLUMN 4). A CROP RATING WAS COMPUTED FOR SOILS IN CAPABILITY CLASSES 1 THROUGH 4. COLUMN 17 HEADED 'SOIL RATING' IS THE CROP RATING IF THE SOIL IS IN CAPABILITY CLASSES 1 THROUGH 4. THE RANGE RATING IS THE SOIL RATING FOR SOIL UNITS IN CAPABILITY CLASSES 5 THROUGH 7. SEE APPENDIX D DISCUSSION FOR RESTRICTIONS REGARDING THE USE OF THIS TABLE. ABBREVIATIONS USED IN THE TABLE ARE DEFINED AT THE END OF THE TABLE. CROP YIELDS BASED ON HIGH LEVEL OF MANAGEMENT, RANGE YIELDS BASED ON GOOD TO FAIR CONDITIONS. NA=CROP NOT ADAPTED OR WIDELY GROWN.

** COLUMN NUMBER

APPENDIX TABLE D-1. RATINGS DEVELOPED FROM CROP AND RANGE YIELD ESTIMATES FOR SOUTH DAKOTA SOILS*

SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
BARNES		0-2	1	SI	102	68.0	NA	NA	76.0	19.0	NA	22.0	2.8	0.64	28.6	68.6
BARNES		0-2	2C	SI	55	58.0	NA	29.0	66.0	18.0	NA	NA	2.5	0.54	24.1	65.8
BARNES		2-6	2E	SI	55	57.0	NA	28.0	64.0	18.0	NA	NA	2.5	0.50	22.3	64.6
BARNES		2-6	2E	SI	102	62.0	NA	NA	73.0	18.0	NA	20.0	2.8	0.61	27.3	65.0
BARNES		6-9	3E	SI	55	49.0	NA	26.0	58.0	16.0	NA	NA	2.4	0.47	21.0	58.7
BARNES		6-9	3E	SI	102	54.0	NA	NA	65.0	15.0	NA	16.0	2.6	0.57	25.5	56.4
BARNES		9-15	4E	SI	55	40.0	NA	17.0	47.0	12.0	NA	NA	2.1	0.44	19.7	45.6
BARNES		9-15	4E	SI	102	50.0	NA	NA	53.0	13.0	NA	NA	2.4	0.54	24.1	53.1
BARNES		15-25	6E	SI	55	NA	NA	NA	NA	NA	NA	NA	NA	0.43	19.2	19.2
BARNES		15-25	6E	SI	102	NA	NA	NA	NA	NA	NA	NA	NA	0.51	22.8	22.8
BARNES		25-40	6E	SI	55	NA	NA	NA	NA	NA	NA	NA	NA	0.41	18.3	18.3
BARNES		25-40	6E	SI	102	NA	NA	NA	NA	NA	NA	NA	NA	0.49	21.9	21.9
BARNES	E	2-6	3E	SI	55	40.0	NA	26.0	58.0	16.0	NA	NA	2.1	0.47	21.0	55.4
BARNES	E	2-6	3E	SI	102	59.0	NA	NA	65.0	16.0	NA	17.0	2.6	0.57	25.5	58.7
BARNES	E	6-9	4E	SI	55	36.0	NA	22.0	49.0	NA	NA	NA	1.9	0.44	19.7	48.0
BARNES	E	6-9	4E	SI	102	51.0	NA	NA	56.0	NA	NA	NA	2.4	0.54	24.1	57.1
BARNES	E	9-15	6E	SI	55	NA	NA	NA	NA	NA	NA	NA	1.6	0.41	18.3	37.0
BARNES	E	9-15	6E	SI	102	NA	NA	NA	NA	NA	NA	NA	NA	0.51	22.8	22.8
BARNUM		0-2	3C	SI	61	30.0	32.0	NA	40.0	NA	NA	NA	1.9	0.30	13.4	47.6
BEADLE		0-2	2S	CY	55	54.0	NA	31.0	57.0	17.0	54.0	NA	2.8	0.58	25.9	64.5
BEADLE		0-2	2S	CY	102	61.0	NA	NA	67.0	18.0	54.0	26.0	3.1	0.66	29.5	67.2
BEADLE		2-6	3E	CY	55	50.0	NA	29.0	55.0	17.0	52.0	NA	2.8	0.54	24.1	62.2
BEADLE		2-6	3E	CY	102	59.0	NA	NA	63.0	16.0	48.0	22.0	2.8	0.62	27.7	60.9
BEADLE		6-9	4E	CY	55	41.0	NA	26.0	46.0	NA	42.0	NA	2.6	0.51	22.8	54.0
BEADLE		6-9	3E	CY	102	52.0	NA	NA	54.0	NA	43.0	NA	2.7	0.59	26.4	57.0
BEADLE	E	0-2	3E	CY	102	59.0	NA	NA	59.0	16.0	49.0	22.0	2.7	0.59	26.4	60.0
BEADLE	E	2-6	4E	CY	55	40.0	NA	26.0	43.0	14.0	45.0	NA	2.5	0.51	22.8	52.6
BEADLE	E	2-6	3E	CY	102	53.0	NA	NA	53.0	15.0	41.0	18.0	2.5	0.55	24.6	53.2
BEARDEN		0-2	2E	SI	55	57.0	NA	32.0	65.0	16.0	NA	NA	2.6	0.52	23.2	65.9
BEARDEN		0-2	2E	SI	102	63.0	NA	NA	72.0	19.0	NA	19.0	2.8	0.66	29.5	65.1
BEARDEN	S	0-2	3W	SB	102	43.0	NA	NA	52.0	NA	NA	NA	2.4	1.17	52.3	52.8
BEARPAW		0-2	2C	CY	53	37.0	NA	27.0	56.0	17.0	NA	NA	2.1	0.50	22.3	55.5
BEARPAW		2-6	2E	CY	53	36.0	NA	26.0	54.0	15.0	NA	NA	2.0	0.48	21.4	52.5
BEARPAW		6-9	3E	CY	53	32.0	NA	23.0	45.0	NA	NA	NA	1.8	0.46	20.6	45.9
BECKTON		0-2	4S	CP	60	NA	15.0	12.0	21.0	NA	NA	NA	0.9	0.19	8.5	26.9
BECKTON		0-2	4S	CP	61	NA	NA	13.0	22.0	NA	NA	NA	1.0	0.28	12.5	26.8
BECKTON		2-6	6S	CP	60	NA	NA	NA	NA	NA	NA	NA	NA	0.14	6.3	6.3
BECKTON		2-6	6S	CP	61	NA	NA	NA	NA	NA	NA	NA	NA	0.23	10.3	10.3
BELFIELD		0-2	3S	CY	54	24.0	26.0	23.0	41.0	NA	NA	NA	1.4	0.38	17.0	43.8
BELFIELD		0-2	3S	CY	58	NA	24.0	19.0	31.0	NA	NA	NA	1.2	0.34	15.2	40.8

* A RANGE RATING (COLUMN 16) WAS COMPUTED FOR SOILS IN ALL CAPABILITY CLASSES (COLUMN 4). A CROP RATING WAS COMPUTED FOR SOILS IN CAPABILITY CLASSES 1 THROUGH 4. COLUMN 17 HEADED 'SOIL RATING' IS THE CROP RATING IF THE SOIL IS IN CAPABILITY CLASSES 1 THROUGH 4. THE RANGE RATING IS THE SOIL RATING FOR SOIL UNITS IN CAPABILITY CLASSES 5 THROUGH 7. SEE APPENDIX D DISCUSSION FOR RESTRICTIONS REGARDING THE USE OF THIS TABLE. ABBREVIATIONS USED IN THE TABLE ARE DEFINED AT THE END OF THE TABLE. CROP YIELDS BASED ON HIGH LEVEL OF MANAGEMENT, RANGE YIELDS BASED ON GOOD TO FAIR CONDITIONS. NA=CROP NOT ADAPTED OR WIDELY GROWN.

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SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
BELFIELD		2-6	3E	CY	54	22.0	24.0	21.0	39.0	NA	NA	NA	1.3	0.35	15.6	40.6
BELFIELD		2-6	4E	CY	58	NA	22.0	18.0	29.0	NA	NA	NA	1.0	0.31	13.9	37.4
BELFIELD		6-9	4E	CY	54	NA	20.0	18.0	33.0	NA	NA	NA	1.2	0.35	15.6	38.5
BELFIELD		6-9	6E	CY	58	NA	NA	NA	NA	NA	NA	NA	NA	0.28	12.5	12.5
BENCLARE		0-2	2S	CY	102	77.0	NA	NA	72.0	NA	66.0	28.0	3.5	0.70	31.3	78.2
BENOIT		0-2	5W	WL	53	NA	NA	NA	NA	NA	NA	NA	NA	0.80	35.7	35.7
BENOIT		0-2	5W	WL	55	NA	NA	NA	NA	NA	NA	NA	NA	0.85	38.0	38.0
BENOIT		0-2	5W	WL	102	NA	NA	NA	NA	NA	NA	NA	NA	0.90	40.2	40.2
BEOTIA		0-2	1	SI	102	78.0	NA	NA	88.0	24.0	NA	28.0	3.2	0.68	30.4	81.8
BEOTIA		0-2	2C	SI	55	68.0	NA	37.0	74.0	19.0	NA	NA	2.8	0.54	24.1	75.8
BEOTIA		2-6	2E	SI	55	65.0	NA	36.0	72.0	18.0	NA	NA	2.7	0.50	22.3	73.0
BEOTIA		2-6	2E	SI	102	73.0	NA	NA	83.0	23.0	NA	26.0	3.0	0.63	28.2	77.0
BEOTIA		6-9	3E	SI	55	NA	NA	29.0	62.0	16.0	NA	NA	2.6	0.47	21.0	64.6
BEOTIA		6-9	3E	SI	102	63.0	NA	NA	75.0	19.0	NA	19.0	2.6	0.60	26.8	64.9
BETTS		2-6	3E	TU	102	45.0	NA	NA	46.0	15.0	35.0	17.0	2.3	0.48	21.4	48.1
BETTS		2-6	4E	TU	53	25.0	NA	15.0	39.0	12.0	25.0	NA	1.5	0.39	17.4	35.6
BETTS		2-6	4E	TU	55	36.0	NA	17.0	43.0	14.0	26.0	NA	1.9	0.42	18.8	42.1
BETTS		6-9	4E	TU	53	23.0	NA	14.0	37.0	NA	18.0	NA	1.4	0.37	16.5	30.9
BETTS		6-9	4E	TU	55	29.0	NA	NA	37.0	NA	20.0	NA	1.8	0.40	17.9	34.2
BETTS		6-9	4E	TU	102	41.0	NA	NA	43.0	NA	28.0	16.0	2.2	0.48	21.4	43.1
BETTS		9-25	6E	TU	53	NA	NA	NA	NA	NA	NA	NA	NA	0.37	16.5	16.5
BETTS		9-25	6E	TU	55	NA	NA	NA	NA	NA	NA	NA	NA	0.38	17.0	17.0
BETTS		9-25	6E	TU	102	NA	NA	NA	NA	NA	NA	NA	NA	0.43	19.2	19.2
BETTS		25-40	7E	TU	53	NA	NA	NA	NA	NA	NA	NA	NA	0.34	15.2	15.2
BETTS		25-40	7E	TU	55	NA	NA	NA	NA	NA	NA	NA	NA	0.33	14.7	14.7
BETTS		25-40	7E	TU	102	NA	NA	NA	NA	NA	NA	NA	NA	0.37	16.5	16.5
BETTS	E	2-6	4E	TU	53	23.0	NA	14.0	32.0	NA	20.0	NA	1.1	0.39	17.4	28.9
BETTS	E	2-6	4E	TU	55	32.0	NA	NA	33.0	NA	23.0	NA	1.7	0.42	18.8	34.2
BETTS	E	2-6	4E	TU	102	42.0	NA	NA	43.0	NA	27.0	16.0	2.1	0.48	21.4	42.6
BETTS	E	6-15	6E	TU	53	NA	NA	NA	NA	NA	NA	NA	NA	0.37	16.5	16.5
BETTS	E	6-15	6E	TU	55	NA	NA	NA	NA	NA	NA	NA	1.6	0.38	17.0	37.0
BETTS	E	6-9	6E	TU	102	NA	NA	NA	NA	NA	NA	NA	NA	0.46	20.6	20.6
BETTS	E	9-15	6E	TU	102	NA	NA	NA	NA	NA	NA	NA	NA	0.43	19.2	19.2
BIDMAN		0-2	3S	CY	60	NA	14.0	10.0	28.0	NA	NA	NA	1.0	0.29	13.0	27.6
BIDMAN		0-2	3S	CY	61	NA	20.0	NA	30.0	NA	NA	NA	1.2	0.26	11.6	35.0
BIDMAN		2-6	4E	CY	60	NA	12.0	9.0	23.0	NA	NA	NA	0.9	0.27	12.1	23.9
BIDMAN		2-6	4E	CY	61	NA	18.0	NA	25.0	NA	NA	NA	1.0	0.23	10.3	30.2
BLACKHALL		2-15	6E	SW	58	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
BLACKHALL		2-15	6E	SW	60	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
BLACKPIPE		0-2	3C	SI	60	33.0	33.0	NA	42.0	NA	NA	NA	1.6	0.39	17.4	47.8

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SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
BLACKPIPE		2-6	3E	SI	60	32.0	31.0	NA	39.0	NA	NA	NA	1.5	0.37	16.5	45.0
BLACKPIPE		6-9	4E	SI	60	25.0	25.0	NA	33.0	NA	NA	NA	1.4	0.35	15.6	37.6
BLAKE		0-2	1	SI	102	96.0	NA	NA	90.0	NA	81.0	40.0	4.4	0.72	32.2	100.0
BLENCOE		0-2	2w	OV	102	77.0	NA	NA	74.0	NA	79.0	27.0	3.4	1.20	53.6	80.7
BLENDON		0-2	3E	SY	55	50.0	NA	NA	50.0	14.0	45.0	NA	2.0	0.52	23.2	51.3
BLENDON		0-2	3S	SY	102	67.0	NA	NA	60.0	17.0	50.0	20.0	2.4	0.64	28.6	60.3
BLENDON		2-6	3E	SY	55	48.0	NA	NA	48.0	13.0	42.0	NA	1.9	0.50	22.3	48.6
BLENDON		2-6	3E	SY	102	63.0	NA	NA	56.0	16.0	46.0	19.0	2.1	0.61	27.3	56.0
BLENDON	E	0-2	3E	SY	55	46.0	NA	NA	47.0	NA	43.0	NA	1.8	0.48	21.4	48.2
BLENDON	E	0-2	3E	SY	102	53.0	NA	NA	56.0	16.0	46.0	19.0	2.1	0.60	26.8	54.2
BLENDON	E	2-6	4E	SY	55	38.0	NA	NA	42.0	NA	37.0	NA	1.6	0.45	20.1	41.8
BLENDON	E	2-6	4E	SY	102	49.0	NA	NA	50.0	13.0	39.0	16.0	1.8	0.55	24.6	46.8
BLYBURG		0-2	1	SI	102	92.0	NA	NA	80.0	NA	79.0	38.0	4.2	0.72	32.2	94.5
BON		0-2	1	OV	102	95.0	NA	NA	82.0	29.0	73.0	39.0	4.1	1.20	53.6	95.5
BON		0-2	2C	OV	53	51.0	38.0	31.0	69.0	NA	63.0	NA	3.1	1.02	45.6	73.2
BON		0-2	2C	OV	55	63.0	NA	NA	75.0	NA	70.0	NA	3.3	1.09	48.7	77.1
BONEEK		0-2	3C	SI	61	NA	33.0	22.0	32.0	NA	NA	NA	1.7	0.37	16.5	50.9
BONEEK		2-6	3E	SI	61	NA	31.0	21.0	31.0	NA	NA	NA	1.6	0.33	14.7	48.3
BONEEK		6-9	4E	SI	61	NA	25.0	20.0	28.0	NA	NA	NA	1.3	0.29	13.0	41.7
BONILLA		0-2	1	OV	102	79.0	NA	NA	76.0	NA	69.0	30.0	3.5	1.20	53.6	81.2
BONILLA		0-2	2C	OV	53	58.0	NA	31.0	68.0	19.0	62.0	NA	2.6	0.89	39.8	69.2
BONILLA		0-2	2C	OV	55	64.0	NA	37.0	73.0	19.0	63.0	NA	2.7	1.02	45.6	74.3
BONILLA		2-6	2E	SI	53	57.0	NA	28.0	66.0	18.0	59.0	NA	2.4	0.47	21.0	65.4
BONILLA		2-6	2E	SI	55	60.0	NA	34.0	72.0	18.0	63.0	NA	2.7	0.57	25.5	71.6
BONILLA		2-6	2E	SI	102	74.0	NA	NA	70.0	NA	66.0	29.0	3.3	0.68	30.4	76.7
BORO		2-6	3E	CY	63	29.0	30.0	NA	40.0	NA	34.0	NA	1.5	0.46	20.6	43.2
BORO		6-9	4E	CY	63	NA	26.0	NA	34.0	NA	21.0	NA	1.3	0.44	19.7	37.5
BORO		9-15	6E	CY	63	NA	NA	NA	NA	NA	NA	NA	NA	0.42	18.8	18.8
BORUP	DF	0-2	2w	SB	55	NA	NA	24.0	37.0	13.0	NA	NA	2.6	1.21	54.1	51.9
BORUP	DF	0-2	2w	SB	102	57.0	NA	NA	59.0	13.0	NA	NA	2.6	1.31	58.5	57.8
BORUP	S	0-2	4w	SB	55	NA	NA	NA	37.0	NA	NA	NA	1.8	1.05	46.9	41.2
BORUP	S	0-2	4w	SB	102	40.0	NA	NA	49.0	NA	NA	NA	2.1	1.10	49.2	48.3
BORUP	DNF	0-2	4w	SB	55	NA	NA	NA	NA	NA	NA	NA	NA	1.21	54.1	54.1
BORUP	DNF	0-2	4w	SB	102	NA	NA	NA	NA	NA	NA	NA	NA	1.31	58.5	58.5
BOWBELLS		0-2	2C	OV	53	51.0	NA	31.0	67.0	19.0	NA	NA	2.5	0.91	40.7	66.2
BOWBELLS		0-2	2C	OV	55	50.0	NA	33.0	71.0	19.0	NA	NA	2.6	0.97	43.3	68.4
BOWBELLS		2-6	2E	SI	53	47.0	NA	28.0	64.0	18.0	NA	NA	2.4	0.54	24.1	62.0
BOWBELLS		2-6	2E	SI	55	46.0	NA	30.0	65.0	18.0	NA	NA	2.5	0.57	25.5	63.5
BOWDLE		0-2	3S	SI	53	30.0	NA	21.0	44.0	15.0	NA	NA	1.2	0.43	19.2	42.8
BOWDLE		2-6	3E	SI	53	28.0	NA	19.0	41.0	13.0	NA	NA	1.1	0.40	17.9	38.8

* A RANGE RATING (COLUMN 16) WAS COMPUTED FOR SOILS IN ALL CAPABILITY CLASSES (COLUMN 4). A CROP RATING WAS COMPUTED FOR SOILS IN CAPABILITY CLASSES 1 THROUGH 4. COLUMN 17 HEADED 'SOIL RATING' IS THE CROP RATING IF THE SOIL IS IN CAPABILITY CLASSES 1 THROUGH 4. THE RANGE RATING IS THE SOIL RATING FOR SOIL UNITS IN CAPABILITY CLASSES 5 THROUGH 7. SEE APPENDIX D DISCUSSION FOR RESTRICTIONS REGARDING THE USE OF THIS TABLE. ABBREVIATIONS USED IN THE TABLE ARE DEFINED AT THE END OF THE TABLE. CROP YIELDS BASED ON HIGH LEVEL OF MANAGEMENT, RANGE YIELDS BASED ON GOOD TO FAIR CONDITIONS. NA=CROP NOT ADAPTED OR WIDELY GROWN.

** COLUMN NUMBER

APPENDIX TABLE D-1. RATINGS DEVELOPED FROM CROP AND RANGE YIELD ESTIMATES FOR SOUTH DAKOTA SOILS*

SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WIR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
BOYD		0-2	3S	CY	63	30.0	33.0	NA	44.0	NA	NA	NA	1.5	0.44	19.7	47.0
BOYD		2-6	3E	CY	63	29.0	31.0	NA	42.0	NA	40.0	NA	1.5	0.40	17.9	45.5
BOYD		6-9	4E	CY	63	23.0	28.0	NA	37.0	NA	27.0	NA	1.3	0.38	17.0	37.8
BOYD		9-25	6E	CY	63	NA	NA	NA	NA	NA	NA	NA	NA	0.36	16.1	16.1
BOYD		25-40	7E	CY	63	NA	NA	NA	NA	NA	NA	NA	NA	0.34	15.2	15.2
BRIDGEPORT		0-2	2C	SI	64	31.0	32.0	NA	39.0	NA	NA	NA	1.8	0.40	17.9	47.0
BRIDGEPORT		0-2	3C	SI	60	NA	28.0	NA	30.0	NA	NA	NA	1.4	0.34	15.2	42.4
BRIDGEPORT		2-6	2E	SI	64	29.0	29.0	NA	36.0	NA	NA	NA	1.7	0.37	16.5	43.4
BRIDGEPORT		2-6	3E	SI	60	NA	25.0	NA	28.0	NA	NA	NA	1.3	0.31	13.9	38.7
BROADHURST		2-15	6S	DC	61	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
BROOKINGS		0-2	1	OV	102	79.0	NA	NA	84.0	24.0	NA	29.0	3.4	1.13	50.5	82.5
BROOKINGS		2-6	2E	SI	102	77.0	NA	NA	81.0	21.0	NA	28.0	3.2	0.75	33.5	77.9
BRYANT		0-2	2C	SI	53	35.0	NA	28.0	53.0	16.0	NA	NA	2.0	0.50	22.3	53.8
BRYANT		2-6	2E	SI	53	32.0	NA	27.0	52.0	15.0	NA	NA	1.9	0.47	21.0	51.3
BRYANT		6-9	3E	SI	53	30.0	NA	22.0	44.0	NA	NA	NA	1.6	0.44	19.7	43.3
BUFFINGTON		0-2	2C	SI	63	NA	27.0	NA	45.0	NA	40.0	NA	1.3	0.43	19.2	46.7
BUFFINGTON		0-2	2C	SI	64	NA	27.0	NA	42.0	NA	40.0	NA	1.3	0.40	17.9	45.8
BUFFINGTON		0-2	3C	SI	60	NA	25.0	NA	29.0	NA	NA	NA	1.3	0.29	13.0	39.1
BUFFINGTON		0-2	3C	SI	61	29.0	29.0	NA	34.0	NA	NA	NA	1.6	0.34	15.2	42.3
BUSE		2-6	3E	TU	102	43.0	NA	NA	56.0	15.0	NA	NA	1.9	0.58	25.9	51.0
BUSE		2-6	4E	TU	55	36.0	NA	17.0	44.0	13.0	NA	NA	1.8	0.44	19.7	43.4
BUSE		6-9	4E	TU	55	NA	NA	16.0	39.0	NA	NA	NA	1.7	0.41	18.3	41.0
BUSE		6-9	4E	TU	102	40.0	NA	NA	50.0	13.0	NA	NA	1.7	0.53	23.7	45.6
BUSE		9-25	6E	TU	55	NA	NA	NA	NA	NA	NA	NA	NA	0.38	17.0	17.0
BUSE		9-25	6E	TU	102	NA	NA	NA	NA	NA	NA	NA	NA	0.47	21.0	21.0
BUSE		25-40	7E	TU	55	NA	NA	NA	NA	NA	NA	NA	NA	0.35	15.6	15.6
BUSE		25-40	7E	TU	102	NA	NA	NA	NA	NA	NA	NA	NA	0.40	17.9	17.9
BUSE	E	2-6	4E	TU	55	30.0	NA	16.0	40.0	12.0	NA	NA	1.4	0.41	18.3	38.2
BUSE	E	2-6	4E	TU	102	40.0	NA	NA	50.0	13.0	NA	NA	1.5	0.47	21.0	44.4
BUSE	E	6-15	6E	TU	55	NA	NA	NA	NA	NA	NA	NA	1.3	0.38	17.0	30.0
BUSE	E	6-9	6E	TU	102	NA	NA	NA	NA	NA	NA	NA	NA	0.42	18.8	18.8
BUSE	E	9-15	6E	TU	102	NA	NA	NA	NA	NA	NA	NA	NA	0.40	17.9	17.9
BUTCHE		6-25	6S	SW	61	NA	NA	NA	NA	NA	NA	NA	NA	0.29	13.0	13.0
BUTCHE		25-40	7S	SW	61	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
CABBA		9-15	6S	SW	54	NA	NA	NA	NA	NA	NA	NA	NA	0.30	13.4	13.4
CABBA		15-40	7S	SW	54	NA	NA	NA	NA	NA	NA	NA	NA	0.26	11.6	11.6
CABBART		9-15	6S	SW	58	NA	NA	NA	NA	NA	NA	NA	NA	0.23	10.3	10.3
CABBART		15-40	7S	SW	58	NA	NA	NA	NA	NA	NA	NA	NA	0.22	9.8	9.8
CANNING		0-2	3S	SI	53	28.0	NA	21.0	48.0	12.0	35.0	NA	1.4	0.48	21.4	42.0
CANNING		0-2	3S	SI	63	29.0	31.0	NA	47.0	NA	35.0	NA	1.3	0.43	19.2	44.5

* A RANGE RATING (COLUMN 16) WAS COMPUTED FOR SOILS IN ALL CAPABILITY CLASSES (COLUMN 4). A CROP RATING WAS COMPUTED FOR SOILS IN CAPABILITY CLASSES 1 THROUGH 4. COLUMN 17 HEADED 'SOIL RATING' IS THE CROP RATING IF THE SOIL IS IN CAPABILITY CLASSES 1 THROUGH 4. THE RANGE RATING IS THE SOIL RATING FOR SOIL UNITS IN CAPABILITY CLASSES 5 THROUGH 7. SEE APPENDIX D DISCUSSION FOR RESTRICTIONS REGARDING THE USE OF THIS TABLE. ABBREVIATIONS USED IN THE TABLE ARE DEFINED AT THE END OF THE TABLE. CROP YIELDS BASED ON HIGH LEVEL OF MANAGEMENT, RANGE YIELDS BASED ON GOOD TO FAIR CONDITIONS. NA=CROP NOT ADAPTED OR WIDELY GROWN.

** COLUMN NUMBER

APPENDIX TABLE D-1. RATINGS DEVELOPED FROM CROP AND RANGE YIELD ESTIMATES FOR SOUTH DAKOTA SOILS*

SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
CANNING		2-6	3E	SI	53	26.0	NA	19.0	45.0	11.0	34.0	NA	1.3	0.48	21.4	39.0
CANNING		2-6	3E	SI	63	26.0	30.0	NA	44.0	NA	33.0	NA	1.2	0.41	18.3	41.8
CANNING		6-9	4E	SI	53	NA	NA	NA	NA	NA	26.0	NA	1.1	0.41	18.3	28.1
CANNING		6-9	4E	SI	63	NA	NA	NA	NA	NA	26.0	NA	1.0	0.38	17.0	26.9
CANYON		2-15	6S	SW	60	NA	NA	NA	NA	NA	NA	NA	NA	0.23	10.3	10.3
CANYON		2-15	6S	SW	61	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
CANYON		2-15	6S	SW	64	NA	NA	NA	NA	NA	NA	NA	NA	0.32	14.3	14.3
CANYON		2-15	6S	SW	66	NA	NA	NA	NA	NA	NA	NA	NA	0.36	16.1	16.1
CANYON		15-40	7S	SW	60	NA	NA	NA	NA	NA	NA	NA	NA	0.22	9.8	9.8
CANYON		15-40	7S	SW	61	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
CANYON		15-40	7S	SW	64	NA	NA	NA	NA	NA	NA	NA	NA	0.28	12.5	12.5
CANYON		15-40	7S	SW	66	NA	NA	NA	NA	NA	NA	NA	NA	0.32	14.3	14.3
CAPUTA		0-2	2C	CY	63	37.0	34.0	26.0	44.0	NA	41.0	NA	1.8	0.42	18.8	53.2
CAPUTA		0-2	2C	CY	64	34.0	36.0	NA	44.0	NA	39.0	NA	1.7	0.42	18.8	49.9
CAPUTA		0-2	3C	CY	60	26.0	29.0	21.0	30.0	NA	NA	NA	1.3	0.30	13.4	41.6
CAPUTA		0-2	3C	CY	61	33.0	35.0	26.0	35.0	NA	NA	NA	1.8	0.36	16.1	51.7
CAPUTA		2-6	2E	CY	63	34.0	33.0	25.0	41.0	NA	39.0	NA	1.7	0.40	17.9	50.5
CAPUTA		2-6	2E	CY	64	32.0	33.0	NA	41.0	NA	36.0	NA	1.6	0.38	17.0	46.3
CAPUTA		2-6	3E	CY	60	23.0	26.0	20.0	26.0	NA	NA	NA	1.2	0.28	12.5	37.8
CAPUTA		2-6	3E	CY	61	32.0	32.0	23.0	33.0	NA	NA	NA	1.6	0.32	14.3	47.3
CAPUTA		6-9	3E	CY	63	31.0	30.0	21.0	37.0	NA	33.0	NA	1.6	0.38	17.0	44.9
CAPUTA		6-9	3E	CY	64	30.0	28.0	NA	38.0	NA	32.0	NA	1.4	0.38	17.0	41.1
CAPUTA		6-9	4E	CY	60	NA	21.0	17.0	21.0	NA	NA	NA	1.0	0.26	11.6	34.0
CAPUTA		6-9	4E	CY	61	NA	28.0	19.0	30.0	NA	NA	NA	1.4	0.32	14.3	43.9
CAPUTA		9-15	4E	CY	60	NA	NA	NA	NA	NA	NA	NA	NA	0.24	10.7	10.7
CAPUTA		9-15	4E	CY	63	NA	NA	NA	NA	NA	29.0	NA	1.2	0.36	16.1	31.0
CAPUTA		9-15	4E	CY	64	NA	NA	NA	NA	NA	26.0	NA	1.1	0.36	16.1	28.1
CAPUTA		9-15	6E	CY	61	NA	NA	NA	NA	NA	NA	NA	NA	0.32	14.3	14.3
CARTHAGE		0-2	3E	SY	55	49.0	NA	25.0	51.0	NA	47.0	NA	2.1	0.52	23.2	55.2
CARTHAGE		2-6	3E	SY	55	46.0	NA	22.0	48.0	NA	44.0	NA	1.9	0.50	22.3	50.7
CASS		0-2	3E	SY	55	42.0	32.0	NA	49.0	NA	NA	NA	2.7	0.90	40.2	57.9
CASS		0-2	3E	SY	63	32.0	24.0	NA	42.0	NA	NA	NA	2.0	0.75	33.5	44.9
CAVO		0-2	4S	CP	53	NA	NA	15.0	30.0	NA	21.0	NA	1.2	0.38	17.0	30.9
CAVO		0-2	4S	CP	55	NA	NA	16.0	31.0	NA	22.0	NA	1.3	0.36	16.1	32.7
CAVO		2-6	4S	CP	53	NA	NA	14.0	29.0	NA	20.0	NA	1.1	0.33	14.7	29.2
CAVO		2-6	4S	CP	55	NA	NA	15.0	29.0	NA	19.0	NA	1.2	0.36	16.1	30.1
CAVO		6-9	6E	CP	53	NA	NA	NA	NA	NA	NA	NA	1.0	0.31	13.9	23.1
CAVO		6-9	6E	CP	55	NA	NA	NA	NA	NA	NA	NA	NA	0.31	13.9	13.9
CAVOUR		0-2	4S	CP	55	NA	NA	15.0	30.0	NA	NA	NA	1.1	0.33	14.7	32.2
CAVOUR		0-6	4S	CP	102	NA	NA	NA	36.0	13.0	NA	17.0	1.4	0.48	21.4	40.2

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SOIL SERIES NAME	PHASE	SLOPE (PCT)	LAND CAPABILITY SUBCLASS	RANGE SITE	LAND RESOURCE AREA	CORN GRAIN (BU/A)	WHEAT (BU/A) WTR	WHEAT (BU/A) SPR	OATS (BU/A)	FLAX (BU/A)	SORGHUM GRAIN (BU/A)	SOY-BEANS (BU/A)	ALFALFA (T/A)	RANGE YIELD (AUMS)	RANGE RATING (PCT)	SOIL RATING (PCT)
1**	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
CAVOUR		2-6	4S	CP	55	NA	NA	13.0	28.0	NA	NA	NA	1.0	0.33	14.7	29.0
CEDAR BUTTE		0-2	4S	CP	64	NA	21.0	NA	29.0	NA	20.0	NA	1.1	0.32	14.3	31.9
CEDAR BUTTE		2-6	4S	CP	64	NA	20.0	NA	27.0	NA	17.0	NA	1.0	0.32	14.3	29.3
CEDAR BUTTE		6-9	6E	CP	64	NA	NA	NA	NA	NA	NA	NA	NA	0.28	12.5	12.5
CHAMA		2-6	3E	SI	54	NA	28.0	21.0	35.0	NA	NA	NA	1.2	0.37	16.5	45.4
CHAMA		2-6	4E	SI	58	NA	24.0	17.0	30.0	NA	NA	NA	1.1	0.32	14.3	38.7
CHAMA		6-9	3E	SI	54	NA	21.0	19.0	32.0	NA	NA	NA	1.1	0.35	15.6	38.9
CHAMA		6-9	4E	SI	58	NA	20.0	13.0	25.0	NA	NA	NA	1.0	0.30	13.4	32.0
CHAMA		9-15	4E	SI	54	NA	NA	NA	25.0	NA	NA	NA	1.0	0.31	13.9	25.4
CHAMA		9-25	6E	SI	58	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
CHAMA		15-25	6E	SI	54	NA	NA	NA	NA	NA	NA	NA	NA	0.29	13.0	13.0
CHANCELLOR		0-2	2W	OV	102	77.0	NA	NA	74.0	NA	NA	29.0	3.4	1.15	51.4	78.9
CHANTIER		0-9	6S	DC	63	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
CHANTIER		9-25	7S	DC	63	NA	NA	NA	NA	NA	NA	NA	NA	0.21	9.4	9.4
CHAPPELL		0-2	3E	SY	66	26.0	NA	NA	31.0	NA	NA	NA	1.1	0.50	22.3	29.1
CHAPPELL		2-6	3E	SY	66	24.0	NA	NA	28.0	NA	NA	NA	1.0	0.50	22.3	26.5
CHAPPELL		6-9	6E	SY	66	NA	NA	NA	NA	NA	NA	NA	0.9	0.44	19.7	20.8
CHEYENNE		0-2	3S	SI	63	28.0	29.0	15.0	32.0	NA	23.0	NA	1.3	0.38	17.0	37.4
CHEYENNE		0-2	4S	SI	60	NA	24.0	13.0	25.0	NA	NA	NA	1.1	0.31	13.9	34.8
CHEYENNE		0-2	4S	SI	61	NA	26.0	NA	30.0	NA	NA	NA	1.4	0.29	13.0	41.0
CHEYENNE		2-6	3E	SI	63	20.0	25.0	14.0	30.0	NA	22.0	NA	1.1	0.34	15.2	32.8
CHEYENNE		2-6	4E	SI	60	NA	21.0	11.0	22.0	NA	NA	NA	0.9	0.27	12.1	29.9
CHEYENNE		2-6	4E	SI	61	NA	24.0	NA	29.0	NA	NA	NA	1.2	0.26	11.6	37.6
CHEYENNE		6-9	4E	SI	63	18.0	19.0	11.0	24.0	NA	16.0	NA	0.9	0.30	13.4	25.9
CHEYENNE		6-9	6E	SI	60	NA	NA	NA	NA	NA	NA	NA	0.8	0.24	10.7	18.5
CHEYENNE		6-9	6E	SI	61	NA	NA	NA	NA	NA	NA	NA	NA	0.22	9.8	9.8
CHINOOK		0-2	4E	SY	58	NA	19.0	14.0	26.0	NA	NA	NA	1.2	0.29	13.0	33.5
CHINOOK		2-6	4E	SY	58	NA	NA	13.0	23.0	NA	NA	NA	1.1	0.27	12.1	27.9
CHINOOK		6-9	6E	SY	58	NA	NA	NA	NA	NA	NA	NA	NA	0.24	10.7	10.7
CLAMO	DF	0-2	2w	SB	55	53.0	NA	26.0	51.0	17.0	56.0	NA	2.8	1.25	55.9	61.5
CLAMO	DF	0-2	2W	SB	102	70.0	NA	NA	56.0	18.0	56.0	29.0	3.7	1.35	60.3	70.7
CLAMO	DNF	0-2	4W	SB	55	NA	NA	NA	NA	NA	NA	NA	NA	1.25	55.9	55.9
CLAMO	DNF	0-2	4W	SB	102	NA	NA	NA	NA	NA	NA	NA	NA	1.35	60.3	60.3
CLARNO		0-2	1	SI	102	76.0	NA	NA	76.0	24.0	59.0	28.0	3.1	0.68	30.4	76.8
CLARNO		0-2	2C	SI	55	60.0	NA	NA	67.0	19.0	58.0	NA	2.9	0.54	24.1	67.9
CLARNO		2-6	2E	SI	55	58.0	NA	NA	64.0	16.0	55.0	NA	2.8	0.52	23.2	63.6
CLARNO		2-6	2E	SI	102	72.0	NA	NA	75.0	23.0	54.0	27.0	3.1	0.65	29.0	73.9
CLARNO		6-9	3E	SI	55	49.0	NA	NA	54.0	NA	47.0	NA	2.6	0.47	21.0	56.8
CLARNO		6-9	3E	SI	102	64.0	NA	NA	67.0	18.0	48.0	22.0	2.9	0.61	27.3	64.1
CLARNO		9-15	4E	SI	55	NA	NA	NA	43.0	NA	NA	NA	2.4	0.45	20.1	51.5

* A RANGE RATING (COLUMN 16) WAS COMPUTED FOR SOILS IN ALL CAPABILITY CLASSES (COLUMN 4). A CROP RATING WAS COMPUTED FOR SOILS IN CAPABILITY CLASSES 1 THROUGH 4. COLUMN 17 HEADED 'SOIL RATING' IS THE CROP RATING IF THE SOIL IS IN CAPABILITY CLASSES 1 THROUGH 4. THE RANGE RATING IS THE SOIL RATING FOR SOIL UNITS IN CAPABILITY CLASSES 5 THROUGH 7. SEE APPENDIX D DISCUSSION FOR RESTRICTIONS REGARDING THE USE OF THIS TABLE. ABBREVIATIONS USED IN THE TABLE ARE DEFINED AT THE END OF THE TABLE. CROP YIELDS BASED ON HIGH LEVEL OF MANAGEMENT, RANGE YIELDS BASED ON GOOD TO FAIR CONDITIONS. NA=CROP NOT ADAPTED OR WIDELY GROWN.

** COLUMN NUMBER

APPENDIX TABLE D-1. RATINGS DEVELOPED FROM CROP AND RANGE YIELD ESTIMATES FOR SOUTH DAKOTA SOILS*

SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
CLARNO		9-15	4E	SI	102	50.0	NA	NA	50.0	NA	36.0	NA	2.5	0.59	26.4	52.1
CLARNO		15-25	6E	SI	55	NA	NA	NA	NA	NA	NA	NA	NA	0.43	19.2	19.2
CLARNO		25-40	6E	SI	55	NA	NA	NA	NA	NA	NA	NA	NA	0.41	18.3	18.3
CLARNO	E	2-6	3E	SI	55	50.0	NA	NA	53.0	14.0	47.0	NA	2.4	0.47	21.0	54.3
CLARNO	E	2-6	3E	SI	102	64.0	NA	NA	57.0	21.0	48.0	23.0	2.9	0.61	27.3	64.4
CLARNO	E	6-9	4E	SI	55	46.0	NA	NA	47.0	NA	40.0	NA	1.8	0.45	20.1	47.4
CLARNO	E	6-9	4E	SI	102	54.0	NA	NA	53.0	NA	40.0	NA	2.5	0.59	26.4	55.2
CLARNO	E	9-15	6E	SI	55	NA	NA	NA	NA	NA	NA	NA	NA	0.43	19.2	19.2
CLARNO	E	9-15	6E	SI	102	NA	NA	NA	NA	NA	NA	NA	NA	0.56	25.0	25.0
COLBY		2-6	4E	TU	60	NA	21.0	NA	20.0	NA	NA	NA	0.9	0.29	13.0	29.8
COLBY		2-6	4E	TU	61	NA	26.0	15.0	26.0	NA	NA	NA	1.1	0.34	15.2	37.4
COLBY		2-6	4E	TU	64	NA	25.0	NA	25.0	NA	NA	NA	1.0	0.34	15.2	35.3
COLBY		6-9	4E	TU	64	NA	23.0	NA	23.0	NA	NA	NA	0.9	0.32	14.3	32.3
COLBY		6-25	6E	TU	60	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
COLBY		6-25	6E	TU	61	NA	NA	NA	NA	NA	NA	NA	NA	0.31	13.9	13.9
COLBY		9-15	6E	TU	64	NA	NA	NA	NA	NA	NA	NA	NA	0.30	13.4	13.4
COLBY		25-40	7E	TU	60	NA	NA	NA	NA	NA	NA	NA	NA	0.22	9.8	9.8
COLBY		25-40	7E	TU	61	NA	NA	NA	NA	NA	NA	NA	NA	0.29	13.0	13.0
COLVIN	DF	0-2	2W	SB	55	NA	NA	25.0	59.0	15.0	NA	NA	2.5	1.26	56.3	59.7
COLVIN	DF	0-2	2W	SB	102	59.0	NA	NA	68.0	17.0	NA	21.0	2.7	1.37	61.2	62.6
COLVIN	DNF	0-2	4W	SB	55	NA	NA	NA	NA	NA	NA	NA	NA	1.26	56.3	56.3
COLVIN	DNF	0-2	4W	SB	102	NA	NA	NA	NA	NA	NA	NA	NA	1.37	61.2	61.2
CONATA		2-15	6S	SW	60	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
CONATA		2-15	6S	SW	61	NA	NA	NA	NA	NA	NA	NA	NA	0.29	13.0	13.0
CONATA		2-15	6S	SW	64	NA	NA	NA	NA	NA	NA	NA	NA	0.28	12.5	12.5
CONATA		15-40	7S	SW	60	NA	NA	NA	NA	NA	NA	NA	NA	0.22	9.8	9.8
CONATA		15-40	7S	SW	61	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
CONATA		15-40	7S	SW	64	NA	NA	NA	NA	NA	NA	NA	NA	0.24	10.7	10.7
CORSON		0-2	2S	CY	102	73.0	NA	NA	65.0	NA	57.0	24.0	3.2	0.70	31.3	70.3
CORSON		2-6	3E	CY	102	63.0	NA	NA	62.0	NA	54.0	20.0	3.0	0.62	27.7	63.8
CORSON		6-9	3E	CY	102	55.0	NA	NA	55.0	NA	NA	16.0	2.8	0.60	26.8	56.1
CRESBARD		0-2	2S	CY	102	57.0	NA	NA	59.0	17.0	NA	20.0	2.9	0.66	29.5	60.6
CRESBARD		0-2	3S	CY	55	48.0	NA	27.0	55.0	15.0	NA	NA	2.4	0.54	24.1	57.6
CRESBARD		2-6	3E	CY	55	45.0	NA	25.0	52.0	15.0	NA	NA	2.3	0.50	22.3	54.9
CRESBARD		2-6	3E	CY	102	54.0	NA	NA	57.0	16.0	NA	19.0	2.8	0.62	27.7	57.8
CROFTON		2-6	3E	TU	102	54.0	NA	NA	58.0	19.0	53.0	20.0	2.7	0.55	24.6	60.6
CROFTON		2-6	4E	TU	55	40.0	NA	NA	52.0	NA	NA	NA	2.2	0.41	18.3	50.2
CROFTON		6-15	4E	TU	102	50.0	NA	NA	55.0	18.0	49.0	NA	2.5	0.50	22.3	58.5
CROFTON		6-9	4E	TU	55	37.0	NA	NA	44.0	NA	NA	NA	2.1	0.37	16.5	45.4
CROFTON		9-25	6E	TU	55	NA	NA	NA	NA	NA	NA	NA	NA	0.32	14.3	14.3

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APPENDIX TABLE D-1. RATINGS DEVELOPED FROM CROP AND RANGE YIELD ESTIMATES FOR SOUTH DAKOTA SOILS*

SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
CROFTON		15-25	6E	TU	102	NA	NA	NA	NA	NA	NA	NA	NA	0.40	17.9	17.9
CROFTON		25-40	7E	TU	55	NA	NA	NA	NA	NA	NA	NA	NA	0.30	13.4	13.4
CROFTON		25-40	7E	TU	102	NA	NA	NA	NA	NA	NA	NA	NA	0.37	16.5	16.5
CROFTON	E	2-6	4E	TU	55	33.0	NA	NA	45.0	NA	NA	NA	2.1	0.37	16.5	44.4
CROFTON	E	2-9	4E	TU	102	50.0	NA	NA	55.0	NA	48.0	16.0	2.4	0.50	22.3	53.3
CROFTON	E	6-15	6E	TU	55	NA	NA	NA	NA	NA	NA	NA	NA	0.34	15.2	15.2
CROFTON	E	9-15	6E	TU	102	NA	NA	NA	NA	NA	NA	NA	NA	0.39	17.4	17.4
CROSSPLAIN		0-2	2W	OV	102	77.0	NA	NA	74.0	23.0	66.0	29.0	3.4	1.30	58.1	79.0
DAGLUM		0-2	4S	CP	54	NA	24.0	19.0	31.0	NA	NA	NA	0.8	0.28	12.5	38.5
DAGLUM		0-2	4S	CP	58	NA	19.0	14.0	25.0	NA	NA	NA	0.7	0.18	8.0	30.3
DAGLUM		2-6	4S	CP	54	NA	22.0	15.0	24.0	NA	NA	NA	0.7	0.25	11.2	32.3
DAGLUM		2-6	6S	CP	58	NA	NA	NA	NA	NA	NA	NA	NA	0.11	4.9	4.9
DAVIS		0-2	1	OV	102	88.0	NA	NA	84.0	26.0	82.0	32.0	4.3	1.05	46.9	92.4
DAVIS		2-6	2E	SI	102	85.0	NA	NA	83.0	24.0	75.0	30.0	3.9	0.72	32.2	86.8
DAVISON		0-2	2E	SI	55	51.0	NA	NA	59.0	15.0	45.0	NA	2.4	0.54	24.1	56.1
DAVISON		0-2	2E	SI	102	62.0	NA	NA	67.0	15.0	49.0	18.0	2.7	0.68	30.4	59.7
DAVISON		2-6	3E	SI	55	48.0	NA	NA	56.0	NA	42.0	NA	2.4	0.54	24.1	54.4
DAVISON		2-6	3E	SI	102	61.0	NA	NA	62.0	14.0	43.0	17.0	2.6	0.66	29.5	56.0
DAWES		0-2	2S	CY	66	NA	35.0	NA	43.0	NA	NA	NA	1.5	0.48	21.4	53.2
DAWES		0-2	3S	CY	60	NA	26.0	NA	26.0	NA	NA	NA	1.1	0.32	14.3	37.2
DAWES		0-2	2S	CY	63	NA	33.0	NA	39.0	NA	NA	NA	1.4	0.38	17.0	49.4
DAWES		0-2	2S	CY	64	NA	34.0	NA	39.0	NA	36.0	NA	1.4	0.32	14.3	48.3
DAWES		2-6	3E	CY	63	NA	42.0	NA	38.0	NA	NA	NA	1.3	0.34	15.2	54.9
DAWES		2-6	3S	CY	64	NA	31.0	NA	37.0	NA	33.0	NA	1.3	0.28	12.5	44.6
DAWES		2-6	3E	CY	66	NA	31.0	NA	40.0	NA	NA	NA	1.4	0.44	19.7	48.3
DEGREY		0-2	4S	CP	53	17.0	NA	15.0	27.0	NA	22.0	NA	1.1	0.33	14.7	27.5
DEGREY		0-2	4S	CP	63	NA	22.0	NA	28.0	NA	21.0	NA	1.1	0.33	14.7	32.4
DEGREY		2-6	4S	CP	53	17.0	NA	14.0	26.0	NA	20.0	NA	1.0	0.29	13.0	25.8
DEGREY		2-6	4S	CP	63	NA	20.0	NA	26.0	NA	18.0	NA	1.0	0.29	13.0	29.3
DELMONT		0-2	3S	SWG	102	35.0	NA	NA	43.0	13.0	28.0	16.0	1.7	0.56	25.0	40.5
DELMONT		0-2	4S	SWG	55	24.0	NA	NA	32.0	NA	22.0	NA	1.2	0.33	14.7	28.6
DELMONT		2-6	4E	SWG	55	20.0	NA	NA	28.0	NA	20.0	NA	1.0	0.33	14.7	24.7
DELMONT		2-6	4S	SWG	102	32.0	NA	NA	39.0	NA	25.0	13.0	1.6	0.54	24.1	35.3
DELMONT		6-9	4E	SWG	102	NA	NA	NA	32.0	NA	19.0	NA	1.5	0.52	23.2	30.8
DELMONT		6-15	6E	SWG	55	NA	NA	NA	NA	NA	15.0	NA	NA	0.28	12.5	17.7
DELMONT		9-25	6E	SWG	102	NA	NA	NA	NA	NA	NA	NA	NA	0.50	22.3	22.3
DEMAR		0-2	4S	CP	61	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
DEMAR		2-6	6S	CP	61	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
DEMKY		0-2	3S	CY	53	32.0	33.0	23.0	49.0	NA	39.0	NA	1.7	0.52	23.2	50.8
DEMKY		0-2	3S	CY	55	48.0	36.0	25.0	51.0	NA	45.0	NA	2.4	0.56	25.0	59.8

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SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
DEMKY		2-6	3E	CY	53	31.0	31.0	21.0	46.0	NA	35.0	NA	1.6	0.52	23.2	47.3
DEMKY		2-6	3E	CY	55	45.0	33.0	23.0	49.0	NA	41.0	NA	2.3	0.56	25.0	55.8
DEMKY		6-9	4E	CY	53	NA	27.0	17.0	39.0	NA	NA	NA	1.4	0.50	22.3	44.6
DEMKY		6-9	4E	CY	55	NA	NA	NA	43.0	NA	NA	NA	2.0	0.53	23.7	46.8
DEMPSTER		0-2	2S	SI	102	75.0	NA	NA	78.0	23.0	58.0	30.0	3.1	0.63	28.2	77.1
DEMPSTER		2-6	3S	SI	102	67.0	NA	NA	74.0	18.0	53.0	29.0	3.0	0.61	27.3	70.2
DEMPSTER		6-9	4E	SI	102	55.0	NA	NA	57.0	14.0	46.0	24.0	2.8	0.59	26.4	58.4
DESART		0-6	4E	SY	54	NA	28.0	25.0	36.0	NA	NA	NA	1.4	0.37	16.5	49.4
DESART		0-6	4E	SY	58	NA	24.0	18.0	32.0	NA	NA	NA	1.2	0.32	14.3	40.5
DICKEY		0-2	3E	SY	55	42.0	NA	17.0	39.0	11.0	NA	NA	2.0	0.55	24.6	43.1
DICKEY		0-2	3S	SY	102	47.0	NA	NA	45.0	12.0	NA	NA	2.0	0.70	31.3	46.9
DICKEY		2-6	3E	SY	55	39.0	NA	16.0	40.0	NA	NA	NA	1.8	0.55	24.6	41.9
DICKEY		2-6	3E	SY	102	44.0	NA	NA	43.0	11.0	NA	NA	1.9	0.68	30.4	44.1
DICKEY		6-9	4E	SY	55	NA	NA	NA	34.0	NA	NA	NA	1.5	0.51	22.8	36.1
DICKEY		6-9	4E	SY	102	36.0	NA	NA	39.0	NA	NA	NA	1.6	0.65	29.0	39.4
DICKEY		9-15	6E	SY	55	NA	NA	NA	NA	NA	NA	NA	NA	0.50	22.3	22.3
DICKEY		9-15	6E	SY	102	NA	NA	NA	NA	NA	NA	NA	NA	0.64	28.6	28.6
DICKEY	E	0-2	3E	SY	55	36.0	NA	16.0	39.0	11.0	NA	NA	1.7	0.55	24.6	39.9
DICKEY	E	0-2	3E	SY	102	45.0	NA	NA	43.0	11.0	NA	NA	1.8	0.68	30.4	43.8
DICKEY	E	2-6	4E	SY	55	31.0	NA	NA	34.0	NA	NA	NA	1.5	0.51	22.8	35.0
DICKEY	E	2-6	4E	SY	102	35.0	NA	NA	37.0	NA	NA	NA	1.6	0.65	29.0	38.3
DICKEY	E	6-9	6E	SY	55	NA	NA	NA	NA	NA	NA	NA	NA	0.50	22.3	22.3
DICKEY	E	6-15	6E	SY	102	NA	NA	NA	NA	NA	NA	NA	NA	0.64	28.6	28.6
DIMMICK		0-2	3W	WL	54	NA	NA	NA	NA	NA	NA	NA	NA	0.80	35.7	35.7
DIVIDE		0-2	3S	SI	55	42.0	NA	23.0	45.0	14.0	NA	NA	2.1	0.50	22.3	50.0
DIVIDE		0-2	3S	SI	102	54.0	NA	NA	52.0	15.0	NA	NA	2.5	0.63	28.2	56.2
DIX		0-9	6S	SWG	60	NA	NA	NA	NA	NA	NA	NA	NA	0.22	9.8	9.8
DIX		0-9	6S	SWG	61	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
DIX		0-9	6S	SWG	64	NA	NA	NA	NA	NA	NA	NA	NA	0.30	13.4	13.4
DIX		0-9	6S	SWG	66	NA	NA	NA	NA	NA	NA	NA	NA	0.28	12.5	12.5
DIX		9-40	7S	SWG	60	NA	NA	NA	NA	NA	NA	NA	NA	0.19	8.5	8.5
DIX		9-40	7S	SWG	61	NA	NA	NA	NA	NA	NA	NA	NA	0.21	9.4	9.4
DIX		9-25	7S	SWG	64	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
DIX		9-25	7E	SWG	66	NA	NA	NA	NA	NA	NA	NA	NA	0.26	11.6	11.6
DOGER		0-6	4E	SY	64	23.0	NA	NA	28.0	NA	NA	NA	1.4	0.40	17.9	29.2
DOGER		0-6	4E	SY	65	25.0	NA	NA	24.0	NA	NA	NA	1.5	0.38	17.0	29.2
DOGER		0-6	4E	SY	66	26.0	NA	NA	32.0	NA	NA	NA	1.5	0.45	20.1	32.5
DOGER		6-15	6E	SY	64	NA	NA	NA	NA	NA	NA	NA	NA	0.37	16.5	16.5
DOGER		6-15	6E	SY	65	NA	NA	NA	NA	NA	NA	NA	NA	0.37	16.5	16.5
DOGER		6-15	6E	SY	66	NA	NA	NA	NA	NA	NA	NA	NA	0.43	19.2	19.2

* A RANGE RATING (COLUMN 16) WAS COMPUTED FOR SOILS IN ALL CAPABILITY CLASSES (COLUMN 4). A CROP RATING WAS COMPUTED FOR SOILS IN CAPABILITY CLASSES 1 THROUGH 4. COLUMN 17 HEADED 'SOIL RATING' IS THE CROP RATING IF THE SOIL IS IN CAPABILITY CLASSES 1 THROUGH 4. THE RANGE RATING IS THE SOIL RATING FOR SOIL UNITS IN CAPABILITY CLASSES 5 THROUGH 7. SEE APPENDIX D DISCUSSION FOR RESTRICTIONS REGARDING THE USE OF THIS TABLE. ABBREVIATIONS USED IN THE TABLE ARE DEFINED AT THE END OF THE TABLE. CROP YIELDS BASED ON HIGH LEVEL OF MANAGEMENT, RANGE YIELDS BASED ON GOOD TO FAIR CONDITIONS. NA=CROP NOT ADAPTED OR WIDELY GROWN.

** COLUMN NUMBER

APPENDIX TABLE D-1. RATINGS DEVELOPED FROM CROP AND RANGE YIELD ESTIMATES FOR SOUTH DAKOTA SOILS*

SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
DORAN		0-2	2S	CY	102	68.0	NA	30.0	76.0	17.0	NA	28.0	2.9	0.72	32.2	71.6
DORNA		0-2	2E	SI	53	32.0	28.0	22.0	48.0	NA	42.0	NA	2.0	0.47	21.0	50.1
DOVRAY		0-2	2W	CY	102	62.0	NA	NA	67.0	16.0	NA	19.0	3.1	1.19	53.2	63.1
DUDA		0-2	4E	SA	64	NA	NA	NA	24.0	NA	NA	NA	0.9	0.42	18.8	23.6
DUDA		0-2	4E	SA	65	NA	NA	NA	20.0	NA	NA	NA	0.9	0.40	17.9	21.4
DUDA		0-2	4E	SA	66	13.0	NA	NA	24.0	NA	NA	NA	1.2	0.54	24.1	22.7
DUDA		2-9	6E	SA	64	NA	NA	NA	NA	NA	NA	NA	NA	0.40	17.9	17.9
DUDA		2-9	6E	SA	65	NA	NA	NA	NA	NA	NA	NA	NA	0.38	17.0	17.0
DUDA		2-9	6E	SA	66	NA	NA	NA	NA	NA	NA	NA	NA	0.48	21.4	21.4
DUDLEY		0-2	4S	CP	55	28.0	NA	NA	32.0	NA	29.0	NA	1.3	0.36	16.1	32.3
DUDLEY		0-2	4S	CP	102	36.0	NA	NA	41.0	13.0	32.0	19.0	1.7	0.58	25.9	42.4
DUDLEY		2-6	4S	CP	55	24.0	NA	NA	29.0	NA	26.0	NA	1.2	0.34	15.2	29.0
DUDLEY		2-6	4S	CP	102	33.0	NA	NA	39.0	NA	30.0	18.0	1.5	0.56	25.0	38.8
DUNDAY		0-2	4E	SA	64	23.0	NA	NA	24.0	NA	NA	NA	1.3	0.35	15.6	27.0
DUNDAY		0-2	4E	SA	65	NA	NA	NA	24.0	NA	NA	NA	1.3	0.38	17.0	28.3
DUNDAY		0-2	4E	SA	66	24.0	NA	NA	25.0	NA	NA	NA	1.4	0.50	22.3	28.5
DUNDAY		2-9	6E	SA	61	NA	NA	NA	NA	NA	NA	NA	NA	0.37	16.5	16.5
DUNDAY		2-9	6E	SA	60	NA	NA	NA	NA	NA	NA	NA	NA	0.35	15.6	15.6
DUNDAY		2-9	6E	SA	64	NA	NA	NA	NA	NA	NA	NA	NA	0.32	14.3	14.3
DUNDAY		2-9	6E	SA	65	NA	NA	NA	NA	NA	NA	NA	NA	0.35	15.6	15.6
DUNDAY		2-9	6E	SA	66	NA	NA	NA	NA	NA	NA	NA	NA	0.45	20.1	20.1
DUPREE		2-15	6S	DC	53	NA	NA	NA	NA	NA	NA	NA	NA	0.39	17.4	17.4
DUPREE		2-15	6S	DC	63	NA	NA	NA	NA	NA	NA	NA	NA	0.34	15.2	15.2
DUPREE		15-40	7S	DC	53	NA	NA	NA	NA	NA	NA	NA	NA	0.34	15.2	15.2
DUPREE		15-40	7S	DC	63	NA	NA	NA	NA	NA	NA	NA	NA	0.30	13.4	13.4
DUROC		0-2	2C	SI	64	42.0	46.0	NA	52.0	NA	49.0	NA	2.0	0.37	16.5	61.5
DUROC		2-6	2E	SI	64	40.0	44.0	NA	49.0	NA	48.0	NA	1.8	0.34	15.2	58.4
DURRSTEIN		0-2	6W	SL	53	NA	NA	NA	NA	NA	NA	NA	NA	0.65	29.0	29.0
DURRSTEIN		0-2	6W	SL	55	NA	NA	NA	NA	NA	NA	NA	NA	0.75	33.5	33.5
EAKIN		0-2	2C	SI	53	42.0	NA	26.0	57.0	16.0	48.0	NA	2.0	0.50	22.3	55.4
EAKIN		0-2	2C	SI	55	50.0	35.0	26.0	60.0	18.0	55.0	NA	2.1	0.55	24.6	62.7
EAKIN		2-6	2E	SI	53	41.0	NA	24.0	56.0	14.0	45.0	NA	1.9	0.47	21.0	52.1
EAKIN		2-6	2E	SI	55	48.0	34.0	25.0	58.0	17.0	54.0	NA	2.0	0.53	23.7	60.4
EAKIN		6-9	3E	SI	53	38.0	NA	23.0	45.0	NA	38.0	NA	1.6	0.45	20.1	46.0
EAKIN		6-9	3E	SI	55	42.0	NA	23.0	52.0	15.0	47.0	NA	1.9	0.50	22.3	52.1
EAKIN		9-15	4E	SI	53	31.0	NA	20.0	39.0	NA	NA	NA	1.4	0.41	18.3	39.8
EAKIN		9-15	4E	SI	55	NA	NA	20.0	43.0	NA	NA	NA	1.7	0.48	21.4	45.9
ECKMAN		0-2	1	SI	102	66.0	NA	NA	71.0	19.0	NA	21.0	2.7	0.68	30.4	66.1
ECKMAN		0-2	2E	SI	55	54.0	NA	28.0	67.0	17.0	NA	NA	2.3	0.57	25.5	63.0
ECKMAN		2-6	2E	SI	55	53.0	NA	28.0	63.0	16.0	NA	NA	2.3	0.57	25.5	61.2

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SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
ECKMAN		2-6	2E	SI	102	64.0	NA	NA	67.0	18.0	NA	20.0	2.6	0.63	28.2	63.1
ECKMAN		6-9	3E	SI	55	45.0	NA	26.0	53.0	15.0	NA	NA	2.2	0.54	24.1	55.1
ECKMAN		6-9	3E	SI	102	51.0	NA	NA	63.0	15.0	NA	19.0	2.5	0.60	26.8	56.4
ECKMAN		9-15	4E	SI	55	33.0	NA	23.0	43.0	13.0	NA	NA	2.0	0.50	22.3	46.5
ECKMAN		9-15	4E	SI	102	NA	NA	NA	56.0	NA	NA	NA	2.2	0.57	25.5	56.3
EDGELEY		0-2	2C	SI	55	45.0	NA	27.0	52.0	15.0	NA	NA	2.1	0.48	21.4	54.9
EDGELEY		2-6	2E	SI	55	42.0	NA	27.0	50.0	14.0	NA	NA	2.0	0.46	20.6	52.7
EDGELEY		6-9	3E	SI	55	37.0	NA	25.0	46.0	NA	NA	NA	2.0	0.44	19.7	49.9
EDGELEY		9-15	4E	SI	55	32.0	NA	NA	36.0	NA	NA	NA	NA	0.42	18.8	36.8
EDGELEY		15-25	6E	SI	55	NA	NA	NA	NA	NA	NA	NA	NA	0.40	17.9	17.9
EGAN		0-2	1	SI	102	85.0	NA	NA	83.0	26.0	75.0	31.0	3.7	0.68	30.4	87.6
EGAN		2-6	2E	SI	102	80.0	NA	NA	80.0	24.0	72.0	29.0	3.5	0.64	28.6	82.8
EGAN		6-9	3E	SI	102	69.0	NA	NA	67.0	NA	61.0	26.0	3.2	0.61	27.3	71.8
EGAN	E	2-6	3E	SI	102	69.0	NA	NA	67.0	18.0	60.0	26.0	3.1	0.62	27.7	69.8
EGAN	E	6-9	4E	SI	102	57.0	NA	NA	59.0	NA	54.0	NA	2.8	0.60	26.8	63.5
EGAS		0-2	7S	SL	53	NA	NA	NA	NA	NA	NA	NA	NA	0.65	29.0	29.0
EGAS		0-2	7S	SL	55	NA	NA	NA	NA	NA	NA	NA	NA	0.75	33.5	33.5
EGELAND		0-2	3E	SY	55	47.0	NA	25.0	47.0	14.0	NA	NA	1.8	0.55	24.6	51.2
EGELAND		0-2	3S	SY	102	53.0	NA	NA	53.0	15.0	NA	18.0	1.9	0.70	31.3	51.4
EGELAND		2-6	3E	SY	55	45.0	NA	23.0	45.0	13.0	NA	NA	1.7	0.52	23.2	48.1
EGELAND		2-6	3E	SY	102	51.0	NA	NA	48.0	14.0	NA	17.0	1.8	0.64	28.6	48.2
EGELAND		6-9	4E	SY	55	39.0	NA	19.0	40.0	NA	NA	NA	1.4	0.50	22.3	41.5
EGELAND		6-9	4E	SY	102	47.0	NA	NA	44.0	13.0	NA	NA	1.5	0.61	27.3	44.6
EGELAND		9-15	6E	SY	55	NA	NA	NA	NA	NA	NA	NA	NA	0.48	21.4	21.4
EGELAND		9-15	6E	SY	102	NA	NA	NA	NA	NA	NA	NA	NA	0.59	26.4	26.4
EGELAND	E	0-2	3E	SY	55	41.0	NA	19.0	41.0	13.0	NA	NA	1.6	0.52	23.2	43.9
EGELAND	E	0-2	3E	SY	102	50.0	NA	NA	47.0	14.0	NA	14.0	1.7	0.64	28.6	45.7
EGELAND	E	2-6	4E	SY	55	38.0	NA	16.0	37.0	11.0	NA	NA	1.4	0.50	22.3	38.5
EGELAND	E	2-6	4E	SY	102	42.0	NA	NA	41.0	13.0	NA	NA	1.5	0.61	27.3	42.5
EGELAND	E	6-9	6E	SY	55	NA	NA	NA	NA	NA	NA	NA	NA	0.48	21.4	21.4
EGELAND	E	6-9	6E	SY	102	NA	NA	NA	NA	NA	NA	NA	NA	0.59	26.4	26.4
EKALAKA		0-6	4E	SY	54	NA	21.0	19.0	34.0	NA	NA	NA	1.3	0.33	14.7	40.6
EKALAKA		0-6	4E	SY	58	NA	24.0	18.0	33.0	NA	NA	NA	1.2	0.30	13.4	40.7
ELPAM	DNF	0-2	4W	SB	53	NA	NA	17.0	34.0	NA	NA	NA	2.0	1.08	48.3	42.3
ELPAM	DNF	0-2	4W	SB	55	NA	NA	NA	36.0	NA	NA	NA	2.2	1.12	50.0	45.3
ELSMERE		0-6	4E	SB	64	28.0	NA	NA	40.0	NA	NA	NA	2.3	1.05	46.9	42.3
ELSMERE		0-6	4E	SB	65	NA	NA	NA	41.0	NA	NA	NA	2.4	1.20	53.6	50.4
ELSMERE		0-6	4E	SB	66	NA	NA	NA	47.0	NA	NA	NA	2.6	1.30	58.1	56.0
EMBDEN		0-2	3E	SY	55	53.0	NA	28.0	52.0	16.0	NA	NA	2.1	0.55	24.6	57.9
EMBDEN		0-2	3S	SY	102	66.0	NA	NA	65.0	18.0	NA	19.0	2.5	0.70	31.3	62.2

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SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
EMBDEN		2-6	3E	SY	55	50.0	NA	25.0	47.0	15.0	NA	NA	2.0	0.52	23.2	53.4
EMBDEN		2-6	3E	SY	102	61.0	NA	NA	58.0	16.0	NA	18.0	2.3	0.64	28.6	56.7
EMRICK		0-2	1	SI	102	63.0	NA	NA	75.0	23.0	NA	NA	3.3	0.57	25.5	76.6
EMRICK		0-2	2E	SI	55	56.0	NA	32.0	67.0	19.0	NA	NA	2.6	0.47	21.0	68.2
ENET		0-2	2S	SI	102	54.0	NA	NA	62.0	17.0	41.0	27.0	2.5	0.68	30.4	60.0
ENET		0-2	3S	SI	55	45.0	NA	25.0	49.0	16.0	39.0	NA	2.2	0.54	24.1	53.0
ENET		2-6	3E	SI	55	40.0	NA	22.0	44.0	15.0	37.0	NA	2.1	0.51	22.8	48.6
ENET		2-6	3S	SI	102	52.0	NA	NA	59.0	15.0	30.0	23.0	2.4	0.64	28.6	53.7
ENET		6-9	4E	SI	55	NA	NA	NA	37.0	NA	28.0	NA	1.6	0.47	21.0	37.0
ENET		6-9	4E	SI	102	NA	NA	NA	52.0	NA	31.0	NA	2.1	0.60	26.8	47.5
EPPING		0-15	6S	SW	60	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
EPPING		0-15	6S	SW	61	NA	NA	NA	NA	NA	NA	NA	NA	0.29	13.0	13.0
EPPING		0-15	6S	SW	64	NA	NA	NA	NA	NA	NA	NA	NA	0.30	13.4	13.4
EPPING		15-40	7S	SW	60	NA	NA	NA	NA	NA	NA	NA	NA	0.23	10.3	10.3
EPPING		15-40	7S	SW	61	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
EPPING		15-40	7S	SW	64	NA	NA	NA	NA	NA	NA	NA	NA	0.28	12.5	12.5
EPSIE		2-40	7S	SU	60	NA	NA	NA	NA	NA	NA	NA	NA	0.13	5.8	5.8
ESTELLINE		0-2	3S	SI	55	52.0	NA	26.0	54.0	14.0	NA	NA	1.8	0.52	23.2	54.3
ESTELLINE		0-2	2S	SI	102	67.0	NA	NA	80.0	21.0	NA	26.0	2.7	0.68	30.4	72.3
ESTELLINE		2-6	3S	SI	102	66.0	NA	NA	77.0	19.0	NA	24.0	2.6	0.63	28.2	68.5
ESTELLINE		6-9	4E	SI	102	53.0	NA	NA	68.0	16.0	NA	20.0	2.5	0.61	27.3	59.2
ETHAN		2-6	3E	SI	55	54.0	NA	NA	50.0	16.0	41.0	NA	2.2	0.54	24.1	53.5
ETHAN		2-6	3E	SI	102	57.0	NA	NA	64.0	18.0	44.0	21.0	2.9	0.66	29.5	61.1
ETHAN		6-9	4E	SI	55	40.0	NA	NA	45.0	15.0	35.0	NA	2.0	0.51	22.8	46.4
ETHAN		6-9	4E	SI	102	50.0	NA	NA	53.0	17.0	37.0	19.0	2.8	0.61	27.3	54.6
ETHAN		9-25	6E	SI	55	NA	NA	NA	NA	NA	NA	NA	NA	0.47	21.0	21.0
ETHAN		9-25	6E	SI	102	NA	NA	NA	NA	NA	NA	NA	NA	0.55	24.6	24.6
ETHAN	E	2-6	4E	SI	55	40.0	NA	NA	44.0	15.0	38.0	NA	1.9	0.51	22.8	46.5
ETHAN	E	2-6	4E	SI	102	49.0	NA	NA	54.0	17.0	36.0	19.0	2.7	0.61	27.3	54.0
ETHAN	E	6-9	6E	SI	102	NA	NA	NA	NA	NA	NA	NA	NA	0.55	24.6	24.6
ETHAN	E	6-15	6E	SI	55	NA	NA	NA	NA	NA	NA	NA	1.8	0.47	21.0	41.6
EXLINE		0-2	6S	TCP	55	NA	NA	NA	NA	NA	NA	NA	NA	0.26	11.6	11.6
EXLINE		0-2	6S	TCP	102	NA	NA	NA	NA	NA	NA	NA	NA	0.36	16.1	16.1
FARLAND		0-2	2C	SI	53	38.0	NA	25.0	55.0	17.0	NA	NA	1.9	0.47	21.0	53.6
FARLAND		0-2	2C	SI	54	34.0	33.0	28.0	47.0	NA	NA	NA	1.8	0.37	16.5	54.7
FARLAND		2-6	2E	SI	53	36.0	NA	23.0	50.0	15.0	NA	NA	1.9	0.43	19.2	49.6
FARLAND		2-6	2E	SI	54	31.0	30.0	25.0	44.0	NA	NA	NA	1.7	0.33	14.7	50.1
FARLAND		6-9	3E	SI	53	31.0	NA	19.0	43.0	NA	NA	NA	1.8	0.41	18.3	42.5
FARLAND		6-9	3E	SI	54	26.0	25.0	19.0	40.0	NA	NA	NA	1.5	0.31	13.9	42.0
FARNUF		0-2	2C	SI	54	33.0	33.0	26.0	46.0	NA	NA	NA	1.7	0.35	15.6	52.8

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** COLUMN NUMBER

APPENDIX TABLE D-1. RATINGS DEVELOPED FROM CROP AND RANGE YIELD ESTIMATES FOR SOUTH DAKOTA SOILS*

SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
FARNUF		2-6	2E	SI	54	31.0	30.0	25.0	43.0	NA	NA	NA	1.5	0.31	13.9	48.9
FEDORA		0-2	3W	SB	55	40.0	NA	NA	42.0	NA	40.0	NA	2.5	1.20	53.6	48.4
FEDORA		0-2	3W	SB	102	59.0	NA	NA	49.0	14.0	45.0	16.0	2.6	1.35	60.3	53.3
FIRESTEEL		0-2	3S	SI	55	39.0	NA	NA	37.0	NA	32.0	NA	1.8	0.54	24.1	40.4
FIRESTEEL		0-2	3S	SI	102	45.0	NA	NA	50.0	NA	33.0	NA	1.9	0.68	30.4	46.4
FLANDREAU		0-2	2S	SI	102	72.0	NA	NA	75.0	22.0	63.0	28.0	3.0	0.68	30.4	75.2
FLANDREAU		2-6	3S	SI	102	70.0	NA	NA	67.0	19.0	59.0	22.0	2.8	0.63	28.2	67.5
FLANDREAU		6-9	4E	SI	102	57.0	NA	NA	60.0	NA	51.0	NA	2.2	0.61	27.3	59.4
FLANDREAU		9-15	6E	SI	102	NA	NA	NA	NA	NA	NA	NA	NA	0.55	24.6	24.6
FLANDREAU	E	2-6	4E	SI	102	55.0	NA	NA	62.0	17.0	53.0	NA	2.2	0.61	27.3	59.9
FLANDREAU	E	6-9	6E	SI	102	NA	NA	NA	NA	NA	NA	NA	NA	0.58	25.9	25.9
FLEAK		2-15	6E	SW	58	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
FLEAK		15-25	7E	SW	58	NA	NA	NA	NA	NA	NA	NA	NA	0.22	9.8	9.8
FORDVILLE		0-2	2S	SI	102	49.0	NA	NA	55.0	15.0	NA	19.0	1.9	0.61	27.3	51.5
FORDVILLE		0-2	3S	SI	55	45.0	NA	25.0	49.0	13.0	NA	NA	1.8	0.48	21.4	50.5
FORDVILLE		2-6	3E	SI	55	38.0	NA	22.0	46.0	11.0	NA	NA	1.8	0.45	20.1	45.4
FORDVILLE		2-6	3S	SI	102	45.0	NA	NA	48.0	13.0	NA	NA	1.9	0.57	25.5	47.5
FORDVILLE		6-9	4E	SI	55	NA	NA	NA	41.0	NA	NA	NA	1.3	0.40	17.9	37.7
FORDVILLE		6-9	4E	SI	102	41.0	NA	NA	40.0	NA	NA	NA	1.4	0.54	24.1	40.0
FORDVILLE		9-15	6E	SI	102	NA	NA	NA	NA	NA	NA	NA	NA	0.47	21.0	21.0
FORESTBURG		0-2	4E	SY	55	43.0	NA	18.0	46.0	NA	45.0	NA	2.0	0.48	21.4	48.3
FORESTBURG		2-6	4E	SY	55	40.0	NA	15.0	43.0	NA	44.0	NA	1.7	0.45	20.1	43.8
FORMAN		0-2	1	SI	102	71.0	NA	NA	77.0	19.0	NA	22.0	2.8	0.68	30.4	69.5
FORMAN		0-2	2C	SI	55	60.0	NA	30.0	68.0	18.0	NA	NA	2.6	0.57	25.5	67.6
FORMAN		2-6	2E	SI	55	58.0	NA	27.0	66.0	16.0	NA	NA	2.5	0.54	24.1	63.3
FORMAN		2-6	2E	SI	102	66.0	NA	NA	74.0	18.0	NA	20.0	2.7	0.63	28.2	65.6
FORMAN		6-9	3E	SI	55	49.0	NA	25.0	60.0	13.0	NA	NA	2.4	0.51	22.8	56.5
FORMAN		6-9	3E	SI	102	59.0	NA	NA	69.0	16.0	NA	17.0	2.6	0.60	26.8	59.6
FORMAN		9-15	4E	SI	55	41.0	NA	21.0	47.0	NA	NA	NA	2.3	0.47	21.0	50.4
FORMAN		9-15	4E	SI	102	50.0	NA	NA	50.0	NA	NA	NA	2.4	0.58	25.9	54.5
FORMAN		15-25	6E	SI	55	NA	NA	NA	NA	NA	NA	NA	NA	0.44	19.7	19.7
FORMAN		15-25	6E	SI	102	NA	NA	NA	NA	NA	NA	NA	NA	0.55	24.6	24.6
FORMAN		25-40	6E	SI	55	NA	NA	NA	NA	NA	NA	NA	NA	0.40	17.9	17.9
FORMAN		25-40	6E	SI	102	NA	NA	NA	NA	NA	NA	NA	NA	0.49	21.9	21.9
FORNEY		0-2	3W	CY	102	75.0	NA	NA	68.0	NA	70.0	28.0	3.3	0.76	34.0	76.9
FRAM		0-2	2E	SI	55	53.0	NA	27.0	64.0	14.0	NA	NA	2.5	0.48	21.4	60.4
FRAM		0-2	2E	SI	102	62.0	NA	NA	72.0	15.0	NA	NA	2.6	0.59	26.4	64.4
GANNETT		0-2	5W	WL	64	NA	NA	NA	NA	NA	NA	NA	NA	0.85	38.0	38.0
GANNETT		0-2	5W	WL	65	NA	NA	NA	NA	NA	NA	NA	NA	0.85	38.0	38.0
GANNETT		0-2	5W	WL	66	NA	NA	NA	NA	NA	NA	NA	NA	0.75	33.5	33.5

* A RANGE RATING (COLUMN 16) WAS COMPUTED FOR SOILS IN ALL CAPABILITY CLASSES (COLUMN 4). A CROP RATING WAS COMPUTED FOR SOILS IN CAPABILITY CLASSES 1 THROUGH 4. COLUMN 17 HEADED 'SOIL RATING' IS THE CROP RATING IF THE SOIL IS IN CAPABILITY CLASSES 1 THROUGH 4. THE RANGE RATING IS THE SOIL RATING FOR SOIL UNITS IN CAPABILITY CLASSES 5 THROUGH 7. SEE APPENDIX D DISCUSSION FOR RESTRICTIONS REGARDING THE USE OF THIS TABLE. ABBREVIATIONS USED IN THE TABLE ARE DEFINED AT THE END OF THE TABLE. CROP YIELDS BASED ON HIGH LEVEL OF MANAGEMENT, RANGE YIELDS BASED ON GOOD TO FAIR CONDITIONS. NA=CROP NOT ADAPTED OR WIDELY GROWN.

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APPENDIX TABLE D-1. RATINGS DEVELOPED FROM CROP AND RANGE YIELD ESTIMATES FOR SOUTH DAKOTA SOILS*

SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
GARDENA		0-2	1	SI	102	70.0	NA	37.0	78.0	19.0	NA	NA	3.0	0.52	23.2	78.0
GARDENA		0-2	2C	SI	55	65.0	NA	37.0	74.0	18.0	NA	NA	2.9	0.50	22.3	74.9
GARDENA		2-6	2E	SI	55	59.0	NA	34.0	68.0	15.0	NA	NA	2.7	0.47	21.0	67.8
GAVINS		2-15	6S	TU	55	NA	NA	NA	NA	NA	NA	NA	NA	0.41	18.3	18.3
GAVINS		2-25	6S	TU	102	NA	NA	NA	NA	NA	NA	NA	NA	0.55	24.6	24.6
GAVINS		15-40	7S	TU	55	NA	NA	NA	NA	NA	NA	NA	NA	0.36	16.1	16.1
GAVINS		25-40	7S	TU	102	NA	NA	NA	NA	NA	NA	NA	NA	0.50	22.3	22.3
GAYVILLE		0-2	6W	SL	102	NA	NA	NA	NA	NA	NA	NA	NA	0.85	38.0	38.0
GETTYS		2-6	4E	TU	53	26.0	NA	15.0	38.0	NA	28.0	NA	1.5	0.39	17.4	35.1
GETTYS		2-6	4E	TU	55	37.0	NA	16.0	39.0	NA	30.0	NA	1.8	0.42	18.8	40.0
GETTYS		6-9	4E	TU	53	NA	NA	13.0	36.0	NA	21.0	NA	1.4	0.37	16.5	32.5
GETTYS		6-9	4E	TU	55	NA	NA	NA	34.0	NA	24.0	NA	1.7	0.40	17.9	35.1
GETTYS		9-25	6E	TU	53	NA	NA	NA	NA	NA	NA	NA	NA	0.35	15.6	15.6
GETTYS		9-25	6E	TU	55	NA	NA	NA	NA	NA	NA	NA	NA	0.37	16.5	16.5
GETTYS		25-40	7E	TU	53	NA	NA	NA	NA	NA	NA	NA	NA	0.32	14.3	14.3
GETTYS		25-40	7E	TU	55	NA	NA	NA	NA	NA	NA	NA	NA	0.34	15.2	15.2
GETTYS	E	2-6	4E	TU	53	NA	NA	13.0	30.0	NA	24.0	NA	1.2	0.37	16.5	30.6
GETTYS	E	2-6	4E	TU	55	NA	NA	15.0	34.0	NA	26.0	NA	1.6	0.40	17.9	35.8
GETTYS	E	6-9	6E	TU	53	NA	NA	NA	NA	NA	NA	NA	1.0	0.34	15.2	23.1
GETTYS	E	6-9	6E	TU	55	NA	NA	NA	NA	NA	NA	NA	1.5	0.37	16.5	34.6
GLENBERG		0-2	3E	OV	63	32.0	28.0	NA	34.0	NA	31.0	NA	1.7	0.86	38.4	41.8
GLENBERG		0-2	3E	OV	64	31.0	28.0	NA	34.0	NA	29.0	NA	1.7	0.80	35.7	41.2
GLENBERG		0-2	3E	OV	66	33.0	29.0	NA	40.0	NA	NA	NA	1.8	0.94	42.0	46.2
GLENBERG		0-2	4E	OV	60	NA	20.0	NA	30.0	NA	NA	NA	1.4	0.63	28.2	36.6
GLENBERG		0-2	4E	OV	61	NA	23.0	12.0	32.0	NA	NA	NA	1.7	0.62	27.7	39.0
GLENBERG		2-6	4E	SY	60	NA	18.0	NA	28.0	NA	NA	NA	1.3	0.40	17.9	33.6
GLENBERG		2-6	4E	SY	61	NA	NA	NA	NA	NA	NA	NA	1.4	0.34	15.2	32.3
GLENDIVE		0-2	4E	OV	58	NA	30.0	19.0	36.0	NA	NA	NA	1.6	0.68	30.4	47.8
GLENDIVE		2-6	4E	SY	58	NA	28.0	18.0	33.0	NA	NA	NA	1.3	0.40	17.9	43.5
GLENHAM		0-2	2C	SI	53	39.0	35.0	26.0	56.0	NA	47.0	NA	2.1	0.50	22.3	58.4
GLENHAM		0-2	2C	SI	55	51.0	NA	28.0	58.0	NA	53.0	NA	2.3	0.54	24.1	61.0
GLENHAM		2-6	2E	SI	53	37.0	33.0	24.0	54.0	NA	43.0	NA	2.0	0.48	21.4	54.9
GLENHAM		2-6	2E	SI	55	48.0	NA	27.0	56.0	NA	51.0	NA	2.3	0.51	22.8	58.9
GLENHAM		6-9	3E	SI	53	31.0	29.0	22.0	46.0	NA	36.0	NA	1.9	0.46	20.6	48.3
GLENHAM		6-9	3E	SI	55	39.0	NA	24.0	49.0	NA	41.0	NA	2.1	0.49	21.9	50.7
GLENHAM		9-15	4E	SI	53	NA	26.0	17.0	39.0	NA	28.0	NA	1.5	0.45	20.1	42.3
GLENHAM		9-15	4E	SI	55	NA	NA	19.0	40.0	NA	39.0	NA	1.9	0.47	21.0	45.6
GLENHAM		15-25	6E	SI	53	NA	NA	NA	NA	NA	NA	NA	NA	0.43	19.2	19.2
GLENHAM		15-25	6E	SI	55	NA	NA	NA	NA	NA	NA	NA	NA	0.45	20.1	20.1
GLENHAM	E	0-2	2E	SI	53	37.0	NA	23.0	50.0	NA	45.0	NA	1.8	0.48	21.4	49.5

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SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
GLENHAM	E	0-2	2E	SI	55	48.0	NA	25.0	52.0	NA	50.0	NA	2.1	0.51	22.8	55.9
GLENHAM	E	2-6	3E	SI	53	31.0	NA	21.0	45.0	NA	36.0	NA	1.6	0.47	21.0	43.1
GLENHAM	E	2-6	3E	SI	55	41.0	NA	22.0	49.0	NA	45.0	NA	2.0	0.50	22.3	50.6
GLENHAM	E	6-9	4E	SI	53	27.0	NA	17.0	39.0	NA	28.0	NA	1.4	0.45	20.1	36.1
GLENHAM	E	6-9	4E	SI	55	NA	NA	NA	41.0	NA	31.0	NA	1.8	0.49	21.9	41.2
GLENHAM	E	9-15	6E	SI	53	NA	NA	NA	NA	NA	NA	NA	NA	0.43	19.2	19.2
GLENHAM	E	9-15	6E	SI	55	NA	NA	NA	NA	NA	NA	NA	1.6	0.45	20.1	37.0
GLENROSS		0-2	6W	SL	54	NA	NA	NA	NA	NA	NA	NA	NA	0.63	28.2	28.2
GLYNDON		0-2	2E	SI	55	57.0	NA	33.0	68.0	15.0	NA	NA	2.7	0.54	24.1	66.8
GLYNDON		0-2	2E	SI	102	67.0	NA	NA	72.0	16.0	NA	18.0	2.8	0.63	28.2	63.4
GOSHEN		0-2	2C	OV	63	46.0	45.0	NA	54.0	NA	NA	NA	2.5	0.94	42.0	66.4
GOSHEN		2-6	2E	SI	63	43.0	42.0	NA	51.0	NA	NA	NA	2.3	0.45	20.1	61.9
GRABLE		0-2	2S	SI	102	70.0	NA	NA	60.0	NA	65.0	28.0	2.8	0.68	30.4	70.6
GRACEVILLE		0-2	1	OV	102	85.0	NA	NA	77.0	24.0	80.0	31.0	3.8	1.30	58.1	86.7
GRAIL		0-2	2C	OV	53	48.0	NA	31.0	63.0	18.0	NA	NA	2.8	0.91	40.7	65.4
GRAIL		0-2	2C	OV	54	48.0	NA	31.0	64.0	NA	NA	NA	2.8	0.80	35.7	66.2
GRAIL		2-6	2E	SI	53	45.0	NA	28.0	58.0	17.0	NA	NA	2.7	0.52	23.2	61.0
GRAIL		2-6	2E	SI	54	46.0	NA	29.0	59.0	NA	NA	NA	2.7	0.48	21.4	62.5
GRAIL		6-9	3E	SI	53	42.0	NA	NA	51.0	15.0	NA	NA	2.4	0.50	22.3	52.2
GRAIL		6-9	3E	SI	54	43.0	NA	NA	52.0	NA	NA	NA	2.4	0.45	20.1	52.8
GRANER		2-25	6E	PC	61	NA	NA	NA	NA	NA	NA	NA	NA	0.32	14.3	14.3
GRANO	DF	0-2	2W	OV	102	42.0	NA	NA	50.0	13.0	NA	NA	2.2	1.03	46.0	49.0
GRANO	DNF	0-2	4W	OV	102	NA	NA	NA	NA	NA	NA	NA	NA	1.03	46.0	46.0
GRASSNA		0-2	2C	OV	53	51.0	NA	31.0	68.0	20.0	NA	NA	3.1	0.91	40.7	69.9
GRASSNA		2-6	2E	SI	53	44.0	NA	28.0	66.0	19.0	NA	NA	3.0	0.50	22.3	65.3
GREAT BEND		0-2	1	SI	102	70.0	NA	NA	73.0	21.0	NA	27.0	2.9	0.63	28.2	72.8
GREAT BEND		0-2	2C	SI	55	57.0	NA	29.0	67.0	17.0	NA	NA	2.5	0.50	22.3	65.1
GREAT BEND		2-6	2E	SI	55	55.0	NA	28.0	65.0	16.0	NA	NA	2.4	0.47	21.0	62.5
GREAT BEND		2-6	2E	SI	102	67.0	NA	NA	72.0	19.0	NA	23.0	2.8	0.57	25.5	68.0
GREAT BEND		6-9	3E	SI	55	43.0	NA	24.0	57.0	12.0	NA	NA	2.4	0.44	19.7	53.4
GREAT BEND		6-9	3E	SI	102	55.0	NA	NA	64.0	15.0	NA	18.0	2.6	0.54	24.1	57.5
GREAT BEND		9-15	4E	SI	55	NA	NA	19.0	43.0	NA	NA	NA	2.3	0.41	18.3	49.6
GREAT BEND		9-15	4E	SI	102	NA	NA	NA	52.0	NA	NA	NA	2.4	0.51	22.8	56.4
GRUMMIT		2-15	6S	SW	61	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
GRUMMIT		15-40	7S	SW	61	NA	NA	NA	NA	NA	NA	NA	NA	0.23	10.3	10.3
HALL		0-2	1	SI	102	70.0	NA	NA	73.0	22.0	NA	28.0	3.2	0.68	30.4	75.4
HALL		0-2	2C	SI	55	65.0	NA	NA	70.0	NA	70.0	NA	3.0	0.54	24.1	74.5
HAMAR		0-2	4W	SB	55	42.0	NA	24.0	61.0	14.0	NA	NA	2.6	1.25	55.9	56.4
HAMAR		0-2	4W	SB	102	59.0	NA	NA	64.0	15.0	NA	NA	2.6	1.35	60.3	61.4
HAMERLY		0-2	2E	SI	55	55.0	NA	28.0	65.0	14.0	NA	NA	2.5	0.52	23.2	61.6

* A RANGE RATING (COLUMN 16) WAS COMPUTED FOR SOILS IN ALL CAPABILITY CLASSES (COLUMN 4). A CROP RATING WAS COMPUTED FOR SOILS IN CAPABILITY CLASSES 1 THROUGH 4. COLUMN 17 HEADED 'SOIL RATING' IS THE CROP RATING IF THE SOIL IS IN CAPABILITY CLASSES 1 THROUGH 4. THE RANGE RATING IS THE SOIL RATING FOR SOIL UNITS IN CAPABILITY CLASSES 5 THROUGH 7. SEE APPENDIX D DISCUSSION FOR RESTRICTIONS REGARDING THE USE OF THIS TABLE. ABBREVIATIONS USED IN THE TABLE ARE DEFINED AT THE END OF THE TABLE. CROP YIELDS BASED ON HIGH LEVEL OF MANAGEMENT, RANGE YIELDS BASED ON GOOD TO FAIR CONDITIONS. NA=CROP NOT ADAPTED OR WIDELY GROWN.

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SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
HAMERLY		0-2	2E	SI	102	63.0	NA	NA	72.0	15.0	NA	18.0	2.7	0.64	28.6	61.4
HAMERLY		2-6	3E	SI	55	50.0	NA	26.0	62.0	13.0	NA	NA	2.3	0.48	21.4	57.2
HAMERLY		2-6	3E	SI	102	61.0	NA	NA	67.0	14.0	NA	NA	2.5	0.59	26.4	61.3
HAND		0-2	1	SI	102	55.0	NA	27.0	68.0	NA	55.0	NA	2.6	0.54	24.1	65.4
HAND		0-2	2C	SI	55	51.0	NA	26.0	64.0	16.0	55.0	NA	2.5	0.52	23.2	61.6
HAND		2-6	2E	SI	55	49.0	NA	24.0	61.0	15.0	54.0	NA	2.5	0.48	21.4	59.1
HAND		2-6	2E	SI	102	52.0	NA	25.0	65.0	NA	54.0	NA	2.5	0.50	22.3	62.4
HAND		6-9	3E	SI	55	42.0	NA	NA	57.0	NA	NA	NA	2.3	0.46	20.6	53.5
HAND		6-9	3E	SI	102	45.0	NA	NA	60.0	NA	49.0	NA	2.3	0.48	21.4	56.2
HANLY		0-2	6E	SA	58	NA	NA	NA	NA	NA	NA	NA	NA	0.34	15.2	15.2
HARMONY		0-2	2S	CY	55	52.0	NA	32.0	63.0	17.0	NA	NA	2.7	0.52	23.2	65.6
HARMONY		0-2	2S	CY	102	60.0	NA	NA	66.0	22.0	NA	NA	2.8	0.66	29.5	69.5
HARMONY		2-6	3E	CY	55	49.0	NA	28.0	59.0	16.0	NA	NA	2.7	0.46	20.6	61.3
HARMONY		2-6	3E	CY	102	58.0	NA	NA	62.0	19.0	NA	NA	2.7	0.60	26.8	64.7
HARRIET		0-2	6W	SL	53	NA	NA	NA	NA	NA	NA	NA	NA	0.76	34.0	34.0
HARRIET		0-2	6W	SL	54	NA	NA	NA	NA	NA	NA	NA	NA	0.61	27.3	27.3
HARRIET		0-2	6W	SL	55	NA	NA	NA	NA	NA	NA	NA	NA	0.79	35.3	35.3
HARRIET		0-2	6W	SL	102	NA	NA	NA	NA	NA	NA	NA	NA	0.89	39.8	39.8
HATTIE		2-6	3E	CY	102	62.0	NA	NA	65.0	16.0	NA	NA	2.7	0.59	26.4	64.0
HATTIE		6-9	3E	CY	102	60.0	NA	NA	63.0	15.0	NA	NA	2.6	0.56	25.0	61.4
HATTIE		9-15	4E	CY	102	51.0	NA	NA	52.0	NA	NA	NA	2.4	0.53	23.7	55.6
HATTIE		15-25	6E	CY	102	NA	NA	NA	NA	NA	NA	NA	NA	0.50	22.3	22.3
HAVERSON		0-2	3C	OV	60	NA	30.0	NA	32.0	NA	NA	NA	1.5	0.70	31.3	45.4
HAVERSON		0-2	3C	OV	61	30.0	NA	NA	40.0	NA	NA	NA	1.9	0.74	33.1	39.9
HAVERSON		0-2	2C	OV	63	32.0	31.0	NA	43.0	NA	39.0	NA	1.9	0.76	34.0	48.0
HAVERSON		0-2	2C	OV	64	31.0	31.0	NA	39.0	NA	34.0	NA	1.9	0.73	32.6	45.7
HAVERSON		2-6	2E	SI	63	NA	NA	NA	NA	NA	NA	NA	NA	0.43	19.2	19.2
HAVERSON		2-6	2E	SI	64	NA	NA	NA	NA	NA	NA	NA	NA	0.38	17.0	17.0
HAVRE		0-2	3C	OV	58	35.0	NA	25.0	44.0	NA	NA	NA	1.8	0.63	28.2	47.7
HAVRELON		0-2	2C	OV	54	35.0	33.0	26.0	46.0	NA	NA	NA	1.8	0.70	31.3	53.7
HAYNIE		0-2	1	OV	102	90.0	NA	NA	84.0	NA	85.0	31.0	4.0	1.25	55.9	91.9
HECLA		0-2	4E	SA	55	42.0	NA	19.0	45.0	12.0	NA	NA	2.2	0.50	22.3	47.1
HECLA		0-2	4S	SA	102	57.0	NA	NA	48.0	15.0	NA	13.0	2.3	0.64	28.6	50.4
HECLA		2-6	4E	SA	55	39.0	NA	16.0	41.0	11.0	NA	NA	2.1	0.48	21.4	42.9
HECLA		2-6	4S	SA	102	51.0	NA	NA	43.0	12.0	NA	NA	2.2	0.61	27.3	48.6
HECLA		6-15	6S	SA	102	NA	NA	NA	NA	NA	NA	NA	NA	0.58	25.9	25.9
HECLA	E	0-2	4E	SA	55	34.0	NA	15.0	37.0	10.0	NA	NA	1.7	0.48	21.4	37.9
HECLA	E	0-2	4E	SA	102	41.0	NA	NA	43.0	11.0	NA	NA	2.1	0.61	27.3	44.5
HECLA	E	2-6	6E	SA	55	NA	NA	NA	NA	NA	NA	NA	1.5	0.46	20.6	34.6
HECLA	E	2-6	6E	SA	102	38.0	NA	NA	41.0	11.0	NA	NA	2.1	0.58	25.9	43.1

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** COLUMN NUMBER

APPENDIX TABLE D-1. RATINGS DEVELOPED FROM CROP AND RANGE YIELD ESTIMATES FOR SOUTH DAKOTA SOILS*

SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
HEIL		0-2	6S	CD	53	NA	NA	NA	NA	NA	NA	NA	NA	0.84	37.5	37.5
HEIL		0-2	6S	CD	54	NA	NA	NA	NA	NA	NA	NA	NA	0.62	27.7	27.7
HEIL		0-2	6S	CD	55	NA	NA	NA	NA	NA	NA	NA	NA	0.89	39.8	39.8
HEIL		0-2	6S	CD	58	NA	NA	NA	NA	NA	NA	NA	NA	0.52	23.2	23.2
HEIMDAL		0-2	1	SI	102	72.0	NA	NA	71.0	19.0	NA	24.0	2.8	0.61	27.3	69.4
HEIMDAL		0-2	2E	SI	55	55.0	NA	28.0	62.0	17.0	NA	NA	2.4	0.50	22.3	62.6
HEIMDAL		2-6	2E	SI	55	51.0	NA	26.0	59.0	16.0	NA	NA	2.3	0.48	21.4	58.9
HEIMDAL		2-6	2E	SI	102	67.0	NA	NA	67.0	17.0	NA	22.0	2.5	0.59	26.4	63.6
HEIMDAL		6-9	3E	SI	102	60.0	NA	NA	60.0	15.0	NA	17.0	2.3	0.57	25.5	55.7
HENKIN		0-2	3E	SY	55	48.0	NA	NA	49.0	15.0	47.0	NA	1.9	0.52	23.2	51.4
HENKIN		0-2	3S	SY	102	57.0	NA	NA	54.0	17.0	45.0	19.0	2.5	0.68	30.4	56.5
HENKIN		2-6	3E	SY	55	47.0	NA	NA	45.0	14.0	42.0	NA	1.8	0.48	21.4	47.9
HENKIN		2-6	3E	SY	102	54.0	NA	NA	52.0	15.0	42.0	18.0	2.3	0.64	28.6	52.6
HENKIN		6-9	4E	SY	55	40.0	NA	NA	41.0	NA	34.0	NA	1.5	0.45	20.1	40.6
HENKIN		6-9	4E	SY	102	47.0	NA	NA	44.0	NA	36.0	NA	1.9	0.61	27.3	46.2
HENKIN	E	0-2	3E	SY	55	40.0	NA	NA	44.0	13.0	43.0	NA	1.7	0.48	21.4	45.3
HENKIN	E	0-2	3E	SY	102	53.0	NA	NA	52.0	15.0	43.0	17.0	2.4	0.64	28.6	52.6
HENKIN	E	2-6	4E	SY	55	36.0	NA	NA	37.0	NA	35.0	NA	1.5	0.45	20.1	38.7
HENKIN	E	2-6	4E	SY	102	47.0	NA	NA	45.0	13.0	38.0	16.0	1.9	0.61	27.3	45.7
HENKIN	E	6-9	6E	SY	55	NA	NA	NA	NA	NA	NA	NA	1.4	0.41	18.3	32.3
HENKIN	E	6-9	6E	SY	102	NA	NA	NA	NA	NA	NA	NA	NA	0.56	25.0	25.0
HIDEWOOD	DF	0-2	2W	OV	102	61.0	NA	NA	74.0	16.0	NA	NA	2.8	1.13	50.5	66.8
HIDEWOOD	DNF	0-2	4W	OV	102	NA	NA	NA	NA	NA	NA	NA	NA	1.13	50.5	50.5
HIGHMORE		0-2	1	SI	102	73.0	NA	NA	77.0	23.0	NA	27.0	3.2	0.64	28.6	77.1
HIGHMORE		0-2	2C	SI	53	38.0	NA	26.0	60.0	17.0	50.0	NA	2.1	0.52	23.2	56.6
HIGHMORE		0-2	2C	SI	55	53.0	NA	27.0	64.0	18.0	57.0	NA	2.2	0.55	24.6	62.8
HIGHMORE		2-6	2E	SI	53	37.0	NA	24.0	54.0	16.0	46.0	NA	2.0	0.50	22.3	52.7
HIGHMORE		2-6	2E	SI	55	51.0	NA	25.0	61.0	17.0	55.0	NA	2.0	0.55	24.6	59.3
HIGHMORE		2-6	2E	SI	102	70.0	NA	NA	74.0	22.0	NA	22.0	3.1	0.61	27.3	72.1
HIGHMORE		6-9	3E	SI	53	32.0	NA	22.0	50.0	14.0	39.0	NA	1.7	0.48	21.4	46.6
HIGHMORE		6-9	3E	SI	55	42.0	NA	23.0	56.0	15.0	46.0	NA	1.9	0.52	23.2	52.6
HIGHMORE		9-15	4E	SI	53	NA	NA	19.0	43.0	NA	NA	NA	1.4	0.46	20.6	42.7
HIGHMORE		9-15	4E	SI	55	NA	NA	20.0	43.0	NA	NA	NA	1.7	0.50	22.3	45.9
HISLE		0-9	6S	TCP	60	NA	NA	NA	NA	NA	NA	NA	NA	0.17	7.6	7.6
HISLE		0-9	6S	TCP	61	NA	NA	NA	NA	NA	NA	NA	NA	0.14	6.3	6.3
HISLE		0-9	6S	TCP	64	NA	NA	NA	NA	NA	NA	NA	NA	0.21	9.4	9.4
HOLT		0-2	3E	SY	64	31.0	29.0	NA	34.0	NA	NA	NA	1.3	0.38	17.0	41.1
HOLT		0-2	3E	SY	66	34.0	NA	NA	42.0	NA	NA	NA	1.4	0.46	20.6	38.2
HOLT		2-6	3E	SY	64	29.0	NA	NA	30.0	NA	NA	NA	1.1	0.37	16.5	29.7
HOLT		2-6	3E	SY	66	32.0	NA	NA	37.0	NA	NA	NA	1.4	0.45	20.1	35.7

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SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
HOLT		6-9	4E	SY	64	24.0	NA	NA	26.0	NA	NA	NA	1.0	0.34	15.2	25.7
HOLT		6-9	4E	SY	66	28.0	NA	NA	32.0	NA	NA	NA	1.3	0.42	18.8	31.7
HOLT		9-15	6E	SY	64	NA	NA	NA	NA	NA	NA	NA	NA	0.31	13.9	13.9
HOLT		9-15	6E	SY	66	NA	NA	NA	NA	NA	NA	NA	NA	0.40	17.9	17.9
HOMME		0-2	1	SI	102	66.0	NA	NA	69.0	NA	54.0	28.0	3.1	0.63	28.2	70.5
HOMME		2-6	2E	SI	102	61.0	NA	NA	64.0	NA	48.0	24.0	2.8	0.59	26.4	63.5
HOMME		6-9	3E	SI	102	53.0	NA	NA	56.0	NA	43.0	NA	2.7	0.55	24.6	57.8
HORD		0-2	1	SI	102	76.0	NA	NA	78.0	NA	66.0	29.0	3.5	0.72	32.2	79.8
HORD		0-2	2C	SI	55	63.0	43.0	NA	71.0	NA	NA	NA	2.7	0.54	24.1	75.6
HOUDEK		0-2	1	SI	102	73.0	NA	NA	77.0	23.0	59.0	27.0	3.2	0.64	28.6	75.9
HOUDEK		0-2	2C	SI	55	63.0	NA	28.0	68.0	17.0	58.0	NA	2.7	0.52	23.2	67.2
HOUDEK		2-6	2E	SI	55	60.0	NA	27.0	65.0	16.0	55.0	NA	2.6	0.48	21.4	64.2
HOUDEK		2-6	2E	SI	102	70.0	NA	NA	74.0	22.0	56.0	24.0	3.1	0.61	27.3	71.9
HOUDEK		6-9	3E	SI	55	53.0	NA	25.0	58.0	13.0	47.0	NA	2.5	0.45	20.1	57.1
HOUDEK		6-9	3E	SI	102	61.0	NA	NA	73.0	16.0	47.0	20.0	3.0	0.58	25.9	62.8
HOUDEK		9-15	4E	SI	55	NA	NA	17.0	49.0	NA	NA	NA	2.4	0.43	19.2	50.9
HOUDEK		9-15	4E	SI	102	49.0	NA	NA	50.0	NA	36.0	NA	2.6	0.57	25.5	52.4
HOUDEK		15-25	6E	SI	55	NA	NA	NA	NA	NA	NA	NA	NA	0.41	18.3	18.3
HOUDEK		15-25	6E	SI	102	NA	NA	NA	NA	NA	NA	NA	NA	0.55	24.6	24.6
HOUDEK		25-40	6E	SI	102	NA	NA	NA	NA	NA	NA	NA	NA	0.51	22.8	22.8
HOVEN		0-2	6S	CD	53	NA	NA	NA	NA	NA	NA	NA	NA	0.75	33.5	33.5
HOVEN		0-2	6S	CD	55	NA	NA	NA	NA	NA	NA	NA	NA	0.80	35.7	35.7
HOVEN		0-2	6S	CD	60	NA	NA	NA	NA	NA	NA	NA	NA	0.50	22.3	22.3
HOVEN		0-2	6S	CD	63	NA	NA	NA	NA	NA	NA	NA	NA	0.70	31.3	31.3
HOVEN		0-2	6S	CD	64	NA	NA	NA	NA	NA	NA	NA	NA	0.65	29.0	29.0
HOVEN		0-2	6S	CD	66	NA	NA	NA	NA	NA	NA	NA	NA	0.75	33.5	33.5
HUGGINS		0-2	3S	CY	64	31.0	31.0	NA	41.0	NA	33.0	NA	1.1	0.37	16.5	42.2
HUGGINS		0-2	3S	CY	66	34.0	33.0	NA	44.0	NA	39.0	NA	1.2	0.54	24.1	46.3
HUGGINS		0-2	4S	CY	60	NA	23.0	NA	28.0	NA	NA	NA	0.9	0.34	15.2	34.2
HUGGINS		2-6	3E	CY	64	28.0	29.0	NA	37.0	NA	30.0	NA	1.0	0.33	14.7	38.6
HUGGINS		2-6	3E	CY	66	32.0	28.0	NA	39.0	NA	36.0	NA	1.1	0.50	22.3	41.4
HUGGINS		2-6	4E	CY	60	NA	NA	NA	24.0	NA	NA	NA	0.8	0.31	13.9	22.5
HUGGINS		6-9	4E	CY	64	NA	24.0	NA	34.0	NA	22.0	NA	0.9	0.31	13.9	34.3
HUGGINS		6-9	4E	CY	66	NA	28.0	NA	34.0	NA	26.0	NA	0.9	0.47	21.0	37.7
HUGGINS		6-9	6E	CY	60	NA	NA	NA	NA	NA	NA	NA	NA	0.29	13.0	13.0
HUNTIMER		0-2	2S	CY	102	73.0	NA	NA	76.0	NA	NA	24.0	3.0	0.72	32.2	72.9
HUNTIMER		2-6	3E	CY	102	69.0	NA	NA	73.0	NA	NA	22.0	2.9	0.72	32.2	69.1
HURLEY		0-6	6S	TCP	53	NA	NA	NA	NA	NA	NA	NA	NA	0.26	11.6	11.6
HURLEY		0-6	6S	TCP	63	NA	NA	NA	NA	NA	NA	NA	NA	0.19	8.5	8.5
IMLAY		0-15	6S	SW	60	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1

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SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
IMLAY		0-15	6S	SW	63	NA	NA	NA	NA	NA	NA	NA	NA	0.32	14.3	14.3
IMLAY		0-15	6S	SW	64	NA	NA	NA	NA	NA	NA	NA	NA	0.34	15.2	15.2
IMLAY		15-25	7S	SW	60	NA	NA	NA	NA	NA	NA	NA	NA	0.23	10.3	10.3
IMLAY		15-40	7S	SW	63	NA	NA	NA	NA	NA	NA	NA	NA	0.29	13.0	13.0
IMLAY		15-40	7S	SW	64	NA	NA	NA	NA	NA	NA	NA	NA	0.30	13.4	13.4
INAVALE		0-2	6E	SA	65	NA	NA	NA	NA	NA	NA	NA	NA	0.42	18.8	18.8
INAVALE		0-2	6E	SA	66	28.0	NA	NA	32.0	NA	NA	NA	1.6	0.50	22.3	34.0
JANSEN		0-2	3S	SI	66	34.0	35.0	NA	45.0	NA	50.0	NA	1.8	0.45	20.1	52.7
JANSEN		2-6	3E	SI	66	33.0	33.0	NA	42.0	NA	47.0	NA	1.7	0.45	20.1	49.8
JANSEN		6-9	4E	SI	66	NA	NA	NA	NA	NA	NA	NA	NA	0.41	18.3	18.3
JAVA		2-6	3E	SI	53	24.0	NA	21.0	39.0	14.0	29.0	NA	1.7	0.47	21.0	40.7
JAVA		2-6	3E	SI	55	35.0	NA	26.0	41.0	14.0	32.0	NA	2.0	0.50	22.3	46.9
JAVA		6-9	4E	SI	53	22.0	NA	17.0	38.0	NA	22.0	NA	1.5	0.45	20.1	33.8
JAVA		6-9	4E	SI	55	32.0	NA	24.0	39.0	NA	25.0	NA	1.8	0.48	21.4	41.8
JAVA		9-25	6E	SI	53	NA	NA	NA	NA	NA	NA	NA	NA	0.43	19.2	19.2
JAVA		9-25	6E	SI	55	NA	NA	NA	NA	NA	NA	NA	NA	0.43	19.2	19.2
JAVA	E	2-6	4E	SI	53	19.0	NA	16.0	37.0	NA	25.0	NA	1.3	0.45	20.1	32.2
JAVA	E	2-6	4E	SI	55	33.0	NA	23.0	39.0	NA	28.0	NA	1.7	0.48	21.4	41.8
JAVA	E	6-9	6E	SI	53	NA	NA	NA	NA	NA	NA	NA	NA	0.43	19.2	19.2
JAVA	E	6-9	6E	SI	55	NA	NA	NA	NA	NA	NA	NA	NA	0.46	20.6	20.6
JERAULD		0-6	6S	TCP	53	NA	NA	NA	NA	NA	NA	NA	NA	0.21	9.4	9.4
JERAULD		0-6	6S	TCP	55	NA	NA	NA	NA	NA	NA	NA	NA	0.28	12.5	12.5
JUDSON		0-2	1	OV	102	87.0	NA	NA	81.0	NA	83.0	36.0	4.2	1.15	51.4	93.6
JUDSON		2-6	2E	SI	102	84.0	NA	NA	78.0	NA	75.0	32.0	3.9	0.72	32.2	87.0
KADOKA		0-2	2C	SI	64	35.0	35.0	NA	46.0	NA	37.0	NA	1.4	0.38	17.0	48.2
KADOKA		0-2	2C	SI	66	39.0	39.0	NA	48.0	NA	40.0	NA	1.5	0.47	21.0	52.5
KADOKA		0-2	3C	SI	60	22.0	29.0	NA	33.0	NA	NA	NA	1.2	0.34	15.2	37.9
KADOKA		2-6	2E	SI	64	33.0	33.0	NA	44.0	NA	33.0	NA	1.3	0.35	15.6	45.1
KADOKA		2-6	2E	SI	66	36.0	37.0	NA	46.0	NA	38.0	NA	1.4	0.43	19.2	49.6
KADOKA		2-6	3E	SI	60	NA	24.0	NA	31.0	NA	NA	NA	1.1	0.31	13.9	37.6
KADOKA		6-9	3E	SI	64	26.0	29.0	NA	39.0	NA	26.0	NA	1.2	0.33	14.7	38.6
KADOKA		6-9	3E	SI	66	29.0	33.0	NA	40.0	NA	29.0	NA	1.3	0.40	17.9	42.4
KADOKA		6-9	4E	SI	60	NA	NA	NA	23.0	NA	NA	NA	1.0	0.29	13.0	24.3
KADOKA		9-15	4E	SI	64	NA	25.0	NA	33.0	NA	22.0	NA	1.0	0.31	13.9	35.2
KADOKA		9-15	4E	SI	66	NA	NA	NA	NA	NA	21.0	NA	1.2	0.38	17.0	26.3
KADOKA		9-15	6E	SI	60	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
KADOKA		15-25	6E	SI	64	NA	NA	NA	NA	NA	NA	NA	NA	0.29	13.0	13.0
KADOKA		15-25	6E	SI	66	NA	NA	NA	NA	NA	NA	NA	NA	0.35	15.6	15.6
KEITH		0-2	2C	SI	64	37.0	45.0	NA	49.0	NA	43.0	NA	1.7	0.40	17.9	56.6
KEITH		0-2	3C	SI	60	26.0	33.0	NA	34.0	NA	NA	NA	1.5	0.36	16.1	43.2

* A RANGE RATING (COLUMN 16) WAS COMPUTED FOR SOILS IN ALL CAPABILITY CLASSES (COLUMN 4). A CROP RATING WAS COMPUTED FOR SOILS IN CAPABILITY CLASSES 1 THROUGH 4. COLUMN 17 HEADED 'SOIL RATING' IS THE CROP RATING IF THE SOIL IS IN CAPABILITY CLASSES 1 THROUGH 4. THE RANGE RATING IS THE SOIL RATING FOR SOIL UNITS IN CAPABILITY CLASSES 5 THROUGH 7. SEE APPENDIX D DISCUSSION FOR RESTRICTIONS REGARDING THE USE OF THIS TABLE. ABBREVIATIONS USED IN THE TABLE ARE DEFINED AT THE END OF THE TABLE. CROP YIELDS BASED ON HIGH LEVEL OF MANAGEMENT, RANGE YIELDS BASED ON GOOD TO FAIR CONDITIONS. NA=CROP NOT ADAPTED OR WIDELY GROWN.

** COLUMN NUMBER

APPENDIX TABLE D-1. RATINGS DEVELOPED FROM CROP AND RANGE YIELD ESTIMATES FOR SOUTH DAKOTA SOILS*

SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
KEITH		2-6	2E	SI	64	31.0	42.0	NA	44.0	NA	42.0	NA	1.6	0.37	16.5	52.2
KEITH		2-6	3E	SI	60	22.0	32.0	NA	32.0	NA	NA	NA	1.4	0.32	14.3	40.4
KEITH		6-9	3E	SI	64	26.0	35.0	NA	39.0	NA	35.0	NA	1.4	0.35	15.6	44.3
KEITH		6-9	4E	SI	60	NA	28.0	NA	26.0	NA	NA	NA	1.2	0.32	14.3	39.4
KEITH		9-15	4E	SI	64	NA	31.0	NA	29.0	NA	28.0	NA	1.2	0.33	14.7	40.3
KEITH		9-15	6E	SI	60	NA	NA	NA	NA	NA	NA	NA	NA	0.30	13.4	13.4
KEITH		15-25	6E	SI	64	NA	NA	NA	NA	NA	NA	NA	NA	0.31	13.9	13.9
KEOTA		2-6	3E	TU	64	NA	24.0	NA	26.0	NA	NA	NA	1.1	0.34	15.2	35.7
KEOTA		2-6	4E	TU	60	NA	23.0	NA	22.0	NA	NA	NA	1.0	0.35	15.6	32.7
KEOTA		2-6	4E	TU	61	NA	NA	24.0	26.0	NA	NA	NA	1.1	0.32	14.3	38.4
KEOTA		6-9	4E	TU	64	NA	22.0	NA	23.0	NA	NA	NA	0.9	0.32	14.3	31.6
KEOTA		6-25	6E	TU	60	NA	NA	NA	NA	NA	NA	NA	NA	0.30	13.4	13.4
KEOTA		6-25	6E	TU	61	NA	NA	NA	NA	NA	NA	NA	NA	0.29	13.0	13.0
KEOTA		9-25	6E	TU	64	NA	NA	NA	NA	NA	NA	NA	NA	0.28	12.5	12.5
KEOTA		25-40	7E	TU	64	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
KEYA		0-2	2C	OV	63	48.0	39.0	NA	53.0	NA	55.0	NA	2.2	0.91	40.7	62.3
KEYA		0-2	2C	OV	64	46.0	41.0	NA	52.0	NA	52.0	NA	2.0	0.90	40.2	60.9
KEYA		0-2	2C	OV	66	50.0	41.0	NA	55.0	NA	57.0	NA	2.2	0.94	42.0	64.5
KEYA		2-6	2E	SI	63	47.0	37.0	NA	51.0	NA	54.0	NA	2.0	0.43	19.2	59.6
KEYA		2-6	2E	SI	64	43.0	39.0	NA	49.0	NA	49.0	NA	1.7	0.40	17.9	56.6
KEYA		2-6	2E	SI	66	46.0	40.0	NA	52.0	NA	55.0	NA	2.0	0.48	21.4	61.1
KEYA		6-9	3E	SI	63	NA	32.0	NA	43.0	NA	46.0	NA	1.7	0.41	18.3	53.0
KEYA		6-9	3E	SI	64	35.0	34.0	NA	44.0	NA	42.0	NA	1.4	0.35	15.6	48.5
KEYA		6-9	3E	SI	66	NA	34.0	NA	46.0	NA	47.0	NA	1.8	0.44	19.7	55.8
KLOTEN		9-25	6E	TU	55	NA	NA	NA	NA	NA	NA	NA	NA	0.42	18.8	18.8
KLOTEN		9-25	6E	TU	102	NA	NA	NA	NA	NA	NA	NA	NA	0.50	22.3	22.3
KLOTEN		25-40	7E	TU	55	NA	NA	NA	NA	NA	NA	NA	NA	0.39	17.4	17.4
KLOTEN		25-40	7E	TU	102	NA	NA	NA	NA	NA	NA	NA	NA	0.43	19.2	19.2
KOLLS		0-2	6S	CD	60	NA	NA	NA	NA	NA	NA	NA	NA	0.60	26.8	26.8
KOLLS		0-2	6S	CD	61	NA	NA	NA	NA	NA	NA	NA	NA	0.52	23.2	23.2
KOLLS		0-2	6S	CD	63	NA	NA	NA	NA	NA	NA	NA	NA	0.76	34.0	34.0
KOLLS		0-2	6S	CD	64	NA	NA	NA	NA	NA	NA	NA	NA	0.72	32.2	32.2
KORCHEA		0-2	2C	OV	54	33.0	34.0	25.0	47.0	NA	NA	NA	1.8	0.73	32.6	53.4
KORCHEA		0-2	3C	OV	58	NA	31.0	22.0	41.0	NA	NA	NA	1.6	0.65	29.0	51.7
KRANZBURG		0-2	1	SI	102	78.0	NA	NA	81.0	21.0	NA	27.0	3.0	0.68	30.4	76.7
KRANZBURG		0-2	2C	SI	55	63.0	NA	28.0	70.0	17.0	NA	NA	2.8	0.54	24.1	67.9
KRANZBURG		2-6	2E	SI	55	60.0	NA	27.0	65.0	16.0	NA	NA	2.7	0.52	23.2	64.5
KRANZBURG		2-6	2E	SI	102	76.0	NA	NA	77.0	18.0	NA	24.0	3.0	0.63	28.2	71.8
KRANZBURG		6-9	3E	SI	55	NA	NA	NA	NA	NA	NA	NA	2.5	0.49	21.9	57.7
KRANZBURG		6-9	3E	SI	102	67.0	NA	NA	72.0	16.0	NA	21.0	2.7	0.60	26.8	64.4

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APPENDIX TABLE D-1. RATINGS DEVELOPED FROM CROP AND RANGE YIELD ESTIMATES FOR SOUTH DAKOTA SOILS*

SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
KRANZBURG	E	2-6	3E	SI	102	70.0	NA	NA	72.0	17.0	NA	21.0	2.6	0.60	26.8	65.3
KRANZBURG	E	6-9	4E	SI	102	60.0	NA	NA	59.0	NA	NA	NA	2.3	0.55	24.6	60.6
KUBE		0-2	2C	SI	63	37.0	35.0	NA	48.0	NA	NA	NA	1.4	0.41	18.3	50.5
KUBE		0-2	2C	SI	64	35.0	35.0	NA	47.0	NA	NA	NA	1.4	0.38	17.0	49.7
KUBE		0-2	3C	SI	60	22.0	29.0	NA	31.0	NA	NA	NA	1.2	0.34	15.2	37.3
KUBE		2-6	2E	SI	63	33.0	33.0	NA	44.0	NA	NA	NA	1.3	0.39	17.4	46.6
KUBE		2-6	2E	SI	64	32.0	33.0	NA	44.0	NA	NA	NA	1.3	0.36	16.1	46.4
KUBE		2-6	3E	SI	60	NA	24.0	NA	29.0	NA	NA	NA	1.1	0.34	15.2	36.8
KYLE		0-2	3S	CY	63	25.0	30.0	23.0	33.0	NA	37.0	NA	1.4	0.42	18.8	43.9
KYLE		0-2	4S	CY	60	NA	23.0	20.0	26.0	NA	NA	NA	1.2	0.34	15.2	39.5
KYLE		0-2	4S	CY	61	NA	32.0	NA	33.0	NA	NA	NA	1.5	0.30	13.4	47.3
KYLE		2-6	3E	CY	63	24.0	29.0	21.0	31.0	NA	35.0	NA	1.4	0.38	17.0	41.8
KYLE		2-6	4E	CY	60	NA	22.0	19.0	25.0	NA	NA	NA	1.1	0.31	13.9	37.5
KYLE		2-6	4E	CY	61	NA	30.0	NA	32.0	NA	NA	NA	1.4	0.27	12.1	44.7
KYLE		6-9	4E	CY	63	20.0	24.0	17.0	29.0	NA	30.0	NA	1.3	0.35	15.6	35.8
KYLE		6-25	6E	CY	60	NA	NA	NA	NA	NA	NA	NA	NA	0.28	12.5	12.5
KYLE		6-25	6E	CY	61	NA	NA	NA	NA	NA	NA	NA	NA	0.24	10.7	10.7
LADELLE		0-2	1	OV	102	87.0	NA	NA	83.0	22.0	NA	28.0	3.4	1.15	51.4	82.1
LADELLE		0-2	2C	OV	55	67.0	NA	33.0	75.0	19.0	NA	NA	3.3	1.02	45.6	76.1
LADNER		0-2	4S	CP	54	NA	NA	NA	NA	NA	NA	NA	NA	0.28	12.5	12.5
LADNER		0-2	4S	CP	58	NA	NA	17.0	31.0	NA	NA	NA	1.1	0.18	8.0	34.3
LADNER		2-9	6E	CP	54	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
LADNER		2-9	6S	CP	58	NA	NA	NA	NA	NA	NA	NA	NA	0.16	7.1	7.1
LAKEPORT		0-2	2W	CY	102	88.0	NA	NA	80.0	NA	82.0	30.0	3.8	0.72	32.2	88.5
LAKOA		6-25	6E	VS	61	NA	NA	NA	NA	NA	NA	NA	NA	0.14	6.3	6.3
LAKOA		9-40	7E	VS	61	NA	NA	NA	NA	NA	NA	NA	NA	0.12	5.4	5.4
LAKOMA		2-6	3E	CY	63	18.0	25.0	NA	29.0	NA	32.0	NA	1.2	0.44	19.7	34.4
LAKOMA		6-9	4E	CY	63	16.0	22.0	NA	26.0	NA	24.0	NA	1.0	0.44	19.7	29.1
LAKOMA		9-25	6E	CY	63	NA	NA	NA	NA	NA	NA	NA	NA	0.42	18.8	18.8
LAKOMA		25-40	7E	CY	63	NA	NA	NA	NA	NA	NA	NA	NA	0.40	17.9	17.9
LAMO	DF	0-2	2W	SB	53	56.0	NA	27.0	64.0	15.0	NA	NA	2.8	1.30	58.1	63.2
LAMO	DF	0-2	2W	SB	55	58.0	NA	29.0	66.0	18.0	68.0	NA	3.2	1.35	60.3	70.9
LAMO	DF	0-2	2W	SB	64	NA	NA	NA	50.0	NA	NA	NA	2.4	1.25	55.9	55.3
LAMO	DF	0-2	2W	SB	66	53.0	33.0	NA	58.0	NA	NA	NA	2.8	1.33	59.4	64.4
LAMO	DF	0-2	2W	SB	102	85.0	NA	NA	73.0	19.0	67.0	30.0	4.1	1.45	64.8	81.2
LAMO	DNF	0-2	4W	SB	53	NA	NA	NA	NA	NA	NA	NA	NA	1.30	58.1	58.1
LAMO	DNF	0-2	4W	SB	55	NA	NA	NA	NA	NA	NA	NA	NA	1.35	60.3	60.3
LAMO	DNF	0-2	4W	SB	66	NA	NA	NA	NA	NA	NA	NA	NA	1.33	59.4	59.4
LAMO	DNF	0-2	4W	SB	102	NA	NA	NA	NA	NA	NA	NA	NA	1.45	64.8	64.8
LAMO	HWT	0-2	4W	SB	64	NA	NA	NA	NA	NA	NA	NA	NA	1.25	55.9	55.9

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LAMO	HWT	0-2	4W	SB	53	NA	NA	NA	NA	NA	NA	NA	2.0	1.30	58.1	46.2
LAMO	HWT	0-2	4W	SB	55	36.0	NA	NA	43.0	NA	44.0	NA	2.7	1.35	60.3	50.0
LAMO	HWT	0-2	4W	SB	66	NA	NA	NA	NA	NA	NA	NA	NA	1.33	59.4	59.4
LAMO	HWT	0-2	4W	SB	102	41.0	NA	NA	47.0	NA	43.0	NA	3.2	1.45	64.8	55.0
LAMOURE	DF	0-2	2W	SB	53	54.0	NA	26.0	63.0	16.0	NA	NA	2.7	1.27	56.7	62.2
LAMOURE	DF	0-2	2W	SB	55	57.0	NA	31.0	64.0	16.0	NA	NA	2.8	1.31	58.5	66.1
LAMOURE	DF	0-2	2W	SB	102	66.0	NA	NA	71.0	18.0	NA	28.0	3.0	1.35	60.3	70.4
LAMOURE	DNF	0-2	4W	SB	53	NA	NA	NA	NA	NA	NA	NA	NA	1.27	56.7	56.7
LAMOURE	DNF	0-2	4W	SB	55	NA	NA	NA	NA	NA	NA	NA	NA	1.31	58.5	58.5
LAMOURE	DNF	0-2	4W	SB	102	NA	NA	NA	NA	NA	NA	NA	NA	1.35	60.3	60.3
LAMOURE	HWT	0-2	4W	SB	53	NA	NA	NA	NA	NA	NA	NA	NA	1.27	56.7	56.7
LAMOURE	HWT	0-2	4W	SB	55	NA	NA	NA	NA	NA	NA	NA	NA	1.31	58.5	58.5
LAMOURE	HWT	0-2	4W	SB	102	NA	NA	NA	NA	NA	NA	NA	2.0	1.35	60.3	46.2
LANE		0-2	2S	CY	53	51.0	NA	28.0	65.0	18.0	50.0	NA	2.8	0.56	25.0	64.0
LANE		0-2	2S	CY	55	53.0	NA	28.0	70.0	18.0	54.0	NA	2.8	0.60	26.8	66.0
LANE		2-6	3E	CY	53	46.0	NA	25.0	62.0	16.0	48.0	NA	2.6	0.52	23.2	58.9
LANE		2-6	3E	CY	55	51.0	NA	26.0	65.0	17.0	53.0	NA	2.8	0.56	25.0	63.1
LANGHEI		2-6	3E	TU	102	43.0	NA	NA	56.0	15.0	NA	NA	1.9	0.58	25.9	51.0
LANGHEI		6-9	4E	TU	102	40.0	NA	NA	50.0	13.0	NA	NA	1.7	0.53	23.7	45.6
LANGHEI		9-25	6E	TU	102	NA	NA	NA	NA	NA	NA	NA	NA	0.53	23.7	23.7
LANGHEI		25-40	7E	TU	102	NA	NA	NA	NA	NA	NA	NA	NA	0.47	21.0	21.0
LANTRY		2-6	4E	TU	54	NA	28.0	23.0	39.0	NA	NA	NA	1.5	0.34	15.2	49.5
LANTRY		6-9	4E	TU	54	NA	21.0	20.0	32.0	NA	NA	NA	1.3	0.32	14.3	40.6
LANTRY		9-15	6E	TU	54	NA	NA	NA	NA	NA	NA	NA	NA	0.30	13.4	13.4
LANTRY		15-25	6E	TU	54	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
LANTRY		25-40	6E	TU	54	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
LAPORTE		2-15	6S	SW	61	NA	NA	NA	NA	NA	NA	NA	NA	0.33	14.7	14.7
LAPORTE		2-15	6S	SW	62	NA	NA	NA	NA	NA	NA	NA	NA	0.38	17.0	17.0
LAPORTE		15-40	7S	SW	61	NA	NA	NA	NA	NA	NA	NA	NA	0.29	13.0	13.0
LAPORTE		15-40	7S	SW	62	NA	NA	NA	NA	NA	NA	NA	NA	0.35	15.6	15.6
LAPRAIRIE		0-2	1	OV	102	87.0	NA	NA	83.0	22.0	NA	28.0	3.9	1.20	53.6	84.4
LAPRAIRIE		0-2	2C	OV	55	57.0	NA	33.0	75.0	19.0	NA	NA	3.3	1.02	45.6	74.0
LAPRAIRIE		2-6	2E	SI	55	53.0	NA	29.0	66.0	17.0	NA	NA	3.2	0.61	27.3	67.2
LAPRAIRIE		2-6	2E	SI	102	81.0	NA	NA	77.0	18.0	NA	26.0	3.8	0.75	33.5	77.5
LARSON		0-2	4S	CP	55	NA	NA	16.0	31.0	NA	NA	NA	1.3	0.28	12.5	35.0
LARSON		2-6	4S	CP	55	NA	NA	15.0	29.0	NA	NA	NA	1.2	0.25	11.2	32.6
LARVIE		0-2	3S	CY	64	30.0	NA	NA	26.0	NA	NA	NA	1.3	0.37	16.5	30.2
LARVIE		0-2	4S	CY	60	NA	21.0	NA	25.0	NA	NA	NA	1.1	0.34	15.2	33.1
LARVIE		2-6	3E	CY	64	29.0	NA	NA	24.0	NA	NA	NA	1.2	0.33	14.7	28.3
LARVIE		2-6	4E	CY	60	NA	20.0	NA	24.0	NA	NA	NA	1.0	0.31	13.9	31.3

* A RANGE RATING (COLUMN 16) WAS COMPUTED FOR SOILS IN ALL CAPABILITY CLASSES (COLUMN 4). A CROP RATING WAS COMPUTED FOR SOILS IN CAPABILITY CLASSES 1 THROUGH 4. COLUMN 17 HEADED 'SOIL RATING' IS THE CROP RATING IF THE SOIL IS IN CAPABILITY CLASSES 1 THROUGH 4. THE RANGE RATING IS THE SOIL RATING FOR SOIL UNITS IN CAPABILITY CLASSES 5 THROUGH 7. SEE APPENDIX D DISCUSSION FOR RESTRICTIONS REGARDING THE USE OF THIS TABLE. ABBREVIATIONS USED IN THE TABLE ARE DEFINED AT THE END OF THE TABLE. CROP YIELDS BASED ON HIGH LEVEL OF MANAGEMENT, RANGE YIELDS BASED ON GOOD TO FAIR CONDITIONS. NA=CROP NOT ADAPTED OR WIDELY GROWN.

** COLUMN NUMBER

APPENDIX TABLE D-1. RATINGS DEVELOPED FROM CROP AND RANGE YIELD ESTIMATES FOR SOUTH DAKOTA SOILS*

SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WIR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
LARVIE		6-9	4E	CY	64	23.0	NA	NA	NA	NA	NA	NA	1.1	0.31	13.9	24.9
LARVIE		6-9	6E	CY	60	NA	NA	NA	NA	NA	NA	NA	NA	0.28	12.5	12.5
LARVIE		9-25	6E	CY	64	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
LARVIE		25-40	7E	CY	64	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
LEFOR		0-2	3E	SY	54	NA	28.0	21.0	39.0	NA	NA	NA	1.3	0.35	15.6	47.1
LEFOR		2-6	3E	SY	54	NA	26.0	20.0	35.0	NA	NA	NA	1.2	0.33	14.7	43.7
LEFOR		6-9	4E	SY	54	NA	21.0	16.0	29.0	NA	NA	NA	1.1	0.31	13.9	36.1
LEHR		0-2	4S	SWG	53	NA	NA	19.0	40.0	12.0	NA	NA	1.1	0.28	12.5	40.0
LEHR		0-2	4S	SWG	54	NA	19.0	13.0	28.0	NA	NA	NA	0.8	0.28	12.5	31.1
LEHR		2-6	4E	SWG	53	NA	NA	16.0	38.0	NA	NA	NA	1.0	0.25	11.2	35.2
LEHR		2-6	4E	SWG	54	NA	18.0	12.0	26.0	NA	NA	NA	0.7	0.25	11.2	28.8
LEHR		6-25	6E	SWG	53	NA	NA	NA	NA	NA	NA	NA	NA	0.21	9.4	9.4
LEHR		6-25	6E	SWG	54	NA	NA	NA	NA	NA	NA	NA	NA	0.21	9.4	9.4
LEOTA	DF	0-2	2W	OV	55	48.0	NA	26.0	64.0	15.0	NA	NA	2.7	1.12	50.0	60.5
LEOTA	DF	0-2	2W	OV	102	61.0	NA	NA	71.0	19.0	NA	NA	2.8	1.30	58.1	68.6
LEOTA	DNF	0-2	4W	OV	55	NA	NA	NA	NA	NA	NA	NA	NA	1.12	50.0	50.0
LEOTA	DNF	0-2	4W	OV	102	NA	NA	NA	NA	NA	NA	NA	NA	1.30	58.1	58.1
LESHARA		0-2	2W	SB	66	61.0	37.0	NA	61.0	NA	NA	NA	3.1	1.60	71.5	71.3
LESHARA		0-2	2W	SB	102	88.0	NA	NA	82.0	NA	NA	37.0	4.0	1.80	80.4	92.5
LETCHER		0-2	4E	SY	55	NA	NA	23.0	38.0	NA	NA	NA	1.5	0.48	21.4	45.0
LIHEN		0-2	4E	SA	58	NA	NA	14.0	26.0	NA	NA	NA	0.9	0.36	16.1	28.4
LIHEN		0-6	4E	SA	54	NA	25.0	14.0	28.0	NA	NA	NA	1.0	0.40	17.9	36.2
LIHEN		2-25	6E	SA	58	NA	NA	NA	NA	NA	NA	NA	NA	0.30	13.4	13.4
LIHEN		6-9	6E	SA	54	NA	NA	NA	NA	NA	NA	NA	NA	0.31	13.9	13.9
LIHEN	E	0-2	4E	SA	54	NA	22.0	13.0	28.0	NA	NA	NA	0.9	0.40	17.9	33.3
LIHEN	E	0-6	6E	SA	58	NA	NA	NA	NA	NA	NA	NA	NA	0.30	13.4	13.4
LIHEN	E	2-6	6E	SA	54	NA	NA	NA	NA	NA	NA	NA	0.9	0.31	13.9	20.8
LINTON		0-6	2E	SI	53	32.0	NA	22.0	45.0	15.0	NA	NA	1.9	0.47	21.0	47.2
LINTON		6-9	3E	SI	53	28.0	NA	18.0	38.0	NA	NA	NA	1.7	0.45	20.1	39.2
LINTON		9-15	4E	SI	53	24.0	NA	NA	35.0	NA	NA	NA	1.4	0.43	19.2	32.1
LISMAS		2-15	6S	SDC	60	NA	NA	NA	NA	NA	NA	NA	NA	0.18	8.0	8.0
LISMAS		2-15	6S	SDC	61	NA	NA	NA	NA	NA	NA	NA	NA	0.15	6.7	6.7
LISMAS		15-40	7S	SDC	60	NA	NA	NA	NA	NA	NA	NA	NA	0.14	6.3	6.3
LISMAS		15-40	7S	SDC	61	NA	NA	NA	NA	NA	NA	NA	NA	0.12	5.4	5.4
LISMORE		0-2	1	OV	102	76.0	NA	NA	86.0	21.0	NA	27.0	3.4	1.13	50.5	79.2
LOHLER		0-2	2C	OV	54	35.0	34.0	25.0	47.0	NA	NA	NA	2.0	0.80	35.7	54.8
LOHMILLER		0-2	3C	OV	60	NA	28.0	15.0	28.0	NA	NA	NA	1.5	0.63	28.2	41.4
LOHMILLER		0-2	3C	OV	61	NA	30.0	21.0	31.0	NA	NA	NA	1.7	0.75	33.5	48.3
LOHMILLER		2-6	3E	CY	60	NA	25.0	14.0	24.0	NA	NA	NA	1.4	0.32	14.3	37.4
LOHMILLER		2-6	3E	CY	61	NA	26.0	19.0	29.0	NA	NA	NA	1.5	0.37	16.5	43.1

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APPENDIX TABLE D-1. RATINGS DEVELOPED FROM CROP AND RANGE YIELD ESTIMATES FOR SOUTH DAKOTA SOILS*

SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
LOUP		0-2	5W	SB	64	NA	NA	NA	NA	NA	NA	NA	NA	1.30	58.1	58.1
LOUP		0-2	5W	SB	65	NA	NA	NA	NA	NA	NA	NA	NA	1.30	58.1	58.1
LOUP		0-2	5W	SB	66	NA	NA	NA	NA	NA	NA	NA	NA	1.35	60.3	60.3
LOWRY		0-2	1	SI	102	66.0	NA	NA	67.0	19.0	NA	27.0	2.7	0.64	28.6	68.3
LOWRY		0-2	2E	SI	53	36.0	NA	24.0	48.0	16.0	42.0	NA	2.0	0.50	22.3	50.7
LOWRY		0-2	2E	SI	55	51.0	NA	NA	53.0	NA	50.0	NA	2.3	0.50	22.3	56.2
LOWRY		0-2	2E	SI	63	36.0	33.0	22.0	49.0	NA	41.0	NA	1.8	0.41	18.3	51.8
LOWRY		2-6	2E	SI	53	32.0	NA	22.0	45.0	15.0	37.0	NA	1.9	0.47	21.0	46.6
LOWRY		2-6	2E	SI	55	48.0	NA	NA	50.0	NA	48.0	NA	2.2	0.50	22.3	53.4
LOWRY		2-6	2E	SI	63	33.0	31.0	20.0	46.0	NA	37.0	NA	1.7	0.38	17.0	48.0
LOWRY		2-6	2E	SI	102	64.0	NA	NA	64.0	18.0	NA	26.0	2.6	0.61	27.3	65.5
LOWRY		6-9	3E	SI	53	29.0	NA	20.0	41.0	NA	28.0	NA	1.7	0.44	19.7	39.8
LOWRY		6-9	3E	SI	55	40.0	NA	NA	47.0	NA	42.0	NA	2.0	0.47	21.0	47.5
LOWRY		6-9	3E	SI	63	30.0	24.0	17.0	41.0	NA	27.0	NA	1.5	0.35	15.6	40.0
LOWRY		6-9	3E	SI	102	57.0	NA	NA	58.0	15.0	NA	NA	2.3	0.55	24.6	57.5
LOWRY		9-15	4E	SI	53	26.0	NA	19.0	37.0	NA	23.0	NA	1.4	0.41	18.3	35.2
LOWRY		9-15	4E	SI	55	NA	NA	NA	NA	NA	NA	NA	NA	0.41	18.3	18.3
LOWRY		9-15	4E	SI	63	25.0	NA	15.0	37.0	NA	23.0	NA	1.3	0.33	14.7	32.5
LOWRY		9-15	4E	SI	102	NA	NA	NA	NA	NA	NA	NA	NA	0.47	21.0	21.0
LUDDEN	DF	0-2	2W	OV	55	51.0	NA	24.0	51.0	16.0	NA	NA	2.7	0.91	40.7	57.9
LUDDEN	DF	0-2	2W	OV	102	61.0	NA	32.0	70.0	13.0	NA	NA	2.7	1.05	46.9	66.2
LUDDEN	DNF	0-2	4W	OV	55	NA	NA	NA	NA	NA	NA	NA	NA	0.91	40.7	40.7
LUDDEN	DNF	0-2	4W	OV	102	NA	NA	NA	NA	NA	NA	NA	NA	1.05	46.9	46.9
LUTE		0-2	6S	SL	66	NA	NA	NA	NA	NA	NA	NA	NA	0.38	17.0	17.0
LUTON	DF	0-2	3W	WL	55	51.0	NA	NA	56.0	11.0	NA	NA	2.9	0.85	38.0	55.3
LUTON	DF	0-2	3W	WL	102	64.0	NA	NA	63.0	12.0	47.0	29.0	3.3	1.00	44.7	64.1
LUTON	S	0-2	4W	WL	55	NA	NA	NA	41.0	NA	NA	NA	2.5	0.85	38.0	51.5
LUTON	S	0-2	4W	WL	102	40.0	NA	NA	39.0	11.0	NA	24.0	3.0	1.00	44.7	50.8
LUTON	DNF	0-2	5W	WL	55	NA	NA	NA	NA	NA	NA	NA	NA	0.85	38.0	38.0
LUTON	DNF	0-2	5W	WL	102	NA	NA	NA	NA	NA	NA	NA	NA	1.00	44.7	44.7
MACKEN		0-2	6S	CD	53	NA	NA	NA	NA	NA	NA	NA	NA	0.91	40.7	40.7
MACKEN		0-2	6S	CD	60	NA	NA	NA	NA	NA	NA	NA	NA	0.58	25.9	25.9
MACKEN		0-2	6S	CD	61	NA	NA	NA	NA	NA	NA	NA	NA	0.69	30.8	30.8
MACKEN		0-2	6S	CD	63	NA	NA	NA	NA	NA	NA	NA	NA	0.88	39.3	39.3
MACKEN		0-2	6S	CD	64	NA	NA	NA	NA	NA	NA	NA	NA	0.86	38.4	38.4
MADDOCK		0-2	4E	SA	53	32.0	NA	16.0	32.0	11.0	NA	NA	1.4	0.50	22.3	36.2
MADDOCK		0-2	4E	SA	55	34.0	NA	16.0	33.0	12.0	NA	NA	1.5	0.54	24.1	38.0
MADDOCK		0-2	4S	SA	102	43.0	NA	NA	39.0	12.0	NA	NA	1.6	0.70	31.3	41.9
MADDOCK		2-6	4E	SA	53	31.0	NA	14.0	28.0	10.0	NA	NA	1.3	0.50	22.3	32.9
MADDOCK		2-6	4E	SA	55	32.0	NA	15.0	31.0	11.0	NA	NA	1.4	0.54	24.1	35.4

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SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
MADDOCK		2-6	4S	SA	102	41.0	NA	NA	37.0	11.0	NA	NA	1.5	0.70	31.3	39.4
MADDOCK		6-15	6E	SA	53	NA	NA	NA	NA	NA	NA	NA	NA	0.45	20.1	20.1
MADDOCK		6-15	6E	SA	55	NA	NA	NA	NA	NA	NA	NA	NA	0.51	22.8	22.8
MADDOCK		6-15	6S	SA	102	NA	NA	NA	NA	NA	NA	NA	NA	0.60	26.8	26.8
MADDOCK	E	0-2	4E	SA	53	27.0	NA	13.0	28.0	10.0	NA	NA	1.2	0.50	22.3	31.1
MADDOCK	E	0-2	4E	SA	55	27.0	NA	14.0	28.0	NA	NA	NA	1.3	0.54	24.1	31.3
MADDOCK	E	0-2	4E	SA	102	38.0	NA	NA	37.0	11.0	NA	NA	1.3	0.70	31.3	37.4
MADDOCK	E	2-6	6E	SA	102	NA	NA	NA	NA	NA	NA	NA	NA	0.60	26.8	26.8
MAITLAND		9-25	6E	VS	61	NA	NA	NA	NA	NA	NA	NA	NA	0.14	6.3	6.3
MAITLAND		9-25	6E	VS	62	NA	NA	NA	NA	NA	NA	NA	NA	0.19	8.5	8.5
MAITLAND		25-40	7E	VS	61	NA	NA	NA	NA	NA	NA	NA	NA	0.11	4.9	4.9
MAITLAND		25-40	7E	VS	62	NA	NA	NA	NA	NA	NA	NA	NA	0.15	6.7	6.7
MANDAN		0-6	2E	SI	53	34.0	NA	23.0	46.0	15.0	NA	NA	2.0	0.50	22.3	48.8
MANDAN		6-9	3E	SI	53	29.0	NA	NA	39.0	NA	NA	NA	1.7	0.45	20.1	37.7
MANNING		0-2	3E	SY	54	NA	27.0	21.0	37.0	NA	NA	NA	1.3	0.35	15.6	46.0
MANNING		2-6	3E	SY	54	NA	25.0	20.0	34.0	NA	NA	NA	1.2	0.35	15.6	42.8
MANTER		0-2	3E	SY	63	31.0	31.0	NA	38.0	NA	NA	NA	1.4	0.45	20.1	43.9
MANTER		0-2	3E	SY	64	29.0	30.0	NA	36.0	NA	NA	NA	1.4	0.40	17.9	42.3
MANTER		0-2	3E	SY	65	NA	NA	NA	33.0	NA	NA	NA	1.3	0.40	17.9	33.2
MANTER		0-2	3E	SY	66	33.0	32.0	NA	41.0	NA	NA	NA	1.5	0.46	20.6	46.4
MANTER		0-2	4E	SY	60	NA	24.0	NA	30.0	NA	NA	NA	1.1	0.34	15.2	37.2
MANTER		0-2	4E	SY	61	NA	30.0	NA	35.0	NA	NA	NA	1.4	0.37	16.5	45.8
MANTER		2-6	3E	SY	63	29.0	28.0	NA	36.0	NA	NA	NA	1.3	0.41	18.3	40.6
MANTER		2-6	3E	SY	64	28.0	28.0	NA	33.0	NA	NA	NA	1.3	0.37	16.5	39.5
MANTER		2-6	3E	SY	65	NA	NA	NA	29.0	NA	NA	NA	1.2	0.37	16.5	29.5
MANTER		2-6	3E	SY	66	30.0	30.0	NA	37.0	NA	NA	NA	1.4	0.43	19.2	42.8
MANTER		2-6	4E	SY	60	NA	22.0	NA	29.0	NA	NA	NA	1.0	0.30	13.4	34.6
MANTER		2-6	4E	SY	61	NA	28.0	NA	31.0	NA	NA	NA	1.3	0.35	15.6	42.0
MANTER		6-9	4E	SY	63	NA	24.0	NA	30.0	NA	NA	NA	1.1	0.39	17.4	37.2
MANTER		6-9	4E	SY	64	NA	24.0	NA	27.0	NA	NA	NA	1.0	0.35	15.6	35.3
MANTER		6-9	4E	SY	65	NA	NA	NA	25.0	NA	NA	NA	1.0	0.35	15.6	25.4
MANTER		6-9	4E	SY	66	NA	25.0	NA	31.0	NA	NA	NA	1.3	0.40	17.9	39.8
MANTER		6-15	6E	SY	60	NA	NA	NA	NA	NA	NA	NA	NA	0.30	13.4	13.4
MANTER		6-15	6E	SY	61	NA	NA	NA	NA	NA	NA	NA	NA	0.35	15.6	15.6
MANVEL		0-2	3E	TU	64	NA	28.0	NA	27.0	NA	NA	NA	1.2	0.34	15.2	39.8
MANVEL		0-2	4E	TU	60	NA	22.0	NA	23.0	NA	NA	NA	1.1	0.35	15.6	33.1
MANVEL		0-2	4E	TU	61	NA	25.0	NA	26.0	NA	NA	NA	1.2	0.29	13.0	37.2
MANVEL		2-6	4E	TU	60	NA	22.0	NA	22.0	NA	NA	NA	0.9	0.31	13.9	31.2
MANVEL		2-6	4E	TU	61	NA	23.0	NA	24.0	NA	NA	NA	1.0	0.26	11.6	33.5
MANVEL		2-6	4E	TU	64	NA	25.0	NA	24.0	NA	NA	NA	1.1	0.32	14.3	35.7

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APPENDIX TABLE D-1. RATINGS DEVELOPED FROM CROP AND RANGE YIELD ESTIMATES FOR SOUTH DAKOTA SOILS*

SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
MANVEL		6-9	4E	TU	64	NA	23.0	NA	22.0	NA	NA	NA	0.9	0.32	14.3	32.0
MANVEL		6-25	6E	TU	60	NA	NA	NA	NA	NA	NA	NA	NA	0.28	12.5	12.5
MANVEL		6-25	6E	TU	61	NA	NA	NA	NA	NA	NA	NA	NA	0.24	10.7	10.7
MANVEL		9-25	6E	TU	64	NA	NA	NA	NA	NA	NA	NA	NA	0.30	13.4	13.4
MARMARTH		0-2	3C	SI	58	NA	NA	23.0	39.0	NA	NA	NA	1.4	0.32	14.3	44.6
MARMARTH		2-6	3E	SI	58	NA	NA	22.0	35.0	NA	NA	NA	1.3	0.31	13.9	41.5
MARMARTH		6-9	4E	SI	58	NA	NA	18.0	32.0	NA	NA	NA	1.1	0.29	13.0	35.5
MARYSLAND	DF	0-2	2W	SB	102	59.0	NA	NA	67.0	16.0	NA	20.0	3.0	1.40	62.6	62.5
MARYSLAND	DNF	0-2	4W	SB	102	NA	NA	NA	NA	NA	NA	NA	NA	1.40	62.6	62.6
MAWER		0-2	4E	SY	61	NA	24.0	15.0	25.0	NA	NA	NA	1.2	0.35	15.6	36.6
MAWER		2-6	4E	SY	61	NA	NA	NA	NA	NA	NA	NA	1.1	0.35	15.6	25.4
MAX		0-2	2C	SI	53	37.0	NA	26.0	55.0	16.0	NA	NA	2.1	0.48	21.4	54.1
MAX		2-6	2E	SI	53	35.0	NA	25.0	53.0	15.0	NA	NA	2.0	0.48	21.4	51.6
MAX		6-9	3E	SI	53	NA	NA	23.0	48.0	13.0	NA	NA	1.7	0.46	20.6	49.1
MAX		9-15	4E	SI	53	NA	NA	17.0	43.0	11.0	NA	NA	1.5	0.44	19.7	41.0
MAX		15-25	6E	SI	53	NA	NA	NA	NA	NA	NA	NA	NA	0.42	18.8	18.8
MC COOK		0-2	2C	OV	63	46.0	NA	NA	54.0	NA	50.0	NA	2.5	0.76	34.0	56.3
MC COOK		0-2	2C	OV	55	60.0	36.0	NA	65.0	NA	62.0	NA	3.1	0.94	42.0	71.9
MCKENZIE		0-2	6S	CD	54	NA	NA	NA	NA	NA	NA	NA	NA	0.75	33.5	33.5
MCKENZIE		0-2	6S	CD	58	NA	NA	NA	NA	NA	NA	NA	NA	0.62	27.7	27.7
MCPAUL		0-2	1	OV	102	90.0	NA	NA	84.0	NA	85.0	31.0	4.0	1.25	55.9	91.9
METRE		0-2	3S	CY	64	23.0	26.0	NA	29.0	NA	23.0	NA	1.2	0.37	16.5	33.7
METRE		0-2	4S	CY	60	NA	20.0	17.0	23.0	NA	NA	NA	1.1	0.31	13.9	34.5
METRE		2-6	3E	CY	64	NA	23.0	NA	28.0	NA	22.0	NA	1.1	0.37	16.5	33.3
METRE		2-6	4E	CY	60	NA	19.0	15.0	21.0	NA	NA	NA	0.9	0.31	13.9	31.0
METRE		6-9	4E	CY	64	NA	NA	NA	24.0	NA	13.0	NA	1.0	0.33	14.7	21.7
METRE		6-9	6E	CY	60	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
MIDWAY		2-15	6S	SW	60	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
MIDWAY		2-15	6S	SW	61	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
MIDWAY		15-40	7S	SW	60	NA	NA	NA	NA	NA	NA	NA	NA	0.22	9.8	9.8
MIDWAY		15-40	7S	SW	61	NA	NA	NA	NA	NA	NA	NA	NA	0.23	10.3	10.3
MILLBORO		0-2	3S	CY	63	38.0	40.0	NA	52.0	NA	51.0	NA	2.0	0.46	20.6	58.5
MILLBORO		2-6	3E	CY	63	36.0	37.0	NA	50.0	NA	48.0	NA	1.9	0.38	17.0	55.1
MILLBORO		6-9	4E	CY	63	31.0	32.0	NA	43.0	NA	39.0	NA	1.6	0.35	15.6	46.8
MILLBORO		9-15	6E	CY	63	NA	NA	NA	NA	NA	NA	NA	1.5	0.33	14.7	34.6
MINATARE		0-2	6S	TCP	60	NA	NA	NA	NA	NA	NA	NA	NA	0.19	8.5	8.5
MINATARE		0-2	6S	TCP	63	NA	NA	NA	NA	NA	NA	NA	NA	0.22	9.8	9.8
MINATARE		0-2	6S	TCP	64	NA	NA	NA	NA	NA	NA	NA	NA	0.24	10.7	10.7
MINNEQUA		0-2	4E	TU	60	NA	23.0	NA	22.0	NA	NA	NA	0.9	0.28	12.5	32.0
MINNEQUA		0-2	4E	TU	61	NA	24.0	NA	25.0	NA	NA	NA	1.1	0.30	13.4	35.3

* A RANGE RATING (COLUMN 16) WAS COMPUTED FOR SOILS IN ALL CAPABILITY CLASSES (COLUMN 4). A CROP RATING WAS COMPUTED FOR SOILS IN CAPABILITY CLASSES 1 THROUGH 4. COLUMN 17 HEADED 'SOIL RATING' IS THE CROP RATING IF THE SOIL IS IN CAPABILITY CLASSES 1 THROUGH 4. THE RANGE RATING IS THE SOIL RATING FOR SOIL UNITS IN CAPABILITY CLASSES 5 THROUGH 7. SEE APPENDIX D DISCUSSION FOR RESTRICTIONS REGARDING THE USE OF THIS TABLE. ABBREVIATIONS USED IN THE TABLE ARE DEFINED AT THE END OF THE TABLE. CROP YIELDS BASED ON HIGH LEVEL OF MANAGEMENT, RANGE YIELDS BASED ON GOOD TO FAIR CONDITIONS. NA=CROP NOT ADAPTED OR WIDELY GROWN.

** COLUMN NUMBER

APPENDIX TABLE D-1. RATINGS DEVELOPED FROM CROP AND RANGE YIELD ESTIMATES FOR SOUTH DAKOTA SOILS*

SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
MINNEQUA		2-6	4E	TU	60	NA	21.0	NA	20.0	NA	NA	NA	0.8	0.28	12.5	29.0
MINNEQUA		2-6	4E	TU	61	NA	22.0	NA	23.0	NA	NA	NA	1.0	0.27	12.1	32.4
MINNEQUA		6-25	6E	TU	60	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
MINNEQUA		6-25	6E	TU	61	NA	NA	NA	NA	NA	NA	NA	NA	0.24	10.7	10.7
MIRANDA		0-2	6S	TCP	53	NA	NA	NA	NA	NA	NA	NA	NA	0.24	10.7	10.7
MIRANDA		0-2	6S	TCP	55	NA	NA	NA	NA	NA	NA	NA	NA	0.26	11.6	11.6
MIRANDA		0-2	6S	TCP	102	NA	NA	NA	NA	NA	NA	NA	NA	0.36	16.1	16.1
MITCHELL		0-2	3E	TU	63	33.0	24.0	NA	39.0	NA	35.0	NA	1.8	0.33	14.7	42.8
MITCHELL		0-2	3E	TU	64	28.0	23.0	NA	33.0	NA	NA	NA	1.7	0.31	13.9	39.0
MITCHELL		0-2	4E	TU	60	26.0	23.0	NA	32.0	NA	NA	NA	1.5	0.28	12.5	37.1
MODALE		0-2	1	SI	102	92.0	NA	NA	80.0	NA	80.0	29.0	4.2	0.68	30.4	90.2
MONDAMIN		0-2	2S	CY	53	38.0	NA	25.0	57.0	17.0	NA	NA	2.0	0.52	23.2	54.5
MONDAMIN		2-6	3E	CY	53	37.0	NA	23.0	54.0	16.0	NA	NA	1.9	0.50	22.3	51.4
MONDAMIN		6-9	4E	CY	53	32.0	NA	17.0	48.0	NA	NA	NA	1.7	0.48	21.4	42.3
MOODY		0-2	1	SI	102	87.0	NA	NA	80.0	23.0	76.0	37.0	4.0	0.68	30.4	89.5
MOODY		2-6	2E	SI	102	81.0	NA	NA	77.0	21.0	74.0	33.0	3.9	0.63	28.2	84.3
MOODY		6-9	3E	SI	102	71.0	NA	NA	67.0	17.0	66.0	24.0	3.6	0.61	27.3	71.8
MOODY		9-15	4E	SI	102	54.0	NA	NA	52.0	NA	NA	NA	3.0	0.57	25.5	61.3
MOODY	E	2-6	3E	SI	102	71.0	NA	NA	52.0	18.0	73.0	28.0	3.3	0.61	27.3	71.5
MOODY	E	6-9	4E	SI	102	61.0	NA	NA	49.0	NA	60.0	22.0	3.0	0.57	25.5	63.0
MOODY	E	9-15	6E	SI	102	NA	NA	NA	NA	NA	NA	NA	NA	0.54	24.1	24.1
MOREAU		0-2	3S	CY	58	NA	NA	21.0	36.0	NA	NA	NA	1.4	0.31	13.9	41.8
MOREAU		2-6	3E	CY	54	NA	NA	24.0	40.0	NA	NA	NA	1.4	0.33	14.7	45.8
MOREAU		2-6	4E	CY	58	NA	NA	20.0	35.0	NA	NA	NA	1.3	0.29	13.0	39.8
MOREAU		6-9	4E	CY	54	NA	NA	20.0	37.0	NA	NA	NA	1.2	0.31	13.9	39.8
MOREAU		6-25	6E	CY	58	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
MOREAU		9-25	6E	CY	54	NA	NA	NA	NA	NA	NA	NA	NA	0.29	13.0	13.0
MOREAU		25-40	7E	CY	54	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
MOREAU		25-40	7E	CY	58	NA	NA	NA	NA	NA	NA	NA	NA	0.24	10.7	10.7
MORTON		0-2	2C	SI	54	34.0	32.0	28.0	48.0	NA	NA	NA	1.7	0.38	17.0	54.0
MORTON		2-6	2E	SI	54	32.0	30.0	26.0	46.0	NA	NA	NA	1.7	0.35	15.6	51.3
MORTON		6-9	3E	SI	54	NA	28.0	23.0	39.0	NA	NA	NA	1.5	0.35	15.6	49.5
MORTON		9-15	4E	SI	54	NA	21.0	20.0	32.0	NA	NA	NA	1.3	0.31	13.9	40.6
MOSHER		0-2	4S	CP	53	17.0	25.0	15.0	32.0	NA	24.0	NA	1.2	0.33	14.7	33.8
MOSHER		0-2	4S	CP	60	NA	17.0	NA	20.0	NA	NA	NA	1.1	0.19	8.5	28.4
MOSHER		0-2	4S	CP	61	30.0	21.0	NA	30.0	NA	NA	NA	1.3	0.31	13.9	35.3
MOSHER		0-2	4S	CP	63	NA	21.0	NA	30.0	NA	22.0	NA	1.3	0.31	13.9	33.9
MOSHER		0-2	4S	CP	64	NA	22.0	NA	28.0	NA	19.0	NA	1.2	0.30	13.4	32.4
MOSHER		2-6	4S	CP	63	NA	18.0	NA	27.0	NA	NA	NA	1.1	0.28	12.5	31.7
MOSHER		2-6	4S	CP	64	NA	20.0	NA	27.0	NA	NA	NA	1.0	0.28	12.5	32.4

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SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
MOSHER		2-6	6S	CP	60	NA	NA	NA	NA	NA	NA	NA	NA	0.19	8.5	8.5
MOSHER		2-6	6S	CP	61	NA	NA	NA	NA	NA	NA	NA	NA	0.31	13.9	13.9
MOSHER		6-9	6E	CP	60	NA	NA	NA	NA	NA	NA	NA	NA	0.16	7.1	7.1
MOSHER		6-9	6E	CP	61	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
MOSHER		6-9	6E	CP	64	NA	NA	NA	NA	NA	NA	NA	NA	0.24	10.7	10.7
MUNJOR		0-2	3E	OV	53	38.0	38.0	NA	48.0	NA	38.0	NA	1.8	0.89	39.8	52.7
MUNJOR		0-2	3E	OV	55	45.0	40.0	NA	52.0	NA	47.0	NA	2.4	0.97	43.3	60.9
MUNJOR		0-2	3E	OV	63	36.0	36.0	NA	47.0	NA	34.0	NA	1.7	0.81	36.2	49.8
MURDO		0-6	4S	SWG	63	17.0	18.0	NA	21.0	NA	NA	NA	0.7	0.25	11.2	24.3
MURDO		0-6	4S	SWG	64	NA	18.0	NA	22.0	NA	NA	NA	0.7	0.32	14.3	26.7
MURDO		0-9	6S	SWG	60	NA	NA	NA	NA	NA	NA	NA	NA	0.22	9.8	9.8
MURDO		6-25	6S	SWG	63	NA	NA	NA	NA	NA	NA	NA	NA	0.23	10.3	10.3
MURDO		6-25	6S	SWG	64	NA	NA	NA	NA	NA	NA	NA	NA	0.30	13.4	13.4
MURDO		9-40	7S	SWG	60	NA	NA	NA	NA	NA	NA	NA	NA	0.19	8.5	8.5
MURDO		25-40	7S	SWG	63	NA	NA	NA	NA	NA	NA	NA	NA	0.20	8.9	8.9
MURDO		25-40	7S	SWG	64	NA	NA	NA	NA	NA	NA	NA	NA	0.28	12.5	12.5
NAHON		0-2	4S	CP	55	28.0	NA	16.0	32.0	NA	NA	NA	1.4	0.33	14.7	34.5
NAHON		0-2	4S	CP	102	36.0	NA	NA	41.0	14.0	NA	NA	1.8	0.48	21.4	43.5
NAPA		0-2	6W	SL	102	NA	NA	NA	NA	NA	NA	NA	NA	0.80	35.7	35.7
NEVEE		2-6	4E	TU	61	NA	NA	NA	NA	NA	NA	NA	NA	0.32	14.3	14.3
NEVEE		6-25	6E	TU	61	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
NIOBELL		0-2	3S	CY	53	31.0	NA	24.0	54.0	15.0	NA	NA	1.7	0.46	20.6	49.1
NIOBELL		0-2	3S	CY	55	37.0	NA	27.0	53.0	NA	NA	NA	1.9	0.50	22.3	52.5
NIOBELL		2-6	3E	CY	53	30.0	NA	22.0	52.0	14.0	NA	NA	1.6	0.46	20.6	46.2
NIOBELL		2-6	3E	CY	55	32.0	NA	24.0	52.0	NA	NA	NA	1.8	0.50	22.3	48.5
NISHON		0-2	4W	CD	53	NA	NA	NA	NA	NA	NA	NA	NA	0.86	38.4	38.4
NOONAN		0-2	4S	CP	53	NA	NA	15.0	29.0	NA	NA	NA	1.2	0.28	12.5	32.6
NOONAN		0-2	4S	CP	55	NA	NA	16.0	30.0	NA	NA	NA	1.3	0.31	13.9	34.6
NOONAN		2-6	4S	CP	53	NA	NA	14.0	27.0	NA	NA	NA	1.1	0.28	12.5	30.3
NOONAN		2-6	4S	CP	55	NA	NA	NA	28.0	NA	NA	NA	1.2	0.27	12.1	29.3
NORA		0-2	1	SI	102	70.0	NA	NA	67.0	21.0	NA	28.0	3.5	0.68	30.4	74.7
NORA		2-6	2E	SI	102	67.0	NA	NA	62.0	19.0	65.0	27.0	3.4	0.63	28.2	71.7
NORA		6-9	3E	SI	102	58.0	NA	NA	52.0	18.0	56.0	26.0	3.1	0.61	27.3	64.3
NORA		9-15	4E	SI	102	42.0	NA	NA	40.0	NA	46.0	NA	2.7	0.53	23.7	51.3
NORA		15-25	6E	SI	102	NA	NA	NA	NA	NA	NA	NA	NA	0.43	19.2	19.2
NORA	E	2-6	3E	SI	102	61.0	NA	NA	54.0	18.0	57.0	26.0	3.2	0.61	27.3	65.8
NORA	E	6-9	4E	SI	102	49.0	NA	NA	48.0	NA	49.0	22.0	2.8	0.53	23.7	56.7
NORA	E	9-15	6E	SI	102	NA	NA	NA	NA	NA	NA	NA	NA	0.43	19.2	19.2
NORREST		0-2	3S	CY	64	26.0	29.0	NA	35.0	NA	26.0	NA	1.5	0.33	14.7	39.1
NORREST		0-2	4S	CY	60	NA	23.0	NA	24.0	NA	NA	NA	1.1	0.31	13.9	34.2

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SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
NORREST		2-6	3E	CY	64	24.0	28.0	NA	33.0	NA	25.0	NA	1.4	0.33	14.7	37.1
NORREST		2-6	4E	CY	60	NA	21.0	NA	23.0	NA	NA	NA	1.0	0.29	13.0	31.6
NORREST		6-9	4E	CY	64	20.0	24.0	NA	31.0	NA	18.0	NA	1.2	0.28	12.5	31.5
NORREST		6-25	6E	CY	60	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
NORREST		9-15	4E	CY	64	NA	NA	NA	NA	NA	13.0	NA	1.0	0.25	11.2	19.2
NORREST		15-25	6E	CY	64	NA	NA	NA	NA	NA	NA	NA	NA	0.23	10.3	10.3
NORREST		25-40	7E	CY	64	NA	NA	NA	NA	NA	NA	NA	NA	0.20	8.9	8.9
NUTLEY		0-2	2S	CY	55	53.0	NA	27.0	66.0	17.0	NA	NA	2.8	0.54	24.1	64.4
NUTLEY		0-2	2S	CY	102	71.0	NA	NA	76.0	22.0	NA	23.0	2.9	0.68	30.4	72.3
NUTLEY		2-6	3E	CY	55	50.0	NA	24.0	64.0	15.0	NA	NA	2.8	0.50	22.3	60.4
NUTLEY		2-6	3E	CY	102	68.0	NA	NA	74.0	18.0	NA	21.0	2.8	0.64	28.6	67.0
NUTLEY		6-9	3E	CY	102	57.0	NA	NA	67.0	NA	NA	20.0	2.7	0.61	27.3	61.9
NUTLEY		6-9	4E	CY	55	46.0	NA	22.0	59.0	NA	NA	NA	2.7	0.48	21.4	58.0
NUTLEY		9-15	4E	CY	102	51.0	NA	NA	57.0	NA	NA	NA	2.5	0.59	26.4	58.2
NUTLEY		9-15	6E	CY	55	38.0	NA	19.0	48.0	NA	NA	NA	2.4	0.43	19.2	49.2
O NEILL		0-2	3E	SY	66	33.0	32.0	NA	41.0	NA	NA	NA	1.5	0.46	20.6	46.4
O NEILL		2-6	3E	SY	66	30.0	30.0	NA	37.0	NA	NA	NA	1.4	0.43	19.2	42.8
OAHE		0-2	3S	SI	53	30.0	NA	21.0	44.0	12.0	31.0	NA	1.2	0.47	21.0	40.0
OAHE		0-2	3S	SI	63	29.0	29.0	20.0	41.0	NA	27.0	NA	1.1	0.39	17.4	41.4
OAHE		2-6	3E	SI	53	28.0	NA	19.0	41.0	11.0	29.0	NA	1.1	0.43	19.2	36.9
OAHE		2-6	3E	SI	63	28.0	25.0	17.0	38.0	NA	25.0	NA	1.0	0.36	16.1	37.1
OAHE		6-9	4E	SI	53	24.0	NA	14.0	33.0	NA	20.0	NA	0.9	0.39	17.4	28.4
OAHE		6-9	4E	SI	63	23.0	21.0	14.0	31.0	NA	19.0	NA	0.9	0.33	14.7	30.6
OAHE		9-15	6E	SI	53	NA	NA	NA	NA	NA	NA	NA	NA	0.37	16.5	16.5
OAK LAKE		0-2	1	SI	102	82.0	NA	NA	92.0	24.0	NA	28.0	3.2	0.68	30.4	83.5
OAK LAKE		2-6	2E	SI	102	78.0	NA	NA	75.0	20.0	NA	26.0	3.0	0.68	30.4	74.2
OBURN		0-2	4S	CP	58	NA	18.0	12.0	28.0	NA	NA	NA	0.8	0.19	8.5	29.9
OBURN		2-9	6S	CP	58	NA	NA	NA	NA	NA	NA	NA	NA	0.19	8.5	8.5
OGALALA		2-6	2E	SI	64	28.0	37.0	NA	41.0	NA	NA	NA	1.5	0.37	16.5	47.8
OGALALA		2-6	3E	SI	60	19.0	29.0	NA	29.0	NA	NA	NA	1.3	0.32	14.3	36.6
OGALALA		6-9	3E	SI	64	21.0	32.0	NA	37.0	NA	NA	NA	1.3	0.35	15.6	41.0
OGALALA		6-9	4E	SI	60	NA	NA	NA	26.0	NA	NA	NA	1.1	0.29	13.0	27.1
OGALALA		9-15	4E	SI	64	NA	NA	NA	33.0	NA	NA	NA	1.1	0.33	14.7	30.9
OGALALA		9-25	6E	SI	60	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
OGALALA		15-25	6E	SI	64	NA	NA	NA	NA	NA	NA	NA	NA	0.31	13.9	13.9
OKO		0-2	3S	CY	53	24.0	NA	20.0	50.0	15.0	44.0	NA	1.8	0.50	22.3	46.3
OKO		0-2	3S	CY	55	32.0	NA	22.0	51.0	15.0	NA	NA	1.9	0.54	24.1	48.5
OKO		2-6	3E	CY	53	23.0	NA	19.0	49.0	14.0	41.0	NA	1.6	0.47	21.0	43.5
OKO		2-6	3E	CY	55	31.0	NA	21.0	49.0	15.0	NA	NA	1.8	0.54	24.1	46.9
OKO		6-9	4E	CY	53	NA	NA	17.0	43.0	13.0	34.0	NA	1.4	0.45	20.1	41.8

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** COLUMN NUMBER

APPENDIX TABLE D-1. RATINGS DEVELOPED FROM CROP AND RANGE YIELD ESTIMATES FOR SOUTH DAKOTA SOILS*

SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
OKO		6-9	4E	CY	55	NA	NA	17.0	40.0	13.0	NA	NA	1.6	0.51	22.8	42.5
OKO		9-15	6E	CY	53	NA	NA	NA	NA	NA	NA	NA	NA	0.41	18.3	18.3
OKO		9-15	6E	CY	55	NA	NA	NA	NA	NA	NA	NA	NA	0.47	21.0	21.0
OKREEK		0-2	3S	CY	63	44.0	36.0	NA	53.0	NA	37.0	NA	2.1	0.40	17.9	55.4
OKREEK		0-2	3S	CY	64	39.0	35.0	NA	48.0	NA	35.0	NA	1.8	0.32	14.3	50.9
OKREEK		0-2	3S	CY	66	40.0	36.0	NA	49.0	NA	36.0	NA	1.8	0.40	17.9	52.0
OKREEK		2-6	3E	CY	63	41.0	34.0	NA	51.0	NA	34.0	NA	2.0	0.40	17.9	52.2
OKREEK		2-6	3E	CY	64	37.0	32.0	NA	46.0	NA	33.0	NA	1.7	0.32	14.3	47.8
OKREEK		2-6	3E	CY	66	38.0	33.0	NA	47.0	NA	34.0	NA	1.7	0.40	17.9	48.9
OKREEK		6-9	4E	CY	63	NA	32.0	NA	44.0	NA	27.0	NA	1.8	0.37	16.5	48.2
OKREEK		6-9	4E	CY	64	NA	29.0	NA	41.0	NA	26.0	NA	1.6	0.30	13.4	44.3
OKREEK		6-9	4E	CY	66	NA	30.0	NA	42.0	NA	27.0	NA	1.6	0.38	17.0	45.4
OKREEK		9-15	6E	CY	63	NA	NA	NA	NA	NA	NA	NA	NA	0.34	15.2	15.2
OKREEK		9-15	6E	CY	64	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
OKREEK		9-15	6E	CY	66	NA	NA	NA	NA	NA	NA	NA	NA	0.35	15.6	15.6
OLDHAM	DF	0-2	2W	OV	102	54.0	NA	NA	69.0	15.0	NA	NA	2.8	1.13	50.5	62.7
OLDHAM	DNF	0-2	4W	OV	55	NA	NA	NA	NA	NA	NA	NA	NA	0.94	42.0	42.0
OLDHAM	DNF	0-2	4W	OV	102	NA	NA	NA	NA	NA	NA	NA	NA	1.13	50.5	50.5
OMADI		0-2	1	SI	102	90.0	NA	NA	84.0	NA	86.0	31.0	4.0	0.68	30.4	92.2
ONAWA	DF	0-2	2W	OV	102	75.0	NA	NA	57.0	NA	65.0	28.0	3.6	1.33	59.4	74.7
ONAWA	DNF	0-2	4W	OV	102	NA	NA	NA	NA	NA	NA	NA	NA	1.33	59.4	59.4
ONITA		0-2	2C	OV	53	50.0	NA	29.0	63.0	19.0	63.0	NA	2.8	0.97	43.3	67.0
ONITA		0-2	2C	OV	55	57.0	NA	29.0	70.0	19.0	67.0	NA	2.9	0.94	42.0	70.7
ONITA		0-2	2C	OV	63	46.0	42.0	NA	60.0	NA	58.0	NA	2.5	0.85	38.0	66.8
ONITA		2-6	2E	SI	53	45.0	NA	26.0	58.0	18.0	60.0	NA	2.6	0.54	24.1	62.0
ONITA		2-6	2E	SI	55	46.0	NA	26.0	65.0	18.0	64.0	NA	2.7	0.57	25.5	64.6
ONITA		2-6	2E	SI	63	40.0	38.0	NA	55.0	NA	55.0	NA	2.2	0.43	19.2	60.6
OPAL		0-2	3S	CY	63	26.0	35.0	22.0	44.0	NA	35.0	NA	1.4	0.42	18.8	47.2
OPAL		2-6	3E	CY	63	25.0	31.0	21.0	41.0	NA	33.0	NA	1.4	0.38	17.0	44.2
OPAL		6-9	4E	CY	63	21.0	26.0	17.0	33.0	NA	24.0	NA	1.3	0.35	15.6	36.3
OPAL		9-25	6E	CY	63	NA	NA	NA	NA	NA	NA	NA	NA	0.31	13.9	13.9
OPAL		25-40	7E	CY	63	NA	NA	NA	NA	NA	NA	NA	NA	0.28	12.5	12.5
ORELLA		0-15	6S	DC	60	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
ORELLA		0-15	6S	DC	64	NA	NA	NA	NA	NA	NA	NA	NA	0.30	13.4	13.4
ORELLA		15-40	7S	DC	60	NA	NA	NA	NA	NA	NA	NA	NA	0.23	10.3	10.3
ORELLA		15-40	7S	DC	64	NA	NA	NA	NA	NA	NA	NA	NA	0.28	12.5	12.5
ORTON		0-2	3E	SY	53	22.0	NA	19.0	36.0	NA	26.0	NA	1.1	0.47	21.0	33.5
ORTON		2-6	3E	SY	53	NA	NA	15.0	33.0	NA	22.0	NA	1.0	0.45	20.1	30.9
ORTON		6-9	4E	SY	53	NA	NA	NA	NA	NA	15.0	NA	1.0	0.43	19.2	20.4
ORTON		9-15	6E	SY	53	NA	NA	NA	NA	NA	NA	NA	NA	0.41	18.3	18.3

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SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
ORWET		0-2	4W	SB	65	NA	NA	NA	NA	NA	NA	NA	NA	1.31	58.5	58.5
PAKA		0-2	2C	SI	65	34.0	NA	NA	46.0	NA	NA	NA	1.4	0.37	16.5	39.7
PAKA		0-2	2C	SI	66	44.0	40.0	NA	52.0	NA	55.0	NA	2.0	0.45	20.1	60.7
PAKA		2-6	2E	SI	65	32.0	NA	NA	43.0	NA	NA	NA	1.3	0.33	14.7	37.1
PAKA		2-6	2E	SI	66	42.0	38.0	NA	50.0	NA	53.0	NA	1.8	0.43	19.2	57.6
PAKA		6-9	3E	SI	65	26.0	NA	NA	36.0	NA	NA	NA	1.1	0.31	13.9	30.9
PAKA		6-9	3E	SI	66	38.0	34.0	NA	45.0	NA	47.0	NA	1.6	0.41	18.3	51.5
PAKA		9-15	4E	SI	65	NA	NA	NA	NA	NA	NA	NA	NA	0.29	13.0	13.0
PAKA		9-15	4E	SI	66	NA	NA	NA	NA	NA	NA	NA	NA	0.39	17.4	17.4
PARNELL	DF	0-2	3W	WL	53	53.0	NA	NA	55.0	16.0	NA	NA	2.8	0.80	35.7	59.4
PARNELL	DF	0-2	3W	WL	55	51.0	NA	NA	61.0	16.0	NA	NA	2.9	0.85	38.0	61.1
PARNELL	DF	0-2	3W	WL	102	62.0	NA	NA	67.0	16.0	NA	NA	2.8	1.00	44.7	65.1
PARNELL	DNF	0-2	5W	WL	53	NA	NA	NA	NA	NA	NA	NA	NA	0.80	35.7	35.7
PARNELL	DNF	0-2	5W	WL	55	NA	NA	NA	NA	NA	NA	NA	NA	0.85	38.0	38.0
PARNELL	DNF	0-2	5W	WL	102	NA	NA	NA	NA	NA	NA	NA	NA	1.00	44.7	44.7
PARSHALL		0-2	3E	SY	54	35.0	31.0	23.0	42.0	NA	NA	NA	1.9	0.38	17.0	50.8
PARSHALL		0-2	4E	SY	58	NA	23.0	19.0	33.0	NA	NA	NA	1.6	0.30	13.4	43.1
PARSHALL		2-6	3E	SY	54	33.0	28.0	21.0	39.0	NA	NA	NA	1.8	0.35	15.6	47.0
PARSHALL		2-6	4E	SY	58	NA	21.0	15.0	31.0	NA	NA	NA	1.5	0.27	12.1	38.3
PARSHALL		6-9	4E	SY	54	NA	NA	NA	NA	NA	NA	NA	NA	0.33	14.7	14.7
PEEVER		0-2	2S	CY	55	55.0	NA	33.0	63.0	17.0	NA	NA	2.6	0.56	25.0	66.3
PEEVER		0-2	2S	CY	102	64.0	NA	NA	71.0	19.0	NA	22.0	2.8	0.68	30.4	66.7
PEEVER		2-6	3E	CY	55	53.0	NA	31.0	61.0	16.0	NA	NA	2.5	0.56	25.0	63.2
PEEVER		2-6	3E	CY	102	63.0	NA	NA	68.0	17.0	NA	20.0	2.7	0.65	29.0	62.9
PEEVER		6-9	3E	CY	102	54.0	NA	NA	58.0	NA	NA	NA	2.4	0.62	27.7	58.9
PEEVER		6-9	4E	CY	55	43.0	NA	26.0	51.0	NA	NA	NA	2.2	0.52	23.2	54.7
PENO		2-6	3E	CY	53	29.0	NA	17.0	39.0	14.0	29.0	NA	1.6	0.50	22.3	39.5
PENO		2-6	3E	CY	55	37.0	NA	19.0	44.0	14.0	NA	NA	2.0	0.54	24.1	46.3
PENO		6-9	4E	CY	53	28.0	NA	16.0	37.0	NA	24.0	NA	1.5	0.47	21.0	34.8
PENO		6-9	4E	CY	55	34.0	NA	17.0	39.0	NA	NA	NA	1.8	0.54	24.1	41.0
PENO		6-25	6E	CY	53	NA	NA	NA	NA	NA	NA	NA	NA	0.45	20.1	20.1
PENO		9-25	6E	CY	55	NA	NA	NA	NA	NA	NA	NA	NA	0.50	22.3	22.3
PENROSE		0-15	6S	SW	61	NA	NA	NA	NA	NA	NA	NA	NA	0.30	13.4	13.4
PENROSE		0-15	6S	SW	64	NA	NA	NA	NA	NA	NA	NA	NA	0.32	14.3	14.3
PENROSE		15-40	7S	SW	61	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
PENROSE		15-40	7S	SW	64	NA	NA	NA	NA	NA	NA	NA	NA	0.30	13.4	13.4
PERCIVAL		0-2	2W	CY	102	70.0	NA	NA	58.0	NA	65.0	28.0	3.1	0.68	30.4	71.5
PIERRE		0-2	3S	CY	63	23.0	26.0	21.0	31.0	NA	26.0	NA	1.3	0.44	19.7	38.4
PIERRE		0-2	4S	CY	60	17.0	21.0	18.0	24.0	NA	NA	NA	1.1	0.34	15.2	32.4
PIERRE		0-2	4S	CY	61	NA	25.0	21.0	30.0	NA	NA	NA	1.3	0.35	15.6	42.9

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PIERRE		2-6	3E	CY	63	21.0	24.0	20.0	29.0	NA	24.0	NA	1.2	0.40	17.9	35.7
PIERRE		2-6	4E	CY	60	17.0	19.0	15.0	22.0	NA	NA	NA	0.9	0.31	13.9	28.6
PIERRE		2-6	4E	CY	61	NA	23.0	19.0	29.0	NA	NA	NA	1.2	0.31	13.9	39.7
PIERRE		6-9	4E	CY	63	18.0	20.0	16.0	24.0	NA	20.0	NA	1.1	0.37	16.5	29.9
PIERRE		6-25	6E	CY	60	NA	NA	NA	NA	NA	NA	NA	NA	0.29	13.0	13.0
PIERRE		6-25	6E	CY	61	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
PIERRE		9-25	6E	CY	63	NA	NA	NA	NA	NA	NA	NA	NA	0.35	15.6	15.6
PIERRE		25-40	7E	CY	60	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
PIERRE		25-40	7E	CY	61	NA	NA	NA	NA	NA	NA	NA	NA	0.24	10.7	10.7
PIERRE		25-40	7E	CY	63	NA	NA	NA	NA	NA	NA	NA	NA	0.32	14.3	14.3
PLAYMOOR		0-2	4W	SB	55	NA	NA	NA	45.0	NA	NA	NA	2.6	1.25	55.9	54.9
PLAYMOOR		0-2	4W	SB	102	40.0	NA	NA	47.0	NA	NA	NA	2.6	1.31	58.5	51.4
POINSETT		0-2	1	SI	102	75.0	NA	NA	84.0	21.0	NA	27.0	3.0	0.59	26.4	76.7
POINSETT		0-2	2C	SI	55	63.0	NA	28.0	70.0	17.0	NA	NA	2.8	0.54	24.1	67.9
POINSETT		2-6	2E	SI	55	60.0	NA	27.0	65.0	16.0	NA	NA	2.7	0.52	23.2	64.5
POINSETT		2-6	2E	SI	102	71.0	NA	NA	82.0	19.0	NA	24.0	2.9	0.59	26.4	72.1
POINSETT		6-9	3E	SI	55	NA	NA	NA	NA	NA	NA	NA	2.5	0.50	22.3	57.7
POINSETT		6-9	3E	SI	102	62.0	NA	NA	77.0	17.0	NA	19.0	2.7	0.55	24.6	64.2
POINSETT		9-15	4E	SI	102	50.0	NA	NA	56.0	13.0	NA	19.0	2.4	0.51	22.8	52.8
POINSETT		15-25	6E	SI	102	NA	NA	NA	NA	NA	NA	NA	NA	0.47	21.0	21.0
PROMISE		0-2	3S	CY	63	28.0	36.0	24.0	50.0	NA	44.0	NA	1.5	0.42	18.8	52.0
PROMISE		2-6	3E	CY	63	26.0	34.0	23.0	48.0	NA	42.0	NA	1.5	0.38	17.0	49.7
PROMISE		6-9	4E	CY	63	23.0	29.0	21.0	40.0	NA	33.0	NA	1.3	0.35	15.6	42.5
PROMISE		9-15	6E	CY	63	NA	NA	NA	NA	NA	NA	NA	NA	0.31	13.9	13.9
PROSPER		0-2	1	OV	102	77.0	NA	NA	84.0	25.0	67.0	30.0	3.5	1.33	59.4	83.0
PROSPER		0-2	2C	OV	55	68.0	NA	36.0	71.0	18.0	67.0	NA	3.0	1.09	48.7	75.6
PROSPER		2-6	2E	SI	55	64.0	NA	32.0	66.0	17.0	63.0	NA	2.8	0.54	24.1	70.1
PROSPER		2-6	2E	SI	102	76.0	NA	NA	80.0	23.0	64.0	29.0	3.3	0.68	30.4	79.2
RABER		0-2	2C	CY	53	33.0	NA	24.0	49.0	15.0	48.0	NA	2.0	0.52	23.2	50.9
RABER		2-6	2E	CY	53	32.0	NA	23.0	48.0	12.0	44.0	NA	2.0	0.48	21.4	47.6
RABER		6-9	3E	CY	53	30.0	NA	21.0	44.0	NA	39.0	NA	1.8	0.46	20.6	44.3
RABER		9-15	4E	CY	53	NA	NA	17.0	38.0	NA	NA	NA	1.5	0.43	19.2	39.9
RABER		15-25	6E	CY	53	NA	NA	NA	NA	NA	NA	NA	NA	0.41	18.3	18.3
RALPH		0-2	3C	SI	58	NA	32.0	23.0	39.0	NA	NA	NA	1.4	0.32	14.3	51.1
RALPH		2-6	3E	SI	58	NA	29.0	22.0	35.0	NA	NA	NA	1.3	0.29	13.0	47.2
RALPH		6-9	4E	SI	58	NA	24.0	18.0	32.0	NA	NA	NA	1.1	0.25	11.2	39.9
RANSLO	DF	0-2	3W	SB	53	31.0	NA	19.0	46.0	12.0	NA	NA	2.2	1.00	44.7	45.0
RANSLO	DNF	0-2	5W	SB	53	NA	NA	NA	NA	NA	NA	NA	NA	1.00	44.7	44.7
RAUVILLE		0-2	5W	WL	53	NA	NA	NA	NA	NA	NA	NA	NA	0.90	40.2	40.2
RAUVILLE		0-2	5W	WL	55	NA	NA	NA	NA	NA	NA	NA	NA	0.95	42.4	42.4

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** COLUMN NUMBER

APPENDIX TABLE D-1. RATINGS DEVELOPED FROM CROP AND RANGE YIELD ESTIMATES FOR SOUTH DAKOTA SOILS*

SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SURGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
RAUVILLE		0-2	5W	WL	102	NA	NA	NA	NA	NA	NA	NA	NA	1.00	44.7	44.7
RAZOR		0-2	3S	CY	60	NA	22.0	14.0	22.0	NA	NA	NA	1.0	0.31	13.9	32.9
RAZOR		0-2	3S	CY	61	NA	28.0	19.0	28.0	NA	NA	NA	1.1	0.37	16.5	41.6
RAZOR		2-6	4E	CY	60	NA	19.0	13.0	21.0	NA	NA	NA	0.9	0.29	13.0	29.7
RAZOR		2-6	4E	CY	61	NA	25.0	17.0	25.0	NA	NA	NA	1.0	0.35	15.6	37.3
RAZOR		6-9	6E	CY	60	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
RAZOR		6-9	6E	CY	61	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
REDIG		6-25	6E	TU	60	NA	NA	NA	NA	NA	NA	NA	NA	0.28	12.5	12.5
REDIG		6-25	6E	TU	61	NA	NA	NA	NA	NA	NA	NA	NA	0.30	13.4	13.4
REDSTOE		0-2	3S	TU	55	24.0	NA	NA	50.0	NA	20.0	NA	1.7	0.42	18.8	35.9
REDSTOE		0-6	3E	TU	102	44.0	NA	NA	54.0	15.0	NA	NA	1.9	0.55	24.6	50.7
REDSTOE		2-6	3E	TU	55	21.0	NA	NA	46.0	NA	19.0	NA	1.6	0.42	18.8	33.1
REDSTOE		6-9	4E	TU	55	NA	NA	NA	42.0	NA	15.0	NA	1.4	0.40	17.9	32.2
REDSTOE		6-9	4E	TU	102	32.0	NA	NA	45.0	NA	NA	NA	1.6	0.51	22.8	40.2
REDSTOE		9-15	6E	TU	55	NA	NA	NA	NA	NA	NA	NA	NA	0.37	16.5	16.5
REDSTOE		9-15	6E	TU	102	NA	NA	NA	NA	NA	NA	NA	NA	0.48	21.4	21.4
REE		0-2	2C	SI	53	39.0	35.0	25.0	57.0	NA	48.0	NA	1.9	0.52	23.2	57.6
REE		0-2	2C	SI	55	48.0	38.0	26.0	61.0	NA	54.0	NA	1.9	0.55	24.6	62.6
REE		0-2	2C	SI	63	36.0	35.0	NA	51.0	NA	44.0	NA	1.6	0.45	20.1	52.1
REE		2-6	2E	SI	53	36.0	33.0	23.0	55.0	NA	45.0	NA	1.8	0.52	23.2	54.2
REE		2-6	2E	SI	55	47.0	36.0	NA	55.0	NA	52.0	NA	1.8	0.51	22.8	58.6
REE		2-6	2E	SI	63	33.0	33.0	NA	49.0	NA	41.0	NA	1.5	0.42	18.8	49.0
REE		6-9	3E	SI	53	NA	NA	NA	40.0	NA	39.0	NA	1.5	0.43	19.2	41.6
REE		6-9	3E	SI	63	30.0	29.0	NA	44.0	NA	36.0	NA	1.5	0.40	17.9	44.3
REEDER		0-2	2C	SI	54	34.0	NA	28.0	46.0	NA	NA	NA	1.7	0.33	14.7	49.3
REEDER		2-6	2E	SI	54	33.0	NA	26.0	45.0	NA	NA	NA	1.6	0.33	14.7	46.9
REEDER		6-9	3E	SI	54	NA	NA	22.0	40.0	NA	NA	NA	1.5	0.31	13.9	44.9
REEDER		9-15	4E	SI	54	NA	NA	NA	NA	NA	NA	NA	1.2	0.29	13.0	27.7
REGAN		0-2	5W	WL	53	NA	NA	NA	NA	NA	NA	NA	NA	0.85	38.0	38.0
REGAN		0-2	5W	WL	54	NA	NA	NA	NA	NA	NA	NA	NA	0.80	35.7	35.7
REGENT		0-2	2C	CY	54	32.0	30.0	28.0	43.0	NA	NA	NA	1.6	0.33	14.7	51.1
REGENT		2-6	2E	CY	54	30.0	29.0	26.0	41.0	NA	NA	NA	1.5	0.30	13.4	48.4
REGENT		6-9	3E	CY	54	25.0	25.0	22.0	35.0	NA	NA	NA	1.4	0.27	12.1	41.7
REGENT		9-15	4E	CY	54	NA	NA	NA	32.0	NA	NA	NA	1.1	0.24	10.7	30.4
RELIANCE		0-2	2C	SI	63	46.0	39.0	NA	50.0	NA	53.0	NA	2.4	0.41	18.3	61.6
RELIANCE		2-6	2E	SI	63	43.0	37.0	NA	48.0	NA	51.0	NA	2.3	0.38	17.0	58.7
RELIANCE		6-9	3E	SI	63	40.0	34.0	NA	43.0	NA	49.0	NA	2.0	0.36	16.1	53.8
RELIANCE		9-15	4E	SI	63	NA	NA	NA	38.0	NA	34.0	NA	1.7	0.32	14.3	40.5
RENNER		0-2	1	SI	102	77.0	NA	NA	84.0	NA	NA	30.0	3.5	0.66	29.5	82.8
RENNER		2-6	2E	SI	102	76.0	NA	NA	80.0	NA	NA	29.0	3.3	0.63	28.2	79.7

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APPENDIX TABLE D-1. RATINGS DEVELOPED FROM CROP AND RANGE YIELD ESTIMATES FOR SOUTH DAKOTA SOILS*

SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
RENNER		6-9	3E	SI	102	NA	NA	NA	NA	NA	NA	NA	3.0	0.61	27.3	69.3
RENNER		9-15	4E	SI	102	NA	NA	NA	NA	NA	NA	NA	2.7	0.59	26.4	62.4
RENNER		15-25	6E	SI	102	NA	NA	NA	NA	NA	NA	NA	NA	0.55	24.6	24.6
RENSHAW		0-2	3S	SWG	102	32.0	NA	NA	34.0	12.0	NA	NA	1.1	0.56	25.0	34.7
RENSHAW		0-2	4S	SWG	55	23.0	NA	13.0	29.0	11.0	NA	NA	0.9	0.33	14.7	29.7
RENSHAW		2-6	4E	SWG	55	18.0	NA	12.0	26.0	10.0	NA	NA	0.8	0.33	14.7	26.4
RENSHAW		2-6	4S	SWG	102	27.0	NA	NA	32.0	11.0	NA	NA	1.0	0.56	25.0	31.4
RENSHAW		6-9	4E	SWG	102	21.0	NA	NA	31.0	10.0	NA	NA	1.0	0.54	24.1	28.7
RENSHAW		6-25	6E	SWG	55	NA	NA	NA	NA	NA	NA	NA	NA	0.29	13.0	13.0
RENSHAW		9-25	6E	SWG	102	NA	NA	NA	NA	NA	NA	NA	NA	0.51	22.8	22.8
RENTILL		0-2	2S	SI	102	54.0	NA	NA	62.0	15.0	NA	NA	2.0	0.61	27.3	56.1
RENTILL		2-6	3S	SI	102	52.0	NA	NA	56.0	13.0	NA	NA	1.8	0.59	26.4	51.0
RHAME		0-2	4E	SY	58	NA	29.0	19.0	28.0	NA	NA	NA	1.2	0.34	15.2	42.7
RHAME		2-6	4E	SY	58	NA	NA	18.0	25.0	NA	NA	NA	1.1	0.30	13.4	32.9
RHAME		6-25	6E	SY	58	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
RHOADES		0-6	6S	TCP	54	NA	NA	NA	NA	NA	NA	NA	NA	0.26	11.6	11.6
RHOADES		6-15	7E	TCP	54	NA	NA	NA	NA	NA	NA	NA	NA	0.24	10.7	10.7
RICHFIELD		0-2	2C	SI	64	36.0	43.0	NA	47.0	NA	46.0	NA	1.7	0.40	17.9	55.7
RICHFIELD		0-2	3C	SI	60	25.0	32.0	NA	33.0	NA	NA	NA	1.4	0.34	15.2	41.5
RICHFIELD		0-2	3C	SI	61	NA	33.0	NA	34.0	NA	NA	NA	1.5	0.35	15.6	48.4
RICHFIELD		2-6	2E	SI	64	32.0	41.0	NA	43.0	NA	44.0	NA	1.6	0.40	17.9	52.2
RICHFIELD		2-6	3E	SI	60	23.0	30.0	NA	31.0	NA	NA	NA	1.3	0.31	13.9	38.7
RICHFIELD		2-6	3E	SI	61	NA	30.0	NA	31.0	NA	NA	NA	1.4	0.31	13.9	44.3
RICHFIELD		6-9	3E	SI	64	25.0	35.0	NA	38.0	NA	36.0	NA	1.4	0.37	16.5	44.1
RICHFIELD		6-9	4E	SI	60	19.0	25.0	NA	26.0	NA	NA	NA	1.2	0.29	13.0	32.9
RICHFIELD		6-9	4E	SI	61	NA	26.0	NA	28.0	NA	NA	NA	1.3	0.29	13.0	39.5
RICHFIELD		9-15	4E	SI	64	NA	28.0	NA	29.0	NA	29.0	NA	1.2	0.35	15.6	39.0
RICHFIELD		9-15	6E	SI	60	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
RICHFIELD		9-15	6E	SI	61	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
RICHFIELD		15-25	6E	SI	64	NA	NA	NA	NA	NA	NA	NA	NA	0.33	14.7	14.7
RIDGEVIEW		0-2	3S	CY	54	26.0	26.0	25.0	43.0	NA	NA	NA	1.4	0.37	16.5	45.7
RIDGEVIEW		2-6	3E	CY	54	24.0	25.0	24.0	42.0	NA	NA	NA	1.3	0.33	14.7	43.6
RIDGEVIEW		6-9	4E	CY	54	20.0	NA	20.0	36.0	NA	NA	NA	1.1	0.31	13.9	34.3
RONSON		0-2	3E	SY	66	15.0	NA	NA	28.0	NA	NA	NA	0.8	0.46	20.6	21.8
RONSON		2-6	3E	SY	66	13.0	NA	NA	24.0	NA	NA	NA	0.7	0.43	19.2	18.8
RONSON		6-9	4E	SY	66	NA	NA	NA	19.0	NA	NA	NA	0.6	0.41	18.3	17.4
ROSEBUD		0-2	2C	SI	64	33.0	40.0	NA	44.0	NA	28.0	NA	1.4	0.40	17.9	47.5
ROSEBUD		0-2	3C	SI	60	NA	30.0	NA	30.0	NA	NA	NA	1.2	0.34	15.2	42.4
ROSEBUD		2-6	2E	SI	64	30.0	36.0	NA	39.0	NA	27.0	NA	1.3	0.37	16.5	43.3
ROSEBUD		2-6	3E	SI	60	NA	29.0	NA	29.0	NA	NA	NA	1.1	0.31	13.9	40.5

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ROSEBUD		6-9	3E	SI	64	25.0	32.0	NA	34.0	NA	21.0	NA	1.1	0.35	15.6	37.0
ROSEBUD		6-9	4E	SI	60	NA	NA	NA	26.0	NA	NA	NA	1.0	0.29	13.0	25.9
ROSEBUD		9-15	4E	SI	64	NA	25.0	NA	32.0	NA	16.0	NA	1.0	0.33	14.7	33.1
ROSEBUD		9-15	6E	SI	60	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
ROSEBUD		15-25	6E	SI	64	NA	NA	NA	NA	NA	NA	NA	NA	0.31	13.9	13.9
SALIX		0-2	1	SI	102	90.0	NA	NA	83.0	NA	80.0	36.0	4.3	0.72	32.2	94.5
SALMO		0-2	4W	SB	55	NA	NA	NA	45.0	NA	NA	NA	2.4	1.15	51.4	52.6
SALMO		0-2	4W	SB	102	40.0	NA	NA	47.0	NA	NA	NA	2.6	1.25	55.9	51.4
SAMSIL		2-15	6S	SW	60	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
SAMSIL		2-15	6S	SW	61	NA	NA	NA	NA	NA	NA	NA	NA	0.30	13.4	13.4
SAMSIL		2-15	6S	SW	63	NA	NA	NA	NA	NA	NA	NA	NA	0.29	13.0	13.0
SAMSIL		15-40	7S	SW	60	NA	NA	NA	NA	NA	NA	NA	NA	0.22	9.8	9.8
SAMSIL		15-40	7S	SW	61	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
SAMSIL		15-40	7S	SW	63	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
SANSARC		2-15	6S	SW	63	NA	NA	NA	NA	NA	NA	NA	NA	0.29	13.0	13.0
SANSARC		15-40	7S	SW	63	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
SARPY		0-2	4E	SB	63	46.0	NA	NA	NA	NA	NA	NA	2.6	1.35	60.3	54.4
SARPY		0-2	4S	SB	102	47.0	NA	NA	36.0	NA	37.0	21.0	3.0	1.45	64.8	51.2
SATANTA		0-2	3C	SI	60	NA	30.0	20.0	31.0	NA	NA	NA	1.4	0.31	13.9	45.9
SATANTA		0-2	3C	SI	61	NA	33.0	26.0	33.0	NA	NA	NA	1.8	0.35	15.6	54.2
SATANTA		2-6	3E	SI	60	NA	28.0	19.0	30.0	NA	NA	NA	1.3	0.31	13.9	43.3
SATANTA		2-6	3E	SI	61	NA	32.0	24.0	32.0	NA	NA	NA	1.7	0.33	14.7	51.6
SATANTA		6-9	4E	SI	60	NA	25.0	17.0	26.0	NA	NA	NA	1.2	0.29	13.0	38.7
SATANTA		6-9	4E	SI	61	NA	29.0	22.0	28.0	NA	NA	NA	1.5	0.31	13.9	46.4
SATANTA		9-15	6E	SI	60	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
SATANTA		9-15	6E	SI	61	NA	NA	NA	NA	NA	NA	NA	NA	0.29	13.0	13.0
SAVAGE		0-2	2C	CY	54	32.0	32.0	28.0	46.0	NA	NA	NA	1.9	0.33	14.7	54.1
SAVAGE		2-6	2E	CY	54	30.0	30.0	25.0	41.0	NA	NA	NA	1.7	0.30	13.4	49.2
SAVAGE		6-9	3E	CY	54	NA	27.0	23.0	35.0	NA	NA	NA	1.5	0.30	13.4	47.8
SAVO		0-2	2C	SI	63	44.0	37.0	NA	49.0	NA	45.0	NA	2.2	0.41	18.3	57.3
SAVO		0-2	2C	SI	64	34.0	34.0	NA	45.0	NA	43.0	NA	1.9	0.38	17.0	51.1
SAVO		0-2	3C	SI	60	NA	28.0	21.0	30.0	NA	NA	NA	1.3	0.32	14.3	44.6
SAVO		0-2	3C	SI	61	NA	32.0	23.0	33.0	NA	NA	NA	1.5	0.35	15.6	50.1
SAVO		2-6	2E	SI	63	41.0	36.0	NA	47.0	NA	43.0	NA	2.1	0.38	17.0	54.8
SAVO		2-6	2E	SI	64	30.0	32.0	NA	41.0	NA	40.0	NA	1.8	0.35	15.6	47.3
SAVO		2-6	3E	SI	60	NA	26.0	NA	28.0	NA	NA	NA	1.2	0.29	13.0	38.7
SAVO		2-6	3E	SI	61	NA	30.0	NA	31.0	NA	NA	NA	1.4	0.32	14.3	44.3
SAVO		6-9	3E	SI	63	34.0	31.0	NA	41.0	NA	34.0	NA	1.8	0.35	15.6	46.3
SAVO		6-9	3E	SI	64	26.0	26.0	NA	36.0	NA	31.0	NA	1.5	0.32	14.3	39.2
SAVO		6-9	4E	SI	60	NA	NA	NA	NA	NA	NA	NA	1.1	0.26	11.6	25.4

* A RANGE RATING (COLUMN 16) WAS COMPUTED FOR SOILS IN ALL CAPABILITY CLASSES (COLUMN 4). A CROP RATING WAS COMPUTED FOR SOILS IN CAPABILITY CLASSES 1 THROUGH 4. COLUMN 17 HEADED 'SOIL RATING' IS THE CROP RATING IF THE SOIL IS IN CAPABILITY CLASSES 1 THROUGH 4. THE RANGE RATING IS THE SOIL RATING FOR SOIL UNITS IN CAPABILITY CLASSES 5 THROUGH 7. SEE APPENDIX D DISCUSSION FOR RESTRICTIONS REGARDING THE USE OF THIS TABLE. ABBREVIATIONS USED IN THE TABLE ARE DEFINED AT THE END OF THE TABLE. CROP YIELDS BASED ON HIGH LEVEL OF MANAGEMENT, RANGE YIELDS BASED ON GOOD TO FAIR CONDITIONS. NA=CROP NOT ADAPTED OR WIDELY GROWN.

** COLUMN NUMBER

APPENDIX TABLE D-1. RATINGS DEVELOPED FROM CROP AND RANGE YIELD ESTIMATES FOR SOUTH DAKOTA SOILS*

SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
SAVO		6-9	4E	SI	61	NA	NA	NA	NA	NA	NA	NA	1.3	0.29	13.0	30.0
SAVO		9-15	4E	SI	63	NA	NA	NA	38.0	NA	NA	NA	1.5	0.33	14.7	38.3
SAVO		9-15	4E	SI	64	NA	NA	NA	31.0	NA	NA	NA	1.2	0.29	13.0	31.0
SAVO		9-15	6E	SI	60	NA	NA	NA	NA	NA	NA	NA	NA	0.23	10.3	10.3
SAVO		9-15	6E	SI	61	NA	NA	NA	NA	NA	NA	NA	NA	0.26	11.6	11.6
SCHAMBER		0-9	6S	VS	60	NA	NA	NA	NA	NA	NA	NA	NA	0.15	6.7	6.7
SCHAMBER		0-9	6S	VS	61	NA	NA	NA	NA	NA	NA	NA	NA	0.19	8.5	8.5
SCHAMBER		0-9	6S	VS	63	NA	NA	NA	NA	NA	NA	NA	NA	0.23	10.3	10.3
SCHAMBER		9-40	7S	VS	60	NA	NA	NA	NA	NA	NA	NA	NA	0.13	5.8	5.8
SCHAMBER		9-40	7S	VS	61	NA	NA	NA	NA	NA	NA	NA	NA	0.15	6.7	6.7
SCHAMBER		9-40	7S	VS	63	NA	NA	NA	NA	NA	NA	NA	NA	0.23	10.3	10.3
SCROGGIN		6-25	6E	TU	58	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
SEN		2-6	3E	SI	54	NA	27.0	21.0	35.0	NA	NA	NA	1.2	0.35	15.6	44.8
SEN		6-9	3E	SI	54	NA	25.0	20.0	33.0	NA	NA	NA	1.1	0.33	14.7	42.0
SEN		9-15	4E	SI	54	NA	NA	NA	29.0	NA	NA	NA	0.9	0.30	13.4	26.4
SEN		15-25	6E	SI	54	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
SERDEN		2-15	6E	SA	55	NA	NA	NA	NA	NA	NA	NA	NA	0.50	22.3	22.3
SEROCO		2-15	6E	SA	53	NA	NA	NA	NA	NA	NA	NA	NA	0.45	20.1	20.1
SEROCO		2-15	6E	SA	54	NA	NA	NA	NA	NA	NA	NA	NA	0.38	17.0	17.0
SEROCO		2-15	6E	SA	55	NA	NA	NA	NA	NA	NA	NA	NA	0.48	21.4	21.4
SHAMBO		0-2	2C	SI	54	NA	NA	28.0	46.0	NA	NA	NA	1.7	0.35	15.6	53.7
SHENA		0-9	6S	SW	64	NA	NA	NA	NA	NA	NA	NA	NA	0.39	17.4	17.4
SHENA		0-9	6S	SW	66	NA	NA	NA	NA	NA	NA	NA	NA	0.43	19.2	19.2
SHINDLER		2-6	3E	SI	102	57.0	NA	NA	64.0	NA	51.0	21.0	2.9	0.66	29.5	62.3
SHINDLER		6-9	4E	SI	102	50.0	NA	NA	53.0	NA	44.0	19.0	2.8	0.62	27.7	55.3
SHINDLER		9-25	6E	SI	102	NA	NA	NA	NA	NA	NA	NA	NA	0.57	25.5	25.5
SHINDLER		25-40	7E	SI	102	NA	NA	NA	NA	NA	NA	NA	NA	0.53	23.7	23.7
SIECHE		9-15	4E	SI	102	NA	NA	NA	NA	NA	NA	NA	NA	0.43	19.2	19.2
SIECHE		15-25	6E	SI	102	NA	NA	NA	NA	NA	NA	NA	NA	0.39	17.4	17.4
SIECHE		25-40	7E	SI	102	NA	NA	NA	NA	NA	NA	NA	NA	0.36	16.1	16.1
SINAI		0-2	2S	CY	55	56.0	NA	27.0	67.0	19.0	NA	NA	2.8	0.54	24.1	66.6
SINAI		0-2	2S	CY	102	73.0	NA	NA	76.0	23.0	NA	24.0	3.0	0.68	30.4	74.4
SINAI		2-6	3E	CY	55	53.0	NA	25.0	64.0	16.0	NA	NA	2.8	0.50	22.3	62.2
SINAI		2-6	3E	CY	102	69.0	NA	NA	73.0	19.0	NA	22.0	2.9	0.64	28.6	68.6
SINAI		6-9	4E	CY	55	48.0	NA	23.0	60.0	NA	NA	NA	2.7	0.48	21.4	59.5
SINAI		6-9	3E	CY	102	57.0	NA	NA	72.0	NA	NA	20.0	2.7	0.61	27.3	63.3
SINAI		9-15	4E	CY	102	52.0	NA	NA	60.0	NA	NA	NA	2.7	0.59	26.4	61.2
SINGSAAS		0-2	1	SI	102	77.0	NA	NA	77.0	21.0	NA	27.0	3.0	0.68	30.4	75.6
SINGSAAS		2-6	2E	SI	102	70.0	NA	NA	75.0	18.0	NA	24.0	2.9	0.63	28.2	69.6
SINGSAAS		6-9	3E	SI	102	64.0	NA	NA	72.0	NA	NA	20.0	2.7	0.61	27.3	65.1

* A RANGE RATING (COLUMN 16) WAS COMPUTED FOR SOILS IN ALL CAPABILITY CLASSES (COLUMN 4). A CROP RATING WAS COMPUTED FOR SOILS IN CAPABILITY CLASSES 1 THROUGH 4. COLUMN 17 HEADED 'SOIL RATING' IS THE CROP RATING IF THE SOIL IS IN CAPABILITY CLASSES 1 THROUGH 4. THE RANGE RATING IS THE SOIL RATING FOR SOIL UNITS IN CAPABILITY CLASSES 5 THROUGH 7. SEE APPENDIX D DISCUSSION FOR RESTRICTIONS REGARDING THE USE OF THIS TABLE. ABBREVIATIONS USED IN THE TABLE ARE DEFINED AT THE END OF THE TABLE. CROP YIELDS BASED ON HIGH LEVEL OF MANAGEMENT, RANGE YIELDS BASED ON GOOD TO FAIR CONDITIONS. NA=CROP NOT ADAPTED OR WIDELY GROWN.

** COLUMN NUMBER

APPENDIX TABLE D-1. RATINGS DEVELOPED FROM CROP AND RANGE YIELD ESTIMATES FOR SOUTH DAKOTA SOILS*

SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
SINGSAAS		9-15	4E	SI	102	52.0	NA	NA	58.0	NA	NA	NA	2.5	0.59	26.4	59.0
SINGSAAS		15-25	6E	SI	102	NA	NA	NA	NA	NA	NA	NA	NA	0.57	25.5	25.5
SIOUX		0-9	6S	VS	55	NA	NA	NA	NA	NA	NA	NA	NA	0.31	13.9	13.9
SIOUX		0-9	6S	VS	102	NA	NA	NA	NA	NA	NA	NA	NA	0.39	17.4	17.4
SIOUX		9-40	7S	VS	55	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
SIOUX		9-40	7S	VS	102	NA	NA	NA	NA	NA	NA	NA	NA	0.35	15.6	15.6
SISSETON		2-6	3E	TU	102	43.0	NA	NA	53.0	15.0	NA	NA	1.8	0.53	23.7	49.5
SISSETON		6-9	4E	TU	102	40.0	NA	NA	47.0	12.0	NA	NA	1.6	0.51	22.8	43.3
SISSETON		9-25	6E	TU	102	NA	NA	NA	NA	NA	NA	NA	NA	0.47	21.0	21.0
SISSETON		25-40	7E	TU	102	NA	NA	NA	NA	NA	NA	NA	NA	0.45	20.1	20.1
SISSETON	E	2-6	4E	TU	102	41.0	NA	NA	49.0	NA	NA	NA	1.6	0.51	22.8	44.8
SISSETON	E	6-9	6E	TU	102	NA	NA	NA	NA	NA	NA	NA	1.5	0.47	21.0	34.6
SNOMO		6-25	6E	CS	61	NA	NA	NA	NA	NA	NA	NA	NA	0.21	9.4	9.4
SOLOMON	DF	0-2	3W	WL	102	59.0	NA	NA	NA	NA	NA	23.0	3.5	1.10	49.2	67.2
SOLOMON	DNF	0-2	5W	WL	102	NA	NA	NA	NA	NA	NA	NA	NA	1.10	49.2	49.2
SORUM		0-2	4E	SY	58	NA	14.0	12.0	26.0	NA	NA	NA	1.0	0.30	13.4	28.3
SORUM		2-6	4E	SY	58	NA	NA	11.0	25.0	NA	NA	NA	0.8	0.28	12.5	24.7
SPEARFISH		0-15	6S	SW	61	NA	NA	NA	NA	NA	NA	NA	NA	0.32	14.3	14.3
SPEARFISH		0-15	6S	SW	62	NA	NA	NA	NA	NA	NA	NA	NA	0.49	21.9	21.9
SPEARFISH		15-40	7S	SW	61	NA	NA	NA	NA	NA	NA	NA	NA	0.29	13.0	13.0
SPEARFISH		15-40	7E	SW	62	NA	NA	NA	NA	NA	NA	NA	NA	0.46	20.6	20.6
SPOTTSWOOD		0-2	2S	OV	102	54.0	NA	NA	52.0	16.0	NA	21.0	2.4	1.15	51.4	55.9
SPOTTSWOOD		0-2	3S	SI	55	47.0	NA	24.0	51.0	14.0	NA	NA	2.2	0.73	32.6	53.4
ST. ONGE		0-2	3C	OV	61	33.0	41.0	31.0	39.0	NA	NA	NA	2.2	0.69	30.8	59.6
STADY		0-2	3S	SI	53	NA	NA	20.0	43.0	12.0	NA	NA	1.2	0.47	21.0	42.0
STADY		0-2	3S	SI	54	NA	NA	21.0	37.0	NA	NA	NA	1.0	0.35	15.6	39.1
STADY		2-6	3E	SI	53	NA	NA	17.0	41.0	11.0	NA	NA	1.1	0.44	19.7	38.1
STADY		2-6	3E	SI	54	NA	NA	18.0	35.0	NA	NA	NA	0.9	0.33	14.7	35.1
STADY		6-9	4E	SI	53	NA	NA	14.0	36.0	NA	NA	NA	0.8	0.41	18.3	31.3
STADY		6-9	4E	SI	54	NA	NA	NA	31.0	NA	NA	NA	0.8	0.31	13.9	26.4
STEINAUER		6-9	4E	TU	102	50.0	NA	NA	58.0	NA	NA	NA	2.1	0.53	23.7	55.2
STEINAUER		9-25	6E	TU	102	NA	NA	NA	NA	NA	NA	NA	NA	0.48	21.4	21.4
STEINAUER		25-40	7E	TU	102	NA	NA	NA	NA	NA	NA	NA	NA	0.45	20.1	20.1
STETTER		0-2	4S	OV	60	NA	NA	NA	25.0	NA	NA	NA	1.3	0.63	28.2	28.8
STICKNEY		0-2	2S	CY	102	66.0	NA	NA	63.0	22.0	48.0	28.0	3.1	0.64	28.6	69.3
STICKNEY		0-2	3S	CY	55	51.0	NA	NA	53.0	17.0	48.0	NA	2.7	0.56	25.0	58.2
STICKNEY		2-6	3E	CY	55	48.0	NA	NA	49.0	16.0	45.0	NA	2.6	0.54	24.1	54.8
STICKNEY		2-6	3E	CY	102	60.0	NA	NA	59.0	19.0	46.0	26.0	3.0	0.61	27.3	64.2
STICKNEY		6-9	4E	CY	102	51.0	NA	NA	45.0	NA	NA	22.0	2.6	0.57	25.5	54.9
STIRK		0-2	6S	OV	63	NA	NA	NA	NA	NA	NA	NA	NA	0.57	25.5	25.5

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APPENDIX TABLE D-1. RATINGS DEVELOPED FROM CROP AND RANGE YIELD ESTIMATES FOR SOUTH DAKOTA SOILS*

SOIL SERIES NAME	PHASE	SLOPE (PCT)	LAND CAPABILITY SUBCLASS	RANGE SITE	LAND RESOURCE AREA	CORN GRAIN (BU/A)	WHEAT (BU/A) WTR	WHEAT (BU/A) SPR	OATS (BU/A)	FLAX (BU/A)	SORGHUM GRAIN (BU/A)	SOY-BEANS (BU/A)	ALFALFA (T/A)	RANGE YIELD (AUMS)	RANGE RATING (PCT)	SOIL RATING (PCT)
1**	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
STIRUM		0-2	4W	SB	53	19.0	NA	13.0	28.0	11.0	NA	NA	1.3	0.88	39.3	30.5
STIRUM		0-2	4W	SB	55	19.0	NA	15.0	31.0	11.0	NA	NA	1.3	0.90	40.2	32.2
STORLA		0-2	3S	SI	55	41.0	NA	NA	45.0	NA	37.0	NA	2.0	0.54	24.1	45.8
STORLA		0-2	3E	SI	102	59.0	NA	NA	48.0	NA	NA	17.0	2.1	0.68	30.4	51.8
STRAW		0-2	2C	SI	54	35.0	34.0	29.0	51.0	NA	NA	NA	1.8	0.35	15.6	56.7
STRAW		0-2	3C	SI	58	31.0	33.0	23.0	42.0	NA	NA	NA	1.6	0.31	13.9	49.5
SULLY		0-2	3E	TU	53	27.0	NA	19.0	37.0	13.0	NA	NA	1.5	0.41	18.3	39.6
SULLY		0-2	3E	TU	55	NA	NA	NA	NA	NA	NA	NA	1.7	0.42	18.8	39.3
SULLY		0-2	3E	TU	63	29.0	NA	19.0	38.0	NA	NA	NA	1.4	0.33	14.7	38.3
SULLY		2-6	4E	TU	53	24.0	NA	17.0	35.0	12.0	NA	NA	1.4	0.37	16.5	36.3
SULLY		2-6	4E	TU	55	NA	NA	NA	NA	NA	NA	NA	1.5	0.39	17.4	34.6
SULLY		2-6	4E	TU	63	25.0	NA	16.0	34.0	NA	NA	NA	1.3	0.29	13.0	33.7
SULLY		6-9	4E	TU	53	NA	NA	16.0	29.0	NA	NA	NA	1.3	0.35	15.6	34.2
SULLY		6-9	4E	TU	55	NA	NA	NA	NA	NA	NA	NA	1.4	0.37	16.5	32.3
SULLY		6-9	4E	TU	63	NA	NA	16.0	30.0	NA	NA	NA	1.1	0.27	12.1	33.1
SULLY		9-25	6E	TU	53	NA	NA	NA	NA	NA	NA	NA	NA	0.33	14.7	14.7
SULLY		9-25	6E	TU	55	NA	NA	NA	NA	NA	NA	NA	NA	0.35	15.6	15.6
SULLY		9-25	6E	TU	63	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
SULLY		25-40	7E	TU	53	NA	NA	NA	NA	NA	NA	NA	NA	0.31	13.9	13.9
SULLY		25-40	7E	TU	55	NA	NA	NA	NA	NA	NA	NA	NA	0.33	14.7	14.7
SULLY		25-40	7E	TU	63	NA	NA	NA	NA	NA	NA	NA	NA	0.23	10.3	10.3
SVEA		0-2	1	OV	102	76.0	NA	NA	81.0	24.0	NA	NA	3.4	1.20	53.6	83.1
SVEA		0-2	2C	OV	55	63.0	NA	38.0	72.0	21.0	NA	NA	3.2	1.02	45.6	78.1
SVEA		2-6	2E	SI	55	49.0	NA	36.0	67.0	18.0	NA	NA	3.2	0.57	25.5	70.9
SVEA		2-6	2E	SI	102	72.0	NA	NA	78.0	22.0	NA	NA	3.2	0.72	32.2	78.3
SVERDRUP		0-2	3S	SY	102	47.0	NA	NA	44.0	13.0	NA	NA	2.0	0.59	26.4	47.5
SVERDRUP		2-6	3E	SY	102	45.0	NA	NA	43.0	12.0	NA	NA	1.9	0.57	25.5	45.3
SVERDRUP		6-9	4E	SY	102	36.0	NA	NA	38.0	NA	NA	NA	1.7	0.54	24.1	39.8
SWANBOY		0-6	6S	DC	60	NA	NA	NA	NA	NA	NA	NA	NA	0.23	10.3	10.3
SWANBOY		0-6	6S	DC	61	NA	NA	NA	NA	NA	NA	NA	NA	0.30	13.4	13.4
SWANBOY		0-9	6S	DC	63	NA	NA	NA	NA	NA	NA	NA	NA	0.32	14.3	14.3
SWANBOY		0-9	6S	DC	64	NA	NA	NA	NA	NA	NA	NA	NA	0.26	11.6	11.6
SWANBOY		9-15	7S	DC	64	NA	NA	NA	NA	NA	NA	NA	NA	0.24	10.7	10.7
SWENODA		0-2	3E	SY	55	46.0	NA	26.0	48.0	15.0	NA	NA	2.0	0.50	22.3	53.3
SWENODA		0-2	3S	SY	102	55.0	NA	NA	59.0	18.0	NA	20.0	2.3	0.60	26.8	58.1
SWENODA		2-6	3E	SY	55	43.0	NA	24.0	45.0	14.0	NA	NA	1.9	0.47	21.0	49.8
SWENODA		2-6	3E	SY	102	53.0	NA	NA	57.0	17.0	NA	18.0	2.2	0.57	25.5	55.0
SWINT		0-2	3C	SI	61	31.0	39.0	30.0	36.0	NA	NA	NA	2.1	0.34	15.2	56.7
SWINT		2-6	3E	SI	61	29.0	36.0	28.0	35.0	NA	NA	NA	2.0	0.34	15.2	53.2
TABLE MOUNTAIN		0-2	2C	SI	62	35.0	41.0	30.0	39.0	NA	NA	NA	2.3	0.56	25.0	60.0

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APPENDIX TABLE D-1. RATINGS DEVELOPED FROM CROP AND RANGE YIELD ESTIMATES FOR SOUTH DAKOTA SOILS*

SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
TABLE MOUNTAIN		0-2	3C	SI	61	34.0	40.0	30.0	39.0	NA	NA	NA	2.2	0.40	17.9	58.9
TABLE MOUNTAIN		2-6	2E	SI	62	33.0	38.0	32.0	37.0	NA	NA	NA	2.1	0.52	23.2	57.9
TABLE MOUNTAIN		2-6	3E	SI	61	31.0	38.0	28.0	35.0	NA	NA	NA	2.1	0.37	16.5	55.0
TABLE MOUNTAIN		6-9	3E	SI	62	NA	NA	NA	NA	NA	NA	NA	2.0	0.47	21.0	46.2
TABLE MOUNTAIN		6-9	4E	SI	61	NA	NA	NA	NA	NA	NA	NA	2.0	0.34	15.2	46.2
TABLE MOUNTAIN		9-15	4E	SI	62	NA	NA	NA	NA	NA	NA	NA	NA	0.41	18.3	18.3
TABLE MOUNTAIN		9-15	6E	SI	61	NA	NA	NA	NA	NA	NA	NA	NA	0.31	13.9	13.9
TALLY		0-2	3E	SY	53	43.0	NA	20.0	46.0	15.0	NA	NA	1.6	0.48	21.4	47.3
TALLY		0-2	3E	SY	54	26.0	NA	26.0	40.0	NA	NA	NA	1.4	0.35	15.6	42.5
TALLY		0-2	4E	SY	58	NA	30.0	19.0	33.0	NA	NA	NA	1.1	0.30	13.4	44.1
TALLY		2-6	3E	SY	53	42.0	NA	17.0	44.0	14.0	NA	NA	1.6	0.45	20.1	44.5
TALLY		2-6	3E	SY	54	NA	NA	24.0	39.0	NA	NA	NA	1.1	0.31	13.9	43.2
TALLY		2-6	4E	SY	58	NA	NA	18.0	31.0	NA	NA	NA	1.1	0.30	13.4	35.1
TALLY		6-9	4E	SY	53	39.0	NA	15.0	40.0	NA	NA	NA	1.5	0.42	18.8	39.6
TALLY		6-9	4E	SY	54	NA	NA	NA	34.0	NA	NA	NA	1.0	0.27	12.1	30.3
TALMO		0-9	6S	VS	53	NA	NA	NA	NA	NA	NA	NA	NA	0.29	13.0	13.0
TALMO		0-9	6S	VS	55	NA	NA	NA	NA	NA	NA	NA	NA	0.33	14.7	14.7
TALMO		0-9	6S	VS	102	NA	NA	NA	NA	NA	NA	NA	NA	0.47	21.0	21.0
TALMO		9-25	7S	VS	53	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
TALMO		9-25	7S	VS	55	NA	NA	NA	NA	NA	NA	NA	NA	0.29	13.0	13.0
TALMO		9-25	7E	VS	102	NA	NA	NA	NA	NA	NA	NA	NA	0.41	18.3	18.3
TASSEL		2-15	6E	SW	60	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
TASSEL		2-15	6E	SW	61	NA	NA	NA	NA	NA	NA	NA	NA	0.32	14.3	14.3
TASSEL		2-15	6E	SW	64	NA	NA	NA	NA	NA	NA	NA	NA	0.32	14.3	14.3
TASSEL		2-15	6E	SW	65	NA	NA	NA	NA	NA	NA	NA	NA	0.32	14.3	14.3
TASSEL		2-15	6E	SW	66	NA	NA	NA	NA	NA	NA	NA	NA	0.36	16.1	16.1
TASSEL		15-40	7E	SW	60	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
TASSEL		15-40	7E	SW	61	NA	NA	NA	NA	NA	NA	NA	NA	0.30	13.4	13.4
TASSEL		15-40	7E	SW	64	NA	NA	NA	NA	NA	NA	NA	NA	0.30	13.4	13.4
TASSEL		15-40	7E	SW	65	NA	NA	NA	NA	NA	NA	NA	NA	0.30	13.4	13.4
TASSEL		15-40	7E	SW	66	NA	NA	NA	NA	NA	NA	NA	NA	0.34	15.2	15.2
TELFER		0-2	4E	SA	53	NA	NA	16.0	32.0	NA	NA	NA	1.4	0.47	21.0	36.1
TELFER		0-2	4E	SA	54	NA	NA	14.0	29.0	NA	NA	NA	1.2	0.38	17.0	31.8
TELFER		2-6	4E	SA	53	NA	NA	15.0	29.0	NA	NA	NA	1.2	0.45	20.1	32.6
TELFER		2-6	4E	SA	54	NA	NA	12.0	26.0	NA	NA	NA	1.1	0.35	15.6	28.2
TELFER		2-15	6E	SA	58	NA	NA	NA	NA	NA	NA	NA	NA	0.34	15.2	15.2
TELFER		6-15	6E	SA	53	NA	NA	NA	NA	NA	NA	NA	NA	0.41	18.3	18.3
TELFER		6-15	6E	SA	54	NA	NA	NA	NA	NA	NA	NA	NA	0.33	14.7	14.7
TELFER		15-40	7E	SA	53	NA	NA	NA	NA	NA	NA	NA	NA	0.39	17.4	17.4
TELFER		15-40	7E	SA	54	NA	NA	NA	NA	NA	NA	NA	NA	0.31	13.9	13.9

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** COLUMN NUMBER

APPENDIX TABLE D-1. RATINGS DEVELOPED FROM CROP AND RANGE YIELD ESTIMATES FOR SOUTH DAKOTA SOILS*

SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
TELFER		15-40	7E	SA	58	NA	NA	NA	NA	NA	NA	NA	NA	0.31	13.9	13.9
TEMVIK		0-2	2C	SI	53	32.0	NA	25.0	53.0	16.0	NA	NA	2.0	0.50	22.3	51.6
TEMVIK		2-6	2E	SI	53	31.0	NA	23.0	52.0	15.0	NA	NA	1.9	0.47	21.0	49.0
TEMVIK		6-9	3E	SI	53	28.0	NA	20.0	44.0	NA	NA	NA	1.6	0.44	19.7	41.5
TETONKA	DF	2-6	2W	CD	53	NA	NA	24.0	50.0	16.0	NA	NA	2.4	0.85	38.0	56.9
TETONKA	DF	0-2	2W	CD	55	51.0	NA	24.0	51.0	16.0	49.0	NA	2.7	0.90	40.2	57.9
TETONKA	DF	0-2	2W	WL	102	61.0	NA	NA	62.0	17.0	47.0	26.0	3.3	0.95	42.4	65.1
TETONKA	DNF	0-2	4W	CD	53	NA	NA	NA	NA	NA	NA	NA	NA	0.85	38.0	38.0
TETONKA	DNF	0-2	4W	CD	55	NA	NA	NA	NA	NA	NA	NA	NA	0.90	40.2	40.2
TETONKA	DNF	0-2	4W	WL	102	NA	NA	NA	NA	NA	NA	NA	NA	0.95	42.4	42.4
THURMAN		0-2	4E	SA	55	42.0	NA	NA	44.0	NA	43.0	NA	1.9	0.54	24.1	46.9
THURMAN		2-6	4E	SA	55	38.0	NA	NA	42.0	NA	42.0	NA	1.8	0.52	23.2	44.5
THURMAN		6-9	6E	SA	55	NA	NA	NA	NA	NA	NA	NA	1.8	0.50	22.3	41.6
TIFFANY		0-2	3W	SB	55	NA	NA	21.0	51.0	NA	NA	NA	2.6	1.39	62.1	56.6
TIFFANY		0-2	3W	SB	102	51.0	NA	NA	56.0	15.0	NA	NA	3.0	1.47	65.7	59.4
TILFORD		0-2	3C	SI	61	31.0	39.0	29.0	36.0	NA	NA	NA	2.1	0.40	17.9	56.2
TILFORD		2-6	3E	SI	61	29.0	36.0	28.0	35.0	NA	NA	NA	2.0	0.37	16.5	53.2
TILFORD		6-9	4E	SI	61	NA	31.0	NA	31.0	NA	NA	NA	1.8	0.34	15.2	48.1
TILFORD		9-15	6E	SI	61	NA	NA	NA	NA	NA	NA	NA	NA	0.30	13.4	13.4
TOBY		0-2	3E	SY	54	NA	NA	26.0	40.0	NA	NA	NA	1.4	0.35	15.6	47.5
TOBY		0-2	4E	SY	58	NA	NA	19.0	30.0	NA	NA	NA	1.2	0.30	13.4	36.4
TOBY		2-6	3E	SY	54	NA	NA	24.0	39.0	NA	NA	NA	1.3	0.35	15.6	44.7
TOBY		2-6	4E	SY	58	NA	NA	18.0	29.0	NA	NA	NA	1.1	0.30	13.4	34.4
TONKA	DF	0-2	2W	CD	53	NA	NA	25.0	50.0	15.0	NA	NA	2.3	0.75	33.5	56.1
TONKA	DF	0-2	2W	CD	55	NA	NA	25.0	51.0	16.0	NA	NA	2.5	0.80	35.7	58.4
TONKA	DF	0-2	2W	WL	102	NA	NA	NA	62.0	16.0	NA	23.0	3.2	0.90	40.2	64.2
TONKA	DNF	0-2	4W	CD	53	NA	NA	NA	NA	NA	NA	NA	NA	0.75	33.5	33.5
TONKA	DNF	0-2	4W	CD	55	NA	NA	NA	NA	NA	NA	NA	NA	0.80	35.7	35.7
TONKA	DNF	0-2	4W	WL	102	NA	NA	NA	NA	NA	NA	NA	NA	0.90	40.2	40.2
TOWNER		0-2	3S	SY	102	52.0	NA	NA	47.0	18.0	NA	19.0	2.2	0.68	30.4	53.8
TRAVESSILLA		2-15	6S	SW	62	NA	NA	NA	NA	NA	NA	NA	NA	0.60	26.8	26.8
TRAVESSILLA		2-25	6S	SW	61	NA	NA	NA	NA	NA	NA	NA	NA	0.32	14.3	14.3
TRAVESSILLA		15-40	7S	SW	62	NA	NA	NA	NA	NA	NA	NA	NA	0.55	24.6	24.6
TRAVESSILLA		25-40	7S	SW	61	NA	NA	NA	NA	NA	NA	NA	NA	0.29	13.0	13.0
TREMBLES		0-2	3E	OV	54	31.0	30.0	24.0	44.0	NA	NA	NA	1.6	0.70	31.3	49.1
TRENT		0-2	1	SI	102	94.0	NA	NA	92.0	NA	79.0	39.0	4.3	0.72	32.2	98.6
TRIPP		0-2	3C	SI	60	23.0	31.0	NA	31.0	NA	NA	NA	1.5	0.32	14.3	40.4
TRIPP		2-6	3E	SI	60	NA	27.0	NA	28.0	NA	NA	NA	1.3	0.32	14.3	40.2
TRIPP		6-9	4E	SI	60	NA	22.0	NA	26.0	NA	NA	NA	1.2	0.29	13.0	35.0
TUTHILL		0-2	3E	SY	63	34.0	33.0	NA	46.0	NA	41.0	NA	1.5	0.45	20.1	48.6

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SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
TUTHILL		0-2	3E	SY	64	32.0	33.0	NA	45.0	NA	35.0	NA	1.4	0.37	16.5	46.0
TUTHILL		0-2	3E	SY	66	34.0	34.0	NA	47.0	NA	42.0	NA	1.6	0.46	20.6	49.9
TUTHILL		0-2	4E	SY	60	18.0	25.0	NA	30.0	NA	NA	NA	1.2	0.34	15.2	33.8
TUTHILL		0-2	4E	SY	61	23.0	30.0	NA	36.0	NA	NA	NA	1.5	0.34	15.2	41.3
TUTHILL		2-6	3E	SY	63	32.0	31.0	NA	43.0	NA	38.0	NA	1.4	0.41	18.3	45.4
TUTHILL		2-6	3E	SY	64	30.0	31.0	NA	41.0	NA	34.0	NA	1.3	0.33	14.7	43.1
TUTHILL		2-6	3E	SY	66	31.0	31.0	NA	44.0	NA	41.0	NA	1.5	0.43	19.2	46.6
TUTHILL		2-6	4E	SY	60	17.0	24.0	NA	NA	NA	NA	NA	1.1	0.30	13.4	32.1
TUTHILL		2-6	4E	SY	61	22.0	29.0	NA	32.0	NA	NA	NA	1.4	0.32	14.3	38.8
TUTHILL		6-9	4E	SY	63	28.0	28.0	NA	37.0	NA	32.0	NA	1.2	0.39	17.4	39.6
TUTHILL		6-9	4E	SY	64	25.0	26.0	NA	34.0	NA	26.0	NA	1.1	0.31	13.9	35.5
TUTHILL		6-9	4E	SY	66	NA	NA	NA	37.0	NA	33.0	NA	1.3	0.40	17.9	36.6
TUTHILL		6-15	6E	SY	60	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
TUTHILL		6-15	6E	SY	61	NA	NA	NA	NA	NA	NA	NA	NA	0.30	13.4	13.4
TUTHILL		9-15	6E	SY	63	NA	NA	NA	NA	NA	NA	NA	NA	0.35	15.6	15.6
TUTHILL		9-15	6E	SY	64	NA	NA	NA	NA	NA	NA	NA	NA	0.29	13.0	13.0
TUTHILL		9-15	6E	SY	66	NA	NA	NA	NA	NA	NA	NA	NA	0.37	16.5	16.5
TUTHILL-SIL		0-2	2C	SI	66	44.0	NA	40.0	52.0	NA	55.0	NA	1.8	0.45	20.1	62.4
TUTHILL-SIL		2-6	2E	SI	66	42.0	NA	38.0	50.0	NA	53.0	NA	1.6	0.43	19.2	59.2
TUTHILL-SIL		6-9	3E	SI	66	38.0	NA	34.0	45.0	NA	47.0	NA	1.5	0.41	18.3	53.3
TWILIGHT		2-6	4E	SY	58	NA	NA	NA	NA	NA	NA	NA	1.0	0.30	13.4	23.1
TWILIGHT		6-15	6E	SY	58	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
TWOTOP		0-9	6S	DC	60	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
TWOTOP		0-9	6S	DC	61	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
ULEN		0-2	3E	SY	55	37.0	NA	21.0	51.0	13.0	NA	NA	2.2	0.48	21.4	49.0
ULEN		0-2	3S	SY	102	43.0	NA	NA	58.0	14.0	NA	NA	2.5	0.66	29.5	54.1
ULYSSES		0-2	2C	SI	64	32.0	39.0	NA	40.0	NA	36.0	NA	1.5	0.40	17.9	48.3
ULYSSES		0-2	3C	SI	60	NA	29.0	NA	31.0	NA	NA	NA	1.2	0.34	15.2	42.0
ULYSSES		2-6	2E	SI	64	30.0	36.0	NA	38.0	NA	34.0	NA	1.3	0.37	16.5	44.7
ULYSSES		2-6	3E	SI	60	NA	26.0	NA	28.0	NA	NA	NA	1.1	0.31	13.9	37.9
ULYSSES		6-9	3E	SI	64	25.0	33.0	NA	34.0	NA	27.0	NA	1.2	0.34	15.2	39.3
ULYSSES		6-9	4E	SI	60	NA	NA	NA	23.0	NA	NA	NA	1.0	0.29	13.0	24.3
ULYSSES		9-15	4E	SI	64	NA	28.0	NA	28.0	NA	21.0	NA	1.1	0.31	13.9	35.8
VALE		0-2	3C	SI	61	31.0	39.0	29.0	36.0	NA	NA	NA	2.1	0.32	14.3	56.2
VALE		2-6	3E	SI	61	29.0	36.0	28.0	35.0	NA	NA	NA	2.0	0.29	13.0	53.2
VALE		6-9	4E	SI	61	NA	31.0	23.0	31.0	NA	NA	NA	1.8	0.27	12.1	50.7
VALENTINE		0-9	6E	SA	60	NA	NA	NA	NA	NA	NA	NA	NA	0.30	13.4	13.4
VALENTINE		0-15	6E	SA	64	NA	NA	NA	NA	NA	NA	NA	NA	0.42	18.8	18.8
VALENTINE		0-15	6E	SA	65	NA	NA	NA	NA	NA	NA	NA	NA	0.42	18.8	18.8
VALENTINE		0-15	6E	SA	66	NA	NA	NA	NA	NA	NA	NA	NA	0.48	21.4	21.4

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SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
VALENTINE		9-25	7E	SA	60	NA	NA	NA	NA	NA	NA	NA	NA	0.26	11.6	11.6
VALENTINE		15-40	7E	SA	64	NA	NA	NA	NA	NA	NA	NA	NA	0.38	17.0	17.0
VALENTINE		15-40	7E	SA	65	NA	NA	NA	NA	NA	NA	NA	NA	0.40	17.9	17.9
VALENTINE		15-40	7E	SA	66	NA	NA	NA	NA	NA	NA	NA	NA	0.47	21.0	21.0
VALLERS	DF	0-2	2W	SB	55	NA	NA	24.0	48.0	12.0	NA	NA	2.5	1.20	53.6	53.4
VALLERS	DF	0-2	2W	SB	102	55.0	NA	NA	54.0	13.0	NA	NA	2.6	1.27	56.7	55.9
VALLERS	S	0-2	4W	SB	55	NA	NA	NA	39.0	NA	NA	NA	1.9	1.10	49.2	43.5
VALLERS	S	0-2	4W	SB	102	36.0	NA	NA	49.0	NA	NA	NA	2.1	1.17	52.3	46.9
VALLERS	DNF	0-2	4W	SB	55	NA	NA	NA	NA	NA	NA	NA	NA	1.20	53.6	53.6
VALLERS	DNF	0-2	4W	SB	102	NA	NA	NA	NA	NA	NA	NA	NA	1.27	56.7	56.7
VANG		0-2	2S	SI	102	45.0	NA	NA	50.0	15.0	NA	17.0	1.9	0.59	26.4	48.5
VANG		0-2	3S	SI	55	37.0	NA	22.0	46.0	12.0	NA	NA	1.7	0.54	24.1	45.4
VEBAR		0-2	3E	SY	54	31.0	29.0	25.0	39.0	NA	NA	NA	1.4	0.38	17.0	47.2
VEBAR		0-2	4E	SY	58	NA	29.0	19.0	29.0	NA	NA	NA	1.3	0.34	15.2	43.6
VEBAR		2-6	3E	SY	54	30.0	26.0	23.0	36.0	NA	NA	NA	1.3	0.35	15.6	43.5
VEBAR		2-6	4E	SY	58	NA	NA	18.0	25.0	NA	NA	NA	1.2	0.30	13.4	33.7
VEBAR		6-9	4E	SY	54	NA	22.0	19.0	31.0	NA	NA	NA	1.1	0.33	14.7	39.1
VEBAR		6-15	6E	SY	58	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
VEBAR		9-25	6E	SY	54	NA	NA	NA	NA	NA	NA	NA	NA	0.31	13.9	13.9
VENLO		0-2	5W	WL	55	NA	NA	NA	NA	NA	NA	NA	NA	0.95	42.4	42.4
VERDEL		0-2	3S	CY	63	32.0	32.0	NA	41.0	NA	37.0	NA	2.1	0.46	20.6	48.4
VETAL		0-2	3E	SY	64	40.0	36.0	NA	50.0	NA	40.0	NA	2.0	0.38	17.0	54.1
VETAL		0-2	3E	SY	65	NA	NA	NA	47.0	NA	NA	NA	1.9	0.38	17.0	47.9
VETAL		0-2	3E	SY	66	53.0	NA	40.0	55.0	NA	47.0	NA	2.4	0.48	21.4	65.9
VETAL		0-2	4E	SY	60	25.0	30.0	NA	31.0	NA	NA	NA	1.6	0.32	14.3	41.0
VETAL		0-2	4E	SY	61	33.0	35.0	NA	39.0	NA	NA	NA	2.1	0.32	14.3	51.0
VETAL		2-6	3E	SY	64	35.0	32.0	NA	45.0	NA	38.0	NA	1.8	0.35	15.6	48.8
VETAL		2-6	3E	SY	65	NA	NA	NA	41.0	NA	NA	NA	1.7	0.35	15.6	42.3
VETAL		2-6	3E	SY	66	51.0	NA	37.0	54.0	NA	45.0	NA	2.3	0.45	20.1	62.8
VETAL		2-6	4E	SY	60	21.0	28.0	NA	29.0	NA	NA	NA	1.4	0.29	13.0	37.1
VETAL		2-6	4E	SY	61	31.0	33.0	NA	35.0	NA	NA	NA	1.8	0.29	13.0	46.5
VETAL		6-9	4E	SY	64	28.0	NA	NA	36.0	NA	33.0	NA	1.5	0.31	13.9	35.8
VETAL		6-9	4E	SY	65	NA	NA	NA	32.0	NA	NA	NA	1.5	0.31	13.9	35.0
VETAL		6-9	4E	SY	66	40.0	NA	NA	48.0	NA	37.0	NA	1.8	0.39	17.4	45.2
VIBORG		0-2	1	OV	102	90.0	NA	NA	91.0	28.0	76.0	38.0	4.1	1.20	53.6	95.8
VIBORG		2-6	2E	SI	102	87.0	NA	NA	87.0	26.0	71.0	37.0	3.9	0.68	30.4	91.2
VIDA		2-6	3E	SI	53	24.0	NA	21.0	39.0	14.0	NA	NA	1.7	0.45	20.1	42.0
VIDA		6-9	4E	SI	53	22.0	NA	16.0	35.0	NA	NA	NA	1.5	0.41	18.3	34.3
VIDA		9-25	6E	SI	53	NA	NA	NA	NA	NA	NA	NA	NA	0.39	17.4	17.4
VIENNA		0-2	1	SI	102	73.0	NA	NA	81.0	19.0	NA	27.0	2.9	0.68	30.4	73.8

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APPENDIX TABLE D-1. RATINGS DEVELOPED FROM CROP AND RANGE YIELD ESTIMATES FOR SOUTH DAKOTA SOILS*

SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
VIENNA		2-6	2E	SI	102	71.0	NA	NA	77.0	18.0	NA	24.0	2.8	0.63	28.2	69.8
VIENNA		6-9	3E	SI	102	61.0	NA	NA	72.0	16.0	NA	19.0	2.7	0.61	27.3	62.2
VIENNA		9-15	4E	SI	102	45.0	NA	NA	54.0	NA	NA	NA	2.4	0.59	26.4	54.2
VIENNA		15-25	6E	SI	102	NA	NA	NA	NA	NA	NA	NA	NA	0.57	25.5	25.5
VIENNA	E	2-6	3E	SI	102	61.0	NA	NA	75.0	17.0	NA	20.0	2.7	0.61	27.3	64.0
VIENNA	E	6-9	4E	SI	102	54.0	NA	NA	62.0	NA	NA	NA	2.4	0.59	26.4	60.4
VIENNA	E	9-15	6E	SI	102	NA	NA	NA	NA	NA	NA	NA	2.2	0.57	25.5	50.8
VOLGA	DF	0-2	2W	SB	102	62.0	NA	NA	65.0	13.0	NA	27.0	3.1	1.30	58.1	64.6
VOLGA	DNF	0-2	4W	SB	102	NA	NA	NA	NA	NA	NA	NA	NA	1.30	58.1	58.1
VOLIN		0-2	1	OV	102	95.0	NA	NA	82.0	24.0	76.0	37.0	4.0	1.33	59.4	91.9
WABEK		2-9	6S	VS	53	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
WABEK		9-15	7S	VS	53	NA	NA	NA	NA	NA	NA	NA	NA	0.23	10.3	10.3
WAKONDA		0-2	2E	SI	102	66.0	NA	NA	67.0	NA	53.0	21.0	2.6	1.07	47.8	64.0
WAKONDA	S	0-2	3W	SB	102	59.0	NA	NA	56.0	NA	43.0	NA	2.3	1.20	53.6	57.1
WALKE		0-2	3S	CY	53	32.0	33.0	24.0	50.0	NA	39.0	NA	1.7	0.52	23.2	51.4
WALKE		2-6	3E	CY	53	31.0	32.0	23.0	48.0	NA	36.0	NA	1.6	0.52	23.2	49.1
WANBLEE		0-9	6S	TCP	60	NA	NA	NA	NA	NA	NA	NA	NA	0.15	6.7	6.7
WANBLEE		0-9	6S	TCP	61	NA	NA	NA	NA	NA	NA	NA	NA	0.12	5.4	5.4
WANBLEE		0-9	6S	TCP	63	NA	NA	NA	NA	NA	NA	NA	NA	0.17	7.6	7.6
WANBLEE		0-9	6S	TCP	64	NA	NA	NA	NA	NA	NA	NA	NA	0.32	14.3	14.3
WANBLEE		0-9	6S	TCP	66	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
WANN		0-2	3W	SB	66	50.0	NA	NA	47.0	NA	NA	NA	2.8	1.35	60.3	56.5
WANN		0-2	3W	SB	102	66.0	NA	NA	76.0	17.0	56.0	27.0	3.5	1.48	66.1	71.5
WASA		0-9	6S	DC	60	NA	NA	NA	NA	NA	NA	NA	NA	0.23	10.3	10.3
WASA		0-9	6S	DC	61	NA	NA	NA	NA	NA	NA	NA	NA	0.23	10.3	10.3
WASA		0-9	6S	DC	63	NA	NA	NA	NA	NA	NA	NA	NA	0.32	14.3	14.3
WASA		9-25	7S	DC	60	NA	NA	NA	NA	NA	NA	NA	NA	0.21	9.4	9.4
WASA		9-25	7S	DC	61	NA	NA	NA	NA	NA	NA	NA	NA	0.19	8.5	8.5
WASA		9-25	7S	DC	63	NA	NA	NA	NA	NA	NA	NA	NA	0.27	12.1	12.1
WATROUS		0-2	3S	SI	54	34.0	NA	28.0	48.0	NA	NA	NA	1.7	0.39	17.4	49.9
WAUBAY		0-2	1	SI	102	77.0	NA	NA	84.0	24.0	NA	27.0	3.4	0.68	30.4	81.1
WAUBAY		2-6	2E	SI	102	73.0	NA	NA	81.0	19.0	NA	27.0	3.3	0.63	28.2	75.6
WAYDEN		2-15	6S	SW	54	NA	NA	NA	NA	NA	NA	NA	NA	0.30	13.4	13.4
WAYDEN		15-40	7S	SW	54	NA	NA	NA	NA	NA	NA	NA	NA	0.26	11.6	11.6
WENTWORTH		0-2	1	SI	102	86.0	NA	NA	83.0	27.0	75.0	33.0	3.8	0.68	30.4	89.6
WENTWORTH		2-6	2E	SI	102	81.0	NA	NA	81.0	26.0	72.0	31.0	3.7	0.66	29.5	85.9
WENTWORTH		6-9	3E	SI	102	71.0	NA	NA	73.0	NA	62.0	28.0	3.4	0.64	28.6	75.7
WHITELAKE		0-2	4E	SY	60	NA	NA	NA	30.0	NA	NA	NA	0.9	0.32	14.3	27.0
WHITELAKE		0-2	4E	SY	61	NA	NA	NA	31.0	NA	NA	NA	1.0	0.37	16.5	28.7
WHITELAKE		0-6	4E	SY	64	NA	NA	NA	29.0	NA	NA	NA	1.3	0.40	17.9	31.0

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SOIL SERIES NAME 1**	PHASE 2	SLOPE (PCT) 3	LAND CAPABILITY SUBCLASS 4	RANGE SITE 5	LAND RESOURCE AREA 6	CORN GRAIN (BU/A) 7	WHEAT (BU/A) WTR 8	WHEAT (BU/A) SPR 9	OATS (BU/A) 10	FLAX (BU/A) 11	SORGHUM GRAIN (BU/A) 12	SOY-BEANS (BU/A) 13	ALFALFA (T/A) 14	RANGE YIELD (AUMS) 15	RANGE RATING (PCT) 16	SOIL RATING (PCT) 17
WHITELAKE		0-6	4E	SY	65	NA	NA	NA	31.0	NA	NA	NA	0.9	0.42	18.8	27.5
WHITELAKE		0-6	4E	SY	66	NA	NA	NA	33.0	NA	NA	NA	1.4	0.52	23.2	34.4
WHITEWOOD	DF	0-2	2W	OV	102	77.0	NA	NA	74.0	23.0	63.0	29.0	3.4	1.15	51.4	78.4
WHITEWOOD	DNF	0-2	4W	OV	102	NA	NA	NA	NA	NA	NA	NA	NA	1.15	51.4	51.4
WILLIAMS		0-2	2C	SI	53	38.0	NA	27.0	56.0	17.0	NA	NA	2.1	0.48	21.4	55.8
WILLIAMS		2-6	2E	SI	53	37.0	NA	26.0	54.0	15.0	NA	NA	2.0	0.45	20.1	52.7
WILLIAMS		6-9	3E	SI	53	32.0	NA	24.0	50.0	NA	NA	NA	1.8	0.43	19.2	47.9
WILLIAMS		9-15	4E	SI	53	28.0	NA	17.0	42.0	NA	NA	NA	1.5	0.41	18.3	38.5
WILLIAMS		15-25	6E	SI	53	NA	NA	NA	NA	NA	NA	NA	NA	0.39	17.4	17.4
WINLER		0-9	6S	DC	60	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
WINLER		0-9	6S	DC	61	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
WITTEN		0-2	3S	CY	63	42.0	45.0	NA	60.0	NA	60.0	NA	2.2	0.48	21.4	66.4
WOLF POINT		0-2	3C	OV	58	NA	NA	23.0	36.0	NA	NA	NA	1.5	0.63	28.2	44.3
WOODLY		0-2	3E	SY	63	36.0	36.0	NA	47.0	NA	48.0	NA	1.8	0.45	20.1	53.6
WOODLY		0-2	3E	SY	64	33.0	36.0	NA	46.0	NA	47.0	NA	1.8	0.42	18.8	52.5
WOODLY		2-6	3E	SY	63	33.0	31.0	NA	44.0	NA	46.0	NA	1.6	0.41	18.3	48.7
WOODLY		2-6	3E	SY	64	32.0	31.0	NA	43.0	NA	45.0	NA	1.6	0.38	17.0	48.0
WOODLY		6-9	4E	SY	63	NA	NA	NA	37.0	NA	37.0	NA	1.4	0.39	17.4	39.0
WOODLY		6-9	4E	SY	64	NA	NA	NA	37.0	NA	36.0	NA	1.4	0.34	15.2	38.6
WORTHING	DF	0-2	3W	WL	102	62.0	NA	NA	67.0	17.0	47.0	24.0	3.0	0.95	42.4	64.2
WORTHING	DNF	0-2	5W	WL	102	NA	NA	NA	NA	NA	NA	NA	NA	0.95	42.4	42.4
WORTMAN		0-2	4S	CP	60	NA	NA	NA	20.0	NA	NA	NA	0.8	0.21	9.4	20.3
WORTMAN		0-2	4S	CP	61	NA	NA	NA	NA	NA	NA	NA	1.0	0.23	10.3	23.1
WORTMAN		0-2	4S	CP	64	NA	14.0	NA	24.0	NA	20.0	NA	0.9	0.32	14.3	25.5
WORTMAN		2-6	4S	CP	64	NA	13.0	NA	NA	NA	16.0	NA	0.8	0.32	14.3	22.0
WORTMAN		2-6	6S	CP	60	NA	NA	NA	NA	NA	NA	NA	NA	0.21	9.4	9.4
WORTMAN		2-6	6S	CP	61	NA	NA	NA	NA	NA	NA	NA	NA	0.23	10.3	10.3
WORTMAN		6-9	6E	CP	60	NA	NA	NA	NA	NA	NA	NA	NA	0.19	8.5	8.5
WORTMAN		6-9	6E	CP	61	NA	NA	NA	NA	NA	NA	NA	NA	0.19	8.5	8.5
WORTMAN		6-9	6E	CP	64	NA	NA	NA	NA	NA	NA	NA	NA	0.30	13.4	13.4
YAWDIM		2-15	6S	SW	58	NA	NA	NA	NA	NA	NA	NA	NA	0.25	11.2	11.2
YAWDIM		15-40	7S	SW	58	NA	NA	NA	NA	NA	NA	NA	NA	0.22	9.8	9.8
ZAHILL		2-6	4E	TU	53	NA	NA	15.0	38.0	13.0	NA	NA	1.3	0.37	16.5	38.9
ZAHILL		6-9	4E	TU	53	NA	NA	14.0	35.0	NA	NA	NA	1.2	0.34	15.2	34.0
ZAHILL		9-25	6E	TU	53	NA	NA	NA	NA	NA	NA	NA	NA	0.31	13.9	13.9
ZAHL		2-6	4E	TU	53	NA	NA	15.0	38.0	13.0	NA	NA	1.3	0.37	16.5	38.9
ZAHL		6-9	4E	TU	53	NA	NA	14.0	35.0	NA	NA	NA	1.4	0.36	16.1	35.5
ZAHL		9-25	6E	TU	53	NA	NA	NA	NA	NA	NA	NA	NA	0.33	14.7	14.7
ZAHL		25-40	7E	TU	53	NA	NA	NA	NA	NA	NA	NA	NA	0.30	13.4	13.4
ZAHL	E	2-6	4E	TU	53	NA	NA	14.0	33.0	NA	NA	NA	1.4	0.35	15.6	34.8

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ZAHL	E	6-9	6E	TU	53	NA	NA	NA	NA	NA	NA	NA	1.2	0.33	14.7	27.7
ZELL		0-2	3E	TU	53	36.0	NA	15.0	39.0	13.0	NA	NA	1.6	0.39	17.4	40.4
ZELL		2-6	3E	TU	102	35.0	NA	17.0	47.0	13.0	NA	NA	2.0	0.50	22.3	44.8
ZELL		2-6	4E	TU	53	33.0	NA	14.0	37.0	12.0	NA	NA	1.5	0.37	16.5	37.6
ZELL		6-9	4E	TU	102	NA	NA	NA	NA	NA	NA	NA	2.0	0.47	21.0	46.2
ZELL		6-9	4E	TU	53	NA	NA	13.0	33.0	NA	NA	NA	1.4	0.35	15.6	33.9
ZELL		9-25	6E	TU	102	NA	NA	NA	NA	NA	NA	NA	NA	0.43	19.2	19.2
ZELL		9-25	6E	TU	53	NA	NA	NA	NA	NA	NA	NA	NA	0.33	14.7	14.7
ZELL		25-40	7E	TU	53	NA	NA	NA	NA	NA	NA	NA	NA	0.31	13.9	13.9
ZELL	E	2-6	4E	TU	53	32.0	NA	13.0	33.0	NA	NA	NA	1.2	0.35	15.6	32.8
ZELL	E	6-9	6E	TU	53	NA	NA	NA	NA	NA	NA	NA	NA	0.33	14.7	14.7
ZEONA		0-9	6E	SA	58	NA	NA	NA	NA	NA	NA	NA	NA	0.31	13.9	13.9
ZOOK		0-2	2W	CY	102	88.0	NA	NA	80.0	NA	82.0	30.0	3.8	0.72	32.2	88.5

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Definition of Abbreviations, Appendix Table D-1 on page 106

Definition of Abbreviations, Appendix Table D-1

Soil Series Phases (Column 2)

DF = soil series phase where drainage is feasible; feasibility determined by on-site inspection

DNF = soil series phase where drainage is not feasible; feasibility determined by on-site inspection

E = soil series phase moderately to severely affected by erosion

HWT = soil series phase with a high water table present

S = soil series phase influenced by high salt content

SIL = soil series phase with silt loam texture

Land Capability (Column 4)

Land Capability Classes (arabic number)

1—Class 1 soils can be used continuously for intensive crop production with minimum attention other than good farming practices. No limitations for crop production.

2—Class 2 soils have slight limitations for intensive crop production, such as moderately steep slopes (2-5%) or the climate is too cold or too dry.

3—Class 3 soils have moderate to severe limitations and require more special conservation practices than Class 2 soils to keep them continuously productive. They have shallow soil, steep slopes of 6-10%, the climate is too dry or too cold, or they have shallow water tables.

4—Class 4 soils have very severe limitations and need a greater intensity of conservation practices for cultivated crops than Class 3 soils. Most of the time these soils should be in permanent crops such as pastures.

5—Class 5 soils are not likely to erode but have other limitations, especially wetness, which are impractical to correct and thus cannot be cultivated. They should be used for pasture, range, woodland or wildlife habitat.

6—Class 6 soils are suitable for the same uses as Class 5 soils, but they have a greater need for good management to maintain production because of limitations such as steep slopes, rocks or shallow soils.

7—Class 7 soils have very severe limitations which require extreme care to protect the soil, even with very limited use for grazing, wildlife or timber.

8—Class 8 soils have such severe limitations that they should not be used for any type of agricultural production. These soils can be used wisely for wildlife, recreation, watersheds, and esthetic purposes.

Land Capability Subclasses (lower case letter column 4)

c—climate hazard land capability subclass. The symbol 2c is soil management capability Class 2 soils with climate as the principal limitation for intensive crop production. The "c" symbol is used when the climate is too dry or too cold for crop production.

e—erosion hazard land capablity subclass. The symbol 4e is soil management capability Class 4 soil with very severe erosion hazard as the principal limitation for intensive crop production.

s—soil hazard land capability subclass. The symbol 6s is soil management capability Class 6 soil with soil problems as the principal limitation for grass production. Soil hazards include such things as, a shallow soil, a droughty soil, rocks or stones, salt, and the thickness of and the depth to a claypan.

w—wetness hazard land capability subclass. The symbol 5w is soil management capability Class 5 soil with wetness problems as the principal limitation for grass production. Wetness hazards include such things as high water tables, flooding, or ponding.

Range Site (Column 5)

Symbol	Range Site		
CD	Closed Depression	SI	Silty
CHS	Choppy Sands	SL	Saline Lowland
CP	Claypan	SU	Saline Upland
CS	Clay Savannah	SW	Shallow
CY	Clayey	SWG	Shallow to Gravel
DC	Dense Clay	SY	Sandy
OV	Overflow	TCP	Thin Claypan
PC	Porous Clay	TU	Thin Upland
SA	Sands	VS	Very Shallow
SB	Subirrigated	WL	Wetland
SDC	Shallow Dense Clay		

Appendix E. Progress of Soil Surveys in South Dakota.

A detailed soil survey made on a large-scale aerial photo base map is an essential part of agricultural planning and development. By its use, agronomic research can be extended to farmer's fields. Such soil surveys are being made in South Dakota as cooperative projects by the South Dakota Agricultural Experiment Station and the U.S. Soil Conservation Service. The U.S. Bureau of Indian Affairs, the Bureau of Reclamation, and the Missouri River Basin Investigations Agency cooperate with soil surveys or land classification on lands of special interest to them.

The principal practical purpose of soil surveys is to provide a basis for the study of crop and soil relationships with a view of increasing productivity and to help in soil conservation and reclamation. Soil surveys furnish a link between research and the farmer.

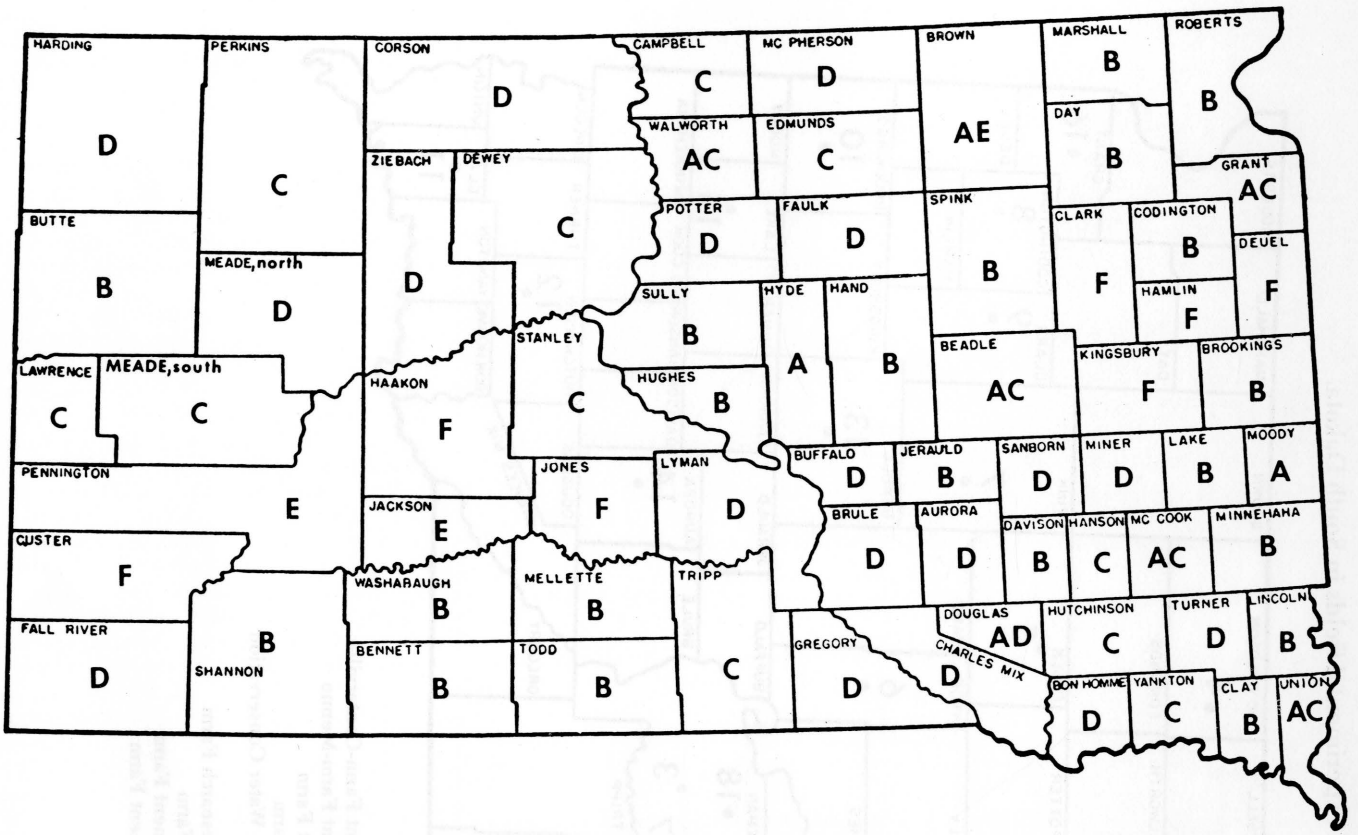
The status of published soil surveys in South Dakota is shown in appendix figure E-1. Surveys are classified as "old reconnaissance soil surveys" and "modern detailed soil surveys."

The old reconnaissance soil surveys were made prior to 1929 and represent the state of soils knowledge of that period. The maps were made on a small scale and without benefit of an aerial photo base map. The accompanying report describes the soils but does not interpret them. South Dakota did not have a state program of soil survey from 1929 to 1947; although the federal government began a sustained program of soil survey in South Dakota in 1932 in connection with the Soil Erosion Survey and the Bureau of Plant Industry, Soils, and Agricultural Engineering. Later the federal soil surveys were combined in the Soil Conservation Service.

The "modern detailed soil surveys" have been published since 1947. The field mapping for these surveys has been done on aerial photo base maps and the accompanying bulletins provide interpretation for the soils mapped. Copies of these published soil surveys may be obtained from the South Dakota State University Agricultural Experiment Station at Brookings or by contacting the County Extension Agent or Soil Conservation officer.

The tentative publication schedule is as follows: in 1978—Dewey, Hanson and Hutchinson, Union, Edmunds, and the southern part of Meade; in 1979—Beadle, Lawrence, McCook, Perkins, Tripp, and Walworth; and in 1980—Grant, Stanley, and Yankton.

Appendix Figure E-1. Progress of soil surveys in South Dakota, (August 1, 1977).



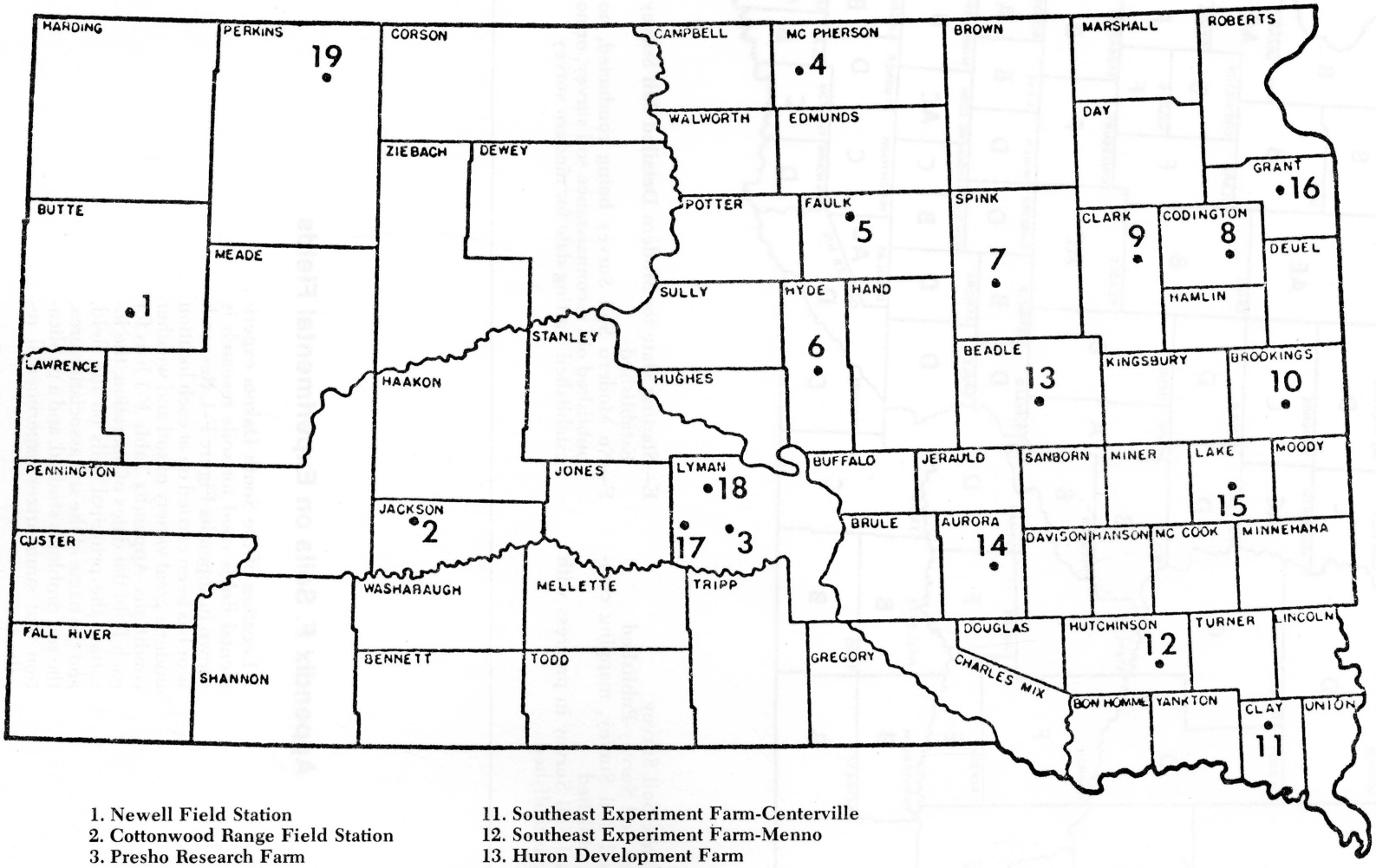
A—Old Reconnaissance Soil Survey
B—Modern Detailed Soil Survey-Published
C—Modern Detailed Soil Survey, mapping completed but not published
D—Modern Detailed Soil Survey in progress with completion date established
E—Starting Date for Modern Detailed Soil Survey Established
F—No Modern Soil Survey being conducted, no published old reconnaissance soil survey, or no established starting date for modern survey

Appendix F. Soils on Experimental Fields

Location of the South Dakota experimental fields used for soils research is shown in appendix Figure F-1. Research is or has been carried on at each location under a great variety of soil and weather conditions. Appendix Table F-1 lists for each field the dates of operation, the location, the principal soils on the field, and the name of the soil association area, the soil problems studied, and a publication that summarizes experimental results.

South Dakota maintains other fields not shown on the map for experimental work in other sciences. An example is the Antelope Range in Harding County.

Appendix Figure F-1. Location of soil experimental fields in South Dakota.



1. Newell Field Station
2. Cottonwood Range Field Station
3. Presho Research Farm
4. North Central Substation
5. Pasture Research Center
6. Central Research Substation
7. Redfield Research Farm
8. Northeast Research Farm
9. Garden City Research Farm
10. Agronomy Farm-Brookings
11. Southeast Experiment Farm-Centerville
12. Southeast Experiment Farm-Menno
13. Huron Development Farm
14. Claypan Research Farm
15. Eastern SD Soil and Water Conservation Research Farm
16. Whetstone Valley Research Farm
17. Vivian Experiment Farm
18. Reed Ranch Experiment Farm
19. Shadehill Development Farm

Appendix Table F-1. Soils and Kinds of Investigations on the Experiment Fields used for Soils Related Research

Field or Station	Dates of Operation	Location (County)	Post Office	Dominant Soil on the field	Name of Soil Association	Soil Problems Studied	Recent Bulletin Summarizing Research
1. Newell Field Station	1907-1969	Butte	Newell	Pierre clay	Pierre-Lismas	Rotations, residues, and fertility	ARS 41-15 "50 years of Agricultural Research at the USDA Newell Field Station
2. Cottonwood Range Field Station	1909-1967	Jackson	Cottonwood	Pierre clay	Pierre-Samsil	Rotations, residues, and fertility	Circ. 116
3. Presho Farm	1957-1973	Lyman	Presho	Promise clay	Opal-Promise	Rotations, residues, and fertility	1973 Annual Progress Report
4. North Central Substation	1908-1972	McPherson	Eureka	Williams loam	Williams-Tonka	Rotation experiments involving legumes	Circ. 103
5. Pasture Research Ctr.	1965-Present	Faulk	Wecota	Williams loam	Williams-Tonka	Efficiency of beef cattle production	Annual Progress Reports
6. Central Research Station	1907-Present	Hyde	Highmore	Glenham loam	Glenham-Hoven-Java	Rotation, tillage and residue experiments	Plant Science Pamphlet #27
7. Redfield Farm	1947-Present	Spink	Redfield	Beotia silt loam	Harmony-Aberdeen-Beotia	Management of irrigated soils	Annual Progress Report
8. Northeast Research Farm	1956-Present	Codington	Watertown	Kranzburg silt loam	Kranzburg-Brookings	Rotations, fertilizers, and legumes	Annual Progress Report
9. Garden City Farm	1964-1973	Clark	Garden City	Poinsett silt loam	Poinsett-Waubay-Parnell	Rotations, fertilizers, and legumes	1973 Annual Progress Report
10. Agronomy Farm	1941-Present	Brookings	Brookings	Vienna loam	Kranzburg-Brookings	Rotations, fertilizers, tillage, and residues	Cir. 123
11. Southeast Experiment Farm	1961-Present	Clay	Beresford	Egan silt loam	Egan-Wentworth-Viborg	Rotations, fertility, tillage methods, and residue experiments	Annual Progress Report
12. Southeast Experiment Farm	1955-1960	Hutchinson	Menno	Houdek loam	Houdek-Prosper	Rotations, fertility, tillage methods, and residue experiments	1960 Annual Progress Report
13. Huron Development Farm	1947-1952	Beadle	Huron	Prosper silt loam	Houdek-Prosper	Rotations, water use, irrigation practices	1952 Annual Progress Report
14. Claypan Research Farm	1953-1968	Aurora	Plankington	Houdek loam	Houdek-Prosper	Fertility and management of claypan soils	1968 Annual Progress Report
15. Eastern SD Soil and Water Conservation Research Farm	1959-Present	Lake	Madison	Egan silty clay loam	Egan-Wentworth-Clarno	Tillage methods, runoff and erosion experiments	Annual Progress Report
16. Whetstone Valley	1969-1973	Grant	Twin Brooks	Peever silty clay loam	Peever-Forman	Fertility, rotations, and legumes	1973 Annual Progress Report
17. Vivian Experiment Farm	1913-1943	Lyman	Vivian	Opal clay	Opal-Promise	Rotations, tillage methods, legumes	1943 Annual Progress Report
18. Reed Ranch	1936-1957	Lyman	Presho	Opal clay	Opal-Promise	Selenium in soils and plants, and its influence on livestock	Circ. 135
19. Shadehill Development Farm	1951-1962	Perkins	Lemmon	Shambo loam	Rhoades-Vebar	Irrigation management using low quality water. Leaching of chemical amendments.	1962 Annual Progress Report

Appendix G. Glossary*

A Horizon–*See* Soil horizon.

ABC soil—A soil with a distinctly developed profile including A, B, and C horizons.

AC soil—A soil having a profile containing only A and C horizons with no clearly developed B horizon.

Acre-Foot—The volume that will cover 1 acre to a depth of 1 foot (43,560 cu. ft.).

Aeration, Soil—The process by which air in the soil is replaced by air from the atmosphere. In a well-aerated soil, the soil atmosphere is similar in composition to the atmosphere above the soil. Poorly aerated soils usually contain a much higher percentage of carbon dioxide and a correspondingly lower percentage of oxygen than the atmosphere above the soil. The rate of aeration depends largely on the size, volume, and continuity of pores from the surface and within the soil.

Aggregation, Soil—The cementing or binding together of several soil particles into a secondary unit, aggregate, or granule. Water-stable aggregates, which will not slake, crumble, or disintegrate easily, are of special importance to a stable soil structure and greater plant growth.

Agronomy—A specialization of agriculture concerned with the theory and practice of field crop production and soil management. The scientific management of land.

Air-Dry—(1.) The state of dryness (a of soil) at equilibrium with the moisture content in the surrounding atmosphere. The actual moisture content will depend upon the relative humidity and the temperature of the surrounding atmosphere. (2.) To allow to reach equilibrium in moisture content with the ambient (surrounding) atmosphere.

Alfisols—*See* soil classification, Orders.

Alkali-soil—An alkali soil has either so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15% or higher) or both, that the growth of most crop plants is reduced. Thus alkali soils as a group, have a wide range of exchangeable sodium and of pH. *See* Saline-alkali.

Alkaline soil—Any soil that is alkaline in reaction. *See* Reaction, soil.

Amendment, soil—Any substance added to the soil that alters soil properties. Examples are gypsum, lime, fertilizers, and sawdust.

Anion—A negatively charged ion or molecule (eg. NO_3-).

Aquifer—A geologic formation or structure that transmits water in sufficient quantity to supply the needs for water development. The term "water bearing" is sometimes used synonymously with aquifer when a stratum furnishes water for a specific use. Aquifers are usually saturated sands and gravels, and fractured, porous, cavernous, and vesicular rock.

Arable Land—Areas of land whose ecology and environment are suitable for the production of cultivated crops.

Aridisols—*See* Soil classification, Orders.

Aspect—The direction that a slope faces.

Available Nutrient—That portion of any essential element or compound in the soil that can be absorbed readily and assimilated by growing plants.

Available Water—The portion of water in a soil that can be readily absorbed by plant roots. Considered by most workers to be that water held in the soil between the boundary conditions of wilting point and field capacity.

Azonal Soils—Soils without distinct genetic horizons. A soil order in the 1938 system of soil classification.

B Horizon—*See* Soil horizon.

Badlands—A land type nearly devoid of vegetation, especially a region where erosion has cut the land into an intricate maze of narrow ravines, sharp crests, and pinnacles.

Base Saturation Percentage—The extent to which the adsorption complex of a soil is saturated with exchangeable cations other than hydrogen and aluminum. It is expressed as a percentage of the total cation exchange capacity.

BC soil—A soil profile with B and C horizons but with little or no A horizon.

Bedrock—The solid rock underlying soils and the regolith in depths ranging from zero (where exposed by erosion or construction) to several hundred feet.

Brown Soils—Light-colored soils of the temperate to cool arid regions. A great soil group of the 1938 system of soil classification. These soils have a brown surface and a light colored transitional subsurface horizon which overlies a zone of calcium carbonate accumulation.

Bulk Density, soil—The mass of dry soil per unit bulk volume. The bulk volume is determined before drying to constant weight at 105°C. A unit of measure expressed as *g* per cubic cm or *lb* per cubic ft.

Bulk Volume—The volume, including the solids and the pores, of an arbitrary soil mass.

C Horizon—*See* Soil horizon.

Calcareous soil—Soil containing sufficient calcium carbonate (often with magnesium carbonate) to effervesce visibly when treated with cold 0.1 *N* hydrochloric acid.

Carbon : Nitrogen Ratio—The ratio of the weight of organic carbon to the weight of total nitrogen in the soil or in organic material, obtained by dividing the percentage of organic carbon (C) by the percentage of total nitrogen (N).

Catena—A sequence of soils of about the same age, derived from similar parent material, and occurring under similar climatic conditions, but having different characteristics due to variation in *relief* and *drainage*.

Cation—A positively charged ion. Common soil cations are calcium, magnesium, sodium, potassium, ammonium, and hydrogen.

Cation Exchange—The interchange between a cation in solution and another cation on the surface of any surface-active material, such as clay colloid, organic colloid, or plant root surface.

Cation Exchange Capacity (CEC)—(Sometimes called total exchange capacity, base exchange capacity, or cation adsorption capacity). The sum total of exchangeable cations that a soil can adsorb expressed in milliequivalents per 100 g of soil, clay, or organic colloid.

Chernozem soil—A group of soils having a deep dark colored surface horizon rich in organic matter which grades below into lighter colored soil and finally into a horizon of carbonate accumulation; developed under tall and mixed grasses in a temperate to cool, subhumid climate. From the Russian for black earth. A great soil group of the 1938 system of soil classification.

Chestnut soil—A group of soils having a dark brown surface horizon which grades into lighter colored soil and finally into a horizon of carbonate accumulation; developed under mid- and short grasses in a temperate to cool semiarid climate. A great soil group of the 1938 system of soil classification.

Chroma—One of the three variables of color. The relative purity or strength (sometimes called saturation) of the spectral color. The chroma increases with increasing purity of the dominant wave length of light or decreasing grayness. *See* Munsell color notation, hue, value.

Chronosequence—A sequence of related soils that differ, one from the other, in certain properties primarily as a result of *time* as a soil-forming factor.

Classification—The assignment of objects or units to groups within a system of categories distinguished by their properties. In the classification of soils the fundamental unit is a soil series. Similar soil series are grouped to form a family.

* From *Glossary of Soil Science Terms*, 1975. Soil Science Society of America, Madison, Wisconsin. 27p. Selections used with permission, and from Donahue, R. L., R. W. Miller, and J. C. Shickluna. 1977. *Soils: An Introduction to Soils and Plant Growth*. 4th edition. Prentice-Hall, Inc. Englewood Cliffs, New Jersey 07632. pp. 557-612. Selections used with permission.

Families are grouped into subgroups, subgroups into great groups, great groups into suborders, and suborders into orders.

Clay (soils)—(1.) A mineral soil separate consisting of particles less than 0.002 mm in equivalent diameter. (2.) A soil textural class. (3) A specific mineral structure.

Clay loam—A textural class. *See* soil texture.

Claypan—A dense, compact layer in the subsoil having a much higher clay content than the overlying material, from which it is separated by a sharply defined boundary; formed by downward movement of clay or by synthesis of clay in place during soil formation. Claypans are usually hard when dry, and plastic and sticky when wet. Also, they usually impede the movement of water and air, and the growth of plant roots.

Climosequence—A sequence of related soils that differ, one from the other, in certain properties primarily as a result of the effect of *climate* as a soil forming factor.

Coarse texture—In the United States includes the sands, loamy sands and sandy loams, except the very fine sandy loam, textural classes. Sometimes subdivided into sandy and moderately coarse textured.

Colluvium—A deposit of rock fragments and soil material accumulated at the base of steep slopes as a result of gravitational action. *See* Creep.

Columnar Soil Structure—*See* Soil structure types.

Color, Soil—*See* Munsell color notation.

Concretion, soil—A local concentration of a chemical compound, such as calcium carbonate or iron oxide, in the form of an aggregate or nodule, of varying size, shape, hardness, and color.

Contour—(1.) An *imaginary* line on the surface of the earth connecting points of the same elevation. (2.) A *true* line drawn on a map connecting points of the same elevation.

Contour farming—Conducting field operations, such as plowing, planting, cultivating, and harvesting, on or approximately on the contour.

Creep, soil—Slow mass movement of soil and soil material down relatively steep slopes, primarily under the influence of gravity but facilitated by saturation with water and by alternate freezing and thawing.

Crotovina—A former animal burrow in one soil horizon that has been filled with organic matter or material from another horizon (also spelled "krotovina").

Deflation—The removal of fine soil particles from soil by wind.

Depth, Effective Soil—The depth of soil material that plant roots can penetrate readily to obtain water and plant nutrients.

Desalinization—Removal of salts from saline soil, usually by leaching with irrigation water.

Diagnostic Horizons—(As used in the Soil Classification System of the National Cooperative Soil Survey in the United States). Combinations of specific soil characteristics that are indicative of certain classes of soils. Those that form at the soil surface are called epipedons, those below the surface, endopedons. Those diagnostic horizons listed below are found in soils of South Dakota.

Albic Horizon—A surface or subsurface horizon that is nearly white because of eluviation (leaching out) of clay and free iron oxides. The light shade is the color of the remaining sand and silt. Occasionally there is a perched water table associated with the albic horizon.

Argillic Horizon—A subsurface horizon into which clay has moved. It has at least 20% more clay than the horizons above. The presence of clay films on ped surfaces and in soil pores is evidence of clay movement.

Calcic Horizon—A surface horizon more than 6 inches (15 cm) thick that has more than 15% calcium carbonate equivalent and at least 5% more carbonates than the C horizon.

Cambic Horizon—A subsurface horizon that has textures finer than loamy fine sand and in which materials have been altered or removed but not accumulated. Evidences of alteration include the elimination of fine stratifications; changes caused by wetness, such as gray colors and mottling; redistribution of carbonates; and yellower or redder colors than in the underlying horizons.

Gypsic Horizon—A weakly cemented or noncemented subsurface horizon (or on the surface when eroded severely) that contains a high concentration of gypsum, mostly $CaSO_4$. Thickness in cm × gypsum percentage is equal to or greater than 150.

Mollic Epipedon—A surface horizon that is dark colored, contains more than 1% organic matter, and is generally more than 7 inches (18 cm) thick. It has more than 50% base saturation and is not both hard and massive when dry. Dark colors have Munsell values darker than 3.5 when moist and 5.5 when dry, have Munsell chromas of less than 3.5 when moist, and have in common soil color names, such as black, very dark brown, very dark gray, or very dark grayish brown.

Natric Epipedon—A subsurface horizon that is a special kind of argillic horizon, containing 15% or more of exchangeable sodium.

Ochric Epipedon—A surface horizon that is too light in color (higher value or chroma than mollic epipedon), too low in organic matter, or too thin to be a mollic epipedon.

Salic Horizon—A saline horizon, usually below the surface, that contains at least 2% salt. Thickness in cm × salt percentage $\geq$ 60.

Dispersion, Soil—The breaking down of soil aggregates into individual particles, resulting in single-grain structure. Generally speaking, the more easily dispersed the soil, the more erodible it is.

Drainage, Soil—As a natural condition of the soil, soil drainage refers to the frequency and duration of periods when the soil is free of saturation; for example, in well-drained soils the water is removed readily but not rapidly; in poorly drained soils the root zone is waterlogged for long periods unless artificially drained, and the roots of ordinary crop plants cannot get sufficient free oxygen; in excessively drained soils the water is removed so completely that most crop plants suffer from lack of water. Strictly speaking, excessively drained soils are a result of excessive runoff due to steep slopes or low available water-holding capacity due to small amounts of silt and clay in the soil.

Drainage Tile—Concrete, plastic or ceramic pipe used to conduct excess or gravitational water from the soil.

Effective Precipitation—That portion of total precipitation that becomes available for plant growth.

Eluvial horizon—A soil horizon formed by the process of eluviation. *See* Eluviation; Illuvial horizon.

Eluviation—Removal of soil material from the upper to the lower horizon in solution or in colloidal suspension.

Entisols—*See* Soil Classification, Orders.

Erosion—(1.) The wearing away of the land surface by running water, wind, ice, or other geological agent, including such processes as gravitational creep. (2.) Detachment and movement of soil or rock fragments by water, wind, ice, or gravity. The following terms are used to describe different kinds of water erosion:

Accelerated Erosion—Erosion much more rapid than normal, natural, or geologic, primarily as a result of the influence of the activities of humans or other animals, or natural catastrophies such as fires or earthquakes.

Geological Erosion—The normal or natural erosion caused by geological processes acting over long geological periods and resulting in the wearing away of mountains, the building up of floodplains and coastal plains. Synonym: natural erosion.

Gully Erosion—The erosion process whereby water accumulates in narrow channels and over short periods, removes the soil from this narrow area to considerable depths, ranging from 1 to 2 feet (30 to 61 cm) to as much as 100 feet (30 m) or more.

Natural (normal) Erosion—Wearing away of the earth's surface by water, ice, or other natural agents under

natural environmental conditions of climate and vegetation, undisturbed by humans. Synonym: geological erosion.

Rill Erosion—An erosion process in which numerous small channels several inches deep are formed; occurs mainly on recently cultivated soil.

Sheet Erosion—The removal of a fairly uniform layer of soil from the land surface by runoff water or wind.

Splash Erosion—The spattering of small soil particles caused by the impact of raindrops on wet soils. The loosened and spattered particles may or may not be subsequently removed by surface runoff.

Esker—A narrow ridge of gravelly or sandy drift deposited by a stream from melting glacier ice.

Essential Element (plant nutrition)—A chemical element required for the normal growth of plants. From air and water: carbon, oxygen, hydrogen. Macronutrients from soil: nitrogen, phosphorus, calcium, magnesium, potassium, sulfur. Micronutrients: iron, zinc, manganese, copper, boron, molybdenum, chlorine.

Evapotranspiration—The combined loss of water from a given area, and during a specified period of time, by evaporation from the soil surface and by transpiration from plants.

Exchangeable Sodium Percentage, (ESP)—The percentage of the cation exchange capacity of a soil occupied by sodium. It is expressed as follows:

$$\text{ESP} = \frac{\text{exchangeable sodium (meq/100 g soil)}}{\text{cation-exchange capacity (meq/100 g soil)}} \times 100\%$$

Family, Soil—In soil classification one of the categories intermediate between soil subgroup and the soil series. *See* Soil classification.

Fertility, Soil—The quality of a soil that enables it to provide essential nutrients in adequate amounts and in proper balance for the growth of specified plants when other growth factors, such as light, moisture, temperature, and the physical condition of the soil, are favorable. *See* Productivity, Soil.

Fertilizer grade—The guaranteed minimum analysis in whole numbers, in percent, of the major plant nutrient elements in a fertilizer material or in a mixed fertilizer. For example, a fertilizer with a grade of 20-10-5 is guaranteed to contain 20% total nitrogen (N), 10% available phosphoric acid (P_2O_5) and 5% water-soluble potash (K_2O). Minor elements also may be included. Recent trends are to express the percentages in terms of the elemental fertilizer [nitrogen (N), phosphorus (P), and potassium (K)].

Field capacity (field moisture capacity)—The amount of soil after the free water has been allowed to drain away for a day or two after the root zone had been previously saturated. It is the greatest amount of water that the soil will hold under conditions of free drainage, usually expressed as a percentage of the ovendry weight of soil.

Fine texture—(1.) Predominating in fine fractions, as fine clay. (2.) Includes all clay loams and clays, i.e., clay loam, sandy clay loam, silty clay loam, sandy clay, silty clay, and clay textural classes. Sometimes subdivided into clayey and moderately fine textures.

First bottom—The normal flood plain of a stream.

Flood Plain—The land bordering a stream, built up of sediments from overflow of the stream and subject to inundation when the stream is at flood stage. *See* first bottom.

Fluvial-eolian—Related to origin of soil parent materials; fluvial refers to deposition by moving water while eolian refers to deposition by wind.

Genetic—Resulting from soil formation processes, such as a genetic soil profile or a genetic horizon.

Gilgai—Microrelief of clays that have high coefficients of expansion and contraction with changes in moisture; usually a succession of micro-basins and micro-knolls in nearly level areas or of micro-valleys and micro-ridges that run with the slope.

Glacial drift—Rock debris that has been transported by glaciers and deposited, either directly from the ice or from the meltwater. The debris may or may not be heterogeneous.

Glaciofluvial deposits—Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and may occur in the form of outwash plains, deltas, kames, eskers, and kame terraces. *See* glacial drift and till.

Gley—Some layer of mineral soil developed under conditions of poor drainage, resulting in reduction of iron and other elements and in gray colors and mottles (blobs of variously colored soils).

Gravitational water—Water which moves into, through, or out of the soil under the influence of gravity.

Gray-Brown Podzols—A zonal great soil group consisting of soils with a thin, moderately dark A1 horizon and with a grayish-brown A2 horizon underlain by a B horizon containing a high percentage of bases and an appreciable quantity of illuviated silicate clay; formed on relatively young land surfaces, mostly glacial deposits, from material relatively rich in calcium, under deciduous forests in humid temperate regions. A category in the 1938 system of soil classification.

Groundwater—Subsurface water in the zone of saturation.

Gully—A channel resulting from erosion and caused by the concentrated but intermittent flow of water usually during and immediately following heavy rains. Deep enough to interfere with, and not to be obliterated by, normal tillage operations.

Halophytic vegetation—Salt-loving or salt-tolerant vegetation, usually having fleshy leaves or thorns and resembling desert vegetation.

Heavy Soil (obsolete in scientific use)—A commonly used term to describe various fine-textured soils because of high drawbar pull when plowing.

Hue—One of the three variables of color. The dominant spectral color. The hue changes with the dominant wave length of the light. *See* Munsell color notation, chroma, and value.

Humic-Gley soils—Includes Wiesenboden and those soils formerly grouped with Half-Bog soils that have a thin muck or peat O horizon and an A1 horizon. Developed in wet meadows and forested swamps. A category of the 1938 system of soil classification.

Igneous Rock—Formed by solidification from a molten or partially molten state. Synonym: primary rock. Example: granite.

Illuvial Horizon—A soil layer or horizon in which material carried from an overlying layer has been precipitated from solution or deposited from suspension. The layer of accumulation. Contrast to eluvial horizon.

Illuviation—The process of deposition of soil material removed from one horizon to another horizon of the soil, usually from an upper horizon to a lower horizon in the profile.

Immature soil—A soil with indistinct or only slightly developed horizons because of the relatively short time it has been subjected to the various soil-forming processes. A soil that has not reached equilibrium with its environment.

Inceptisols—*See* Soil classification, Orders.

Infiltration rate—A soil characteristic determining or describing the *maximum* rate at which water *can* enter the soil under specified conditions, including the presence of an excess of water.

Irrigation—The artificial application of water to the soil for the benefit of growing crops.

Irrigation efficiency—The ratio of the water actually consumed by crops on an irrigated area to the amount of water diverted from the source onto the area.

Irrigation District—A cooperative, self-governing public corporation set up as a subdivision of the state with definite geographic boundaries, organized to obtain and distribute water for irrigation of lands within the district. It is created under authority of the state legislature with the consent of a designated fraction of the landowners or citizens and has taxing power.

Irrigation Methods—The manner in which water is artificially applied to an area. The principal methods and the

manner of applying the water are as follows:

Border strip—The water is applied at the upper end of a strip with earth borders to confine the water to the strip.

Check Basin—The water is applied rapidly to relatively level plots surrounded by levees. The basin is a small check.

Corrugation—The water is applied to small, closely spaced furrows, frequently in grain and forage crops, to confine the flow of irrigation water to one direction.

Drip (trickle)—The water is applied as a drip from "emitters" along a plastic tubing line that usually lies on the soil surface.

Flooding—The water is released from field ditches and allowed to flood over the land.

Furrow—The water is applied between row crops in ditches made by tillage implements.

Sprinkler—The water is sprayed over the soil surface through nozzles from a pressure system.

Subirrigation—The water is applied in open ditches or tile lines until the water table is raised sufficiently to wet the plant root zone.

Wild Flooding—The water is released at high points in the field and distribution is uncontrolled.

Lacustrine Deposit—Sediments deposited in fresh (non-saline) lake water and later exposed either by lowering of the water level or by the elevation of the land.

Land Capability—Land capability is an expression of the effect of physical land conditions, including climate, on the total suitability for continuous use without damage for crops that require regular tillage, or use for grazing, woodlands, or wildlife.

Land Capability Class—One of eight classes of land in the land capability classification of the Soil Conservation Service. These eight land capability classes are distinguished according to the risk of land damage or the difficulty of land use.

Land Capability Subclass—The four kinds of limitations recognized at the subclass level are: risks of erosion, designated by the symbol (e); wetness, drainage, or overflow (w); other root zone (soil) limitations (s); and climatic limitations (c). The subclass provides the map user information about both the degree and kind of limitation. Capability class I has no subclasses.

Light soil (obsolete in scientific use)—A coarse-textured soil with a low drawbar pull and, hence, easy to cultivate.

Lime, agricultural—A soil amendment consisting principally of calcium carbonate but including magnesium carbonate and perhaps other materials, used to furnish calcium and magnesium as essential elements for the growth of plants and to neutralize soil acidity.

Lime (calcium) Requirement—The amount of agricultural limestone, or the equivalent of other specified liming material, required per acre to a soil depth of 6 inches (15 cm) or on 2 million pounds (908,000 kg) of soil to raise the pH of the soil to a desired value under field conditions.

Lithosequence—A group of related soils that differ, one from the other in certain properties primarily as a result of differences in the *parent rock* as a soilforming factor.

Lithosols—An azonal group of soils having an incomplete solum or no clearly expressed soil morphology and consisting of a freshly and imperfectly weathered mass of hard rock or hard rock fragments. A category in the 1938 system of soil classification.

Loamy—Intermediate in texture and properties between fine-textured and coarse-textured soils. Includes all textural classes with the words "loam" or "loamy" as a part of the class name, such as clay loam or loamy sand.

Marsh—Periodically wet or continually flooded areas with the surface not deeply submerged. Covered dominantly with sedges, cattails, rushes, or other hydrophytic plants. Subclasses include fresh-water and salt-water marshes.

Mature soil—A soil with well-developed soil horizons produced by the natural processes of soil formation and essentially in equilibrium with its present environment.

Maximum water-holding capacity —The average moisture content of a disturbed sample of soil, 1 cm high, which is at equilibrium with a water table at its lower surface.

Metamorphic Rock—That which has formed in the solid state in response to pronounced changes in temperature, pressure, and chemical environment. The process takes place, in general, deep in the crust of the earth below the zone of weathering and cementation. Examples: marble, slate, gneiss.

Minimum Tillage—The least amount of tillage required to create the proper soil condition for seed germination, plant establishment, and prevention of weed growth.

Moderately-Coarse Texture— Consisting predominantly of coarse particles. (In soil textural classification, it includes all the sandy loams except the very fine sandy loams.) *See* coarse texture.

Moderately-Fine Texture— Consisting predominantly of intermediate-size (soil) particles or with relatively small amounts of fine or coarse particles. (In soil textural classification, it includes clay loam, sandy clay loam, and silty clay loam.) *See* fine texture.

Moraine—An accumulation of glacial drift formed chiefly by the direct action of glacial ice. Examples are ground, lateral, recessional, and terminal moraines.

Mottling—Soil horizons consisting of irregular mottles of various colors. A common cause of mottling is impeded drainage, although there are other causes, such as soil development from differential weathering of rock.

Mulch—Any material such as straw, sawdust, leaves, plastic film, loose soil, etc., that is spread upon the surface of the soil to protect the soil and plant roots from the effects of raindrops, soil crusting, freezing, evaporation, etc.

Munsell Color Notation—A color designation system that specifies the relative degrees of the three simple variables in color; hue, value, and chroma. For example: 10YR 6/4 is a color of soil with a hue = 10YR, Value = 6, and Chroma = 4. These notations can be translated into several different systems of color names as desired. *See* hue, value, chroma.

Natric Horizon—*See* Diagnostic horizons.

Neutral Soil—A soil in which the surface layer, at least to normal plow depth, is neither acid nor alkaline in reaction. For most practical purposes it is a soil with a pH range from 6.6 through 7.3.

No-Tillage—A method of planting crops that involves no seedbed preparation other than opening the soil for the purpose of placing the seed at the intended depth. This usually involves opening a small slit or punching holes into the soil. There is usually no cultivation during crop production. Chemical weed control is normally used. Also referred to as slot planting or zero tillage.

O Horizon—*See* Soil Horizon.

Oven-dry Soil—Soil which has been dried at 105°C until it reaches constant weight.

Parent Material (soils)—The unconsolidated, chemically-weathered mineral or organic matter from which the A and B horizons (solum) of soils has developed by pedogenic processes. The C horizon may or may not consist of materials similar to those from which the A and B horizons developed.

Particle Size Analysis— Determination of the amounts of different particle sizes in a soil sample, usually by sedimentation, sieving, micrometry, or a combination of these methods.

Parts per Million (ppm)—Weight units of any given substance per one million equivalent weight units of oven-dry soil; or, in the case of soil solution or other solution, the weight units of solute per million weight units of solution.

Ped—A unit of soil structure; an aggregate such as crumb, prism, block, or granule formed by natural processes.

Pedon—(As used in the Soil Classification System of the National Cooperative Soil Survey in the United States). The smallest volume that can be called "a soil." It has three dimensions. It extends downward to the depth of plant roots or to the lower limit of the genetic soil horizons. Its lateral cross section is roughly

hexagonal and ranges from 1 to 10 m in size depending on the variability in the horizons.

Percolation, Soil Water—The downward movement of water through soil, especially the downward flow of water in saturated or nearly saturated soil.

Permeability, Soil—Permeability as used in describing soils refers to the readiness with which air, water, or plant roots penetrate into or pass through its pores. The portion of the soil being discussed should be designated, e.g., "the permeability of the A horizon." The permeability of a soil may be limited by the presence of a less permeable horizon even though the other horizons are permeable.

pH, Soil—A numerical measure of the acidity or hydrogen ion activity of a soil. The neutral point is pH 7.0. All pH values below 7.0 are acid and all above 7.0 are alkaline. Exactly, the negative logarithm of the hydrogen-ion activity of a soil. *See* Reaction, Soil.

Phreatophyte—A plant deriving its water from the water table; commonly used to describe nonbeneficial, water-loving vegetation that transpires excessive amounts of water.

Physical Properties of Soils—Those characteristics, processes, or reactions of a soil that are caused by physical forces and that can be described by, or expressed in, physical terms or equations. Sometimes confused with and difficult to separate from chemical properties; hence, the terms "physical-chemical" or "physiochemical." Examples of physical properties are bulk density, water-holding capacity, hydraulic conductivity, porosity, and pore-size distribution.

Planosol—A great soil group of the intrazonal order and hydromorphic suborder consisting of soils with eluviated surface horizons underlain by B horizons more strongly eluviated, cemented, or compacted than associated normal soil. A category in the 1938 system of soil classification.

Productivity, Soil—The quality of a soil that enables it to produce abundant crops, including balanced and high fertility; adequate air, light, moisture, and temperature; and freedom from insects, diseases, weeds, and wild animals. *See* Fertility, Soil.

Profile, Soil—A vertical section of the soil through all its horizons and extending into the parent material.

R Horizon—*See* Soil Horizon.

Reaction, Soil—The degree of acidity or alkalinity of a soil, usually expressed in terms of pH value. Descriptive terms commonly used are as follows: 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.

Regolith—The layer or mantle of loose, noncohesive or cohesive rock material, of whatever origin, that nearly everywhere forms the surface of the land and rests on bedrock. It comprises rock waste of all sorts: volcanic ash; glacial drift; alluvium; windblown deposits; accumulations of vegetation, such as peat; and soil. (Approximately equivalent to the term "soil" as used by many engineers.)

Regosols—An azonal group of soils lacking definite genetic horizons and deriving from deep, soft mineral deposits, such as loess or glacial drift. A category in the 1938 system of soil classification.

Residual Material—Unconsolidated and partly weathered mineral materials accumulated by disintegration of consolidated rock in place.

Saline-Alkali (Sodic) Soil—(1.) A soil containing sufficient exchangeable sodium to interfere with the growth of most crop plants and containing appreciable quantities of soluble salts. The exchangeable sodium percentage is greater than 15 and the conductivity of the saturation extract is greater than 4 millimhos per centimeter (at 25°C.). The pH of the saturated soil is usually less than 8.5. (2.) A saline-alkali soil has a combination of harmful quantities of salts and either a high alkalinity or high exchangeable sodium, or both, so distributed in the profile that the growth of most crop plants is reduced.

Saline Soil—A nonsodic soil containing sufficient soluble salts to impair its productivity but not containing excessive exchangeable sodium. This name was formerly applied to any soil containing sufficient soluble salts to interfere with plant growth, commonly greater than 3,000 parts per million.

Salinization—The process of accumulation of salts in soil.

Sand—(1.) A soil particle between 0.05 and 2.0 mm in diameter. (2.) Any one of five soil separates: very coarse sand, coarse sand, medium sand, fine sand, and very fine sand. *See* Soil separates. (3.) A soil textural class. *See* Soil texture.

Sedimentary Rocks—A rock largely composed of sediments more or less consolidated; the chief sedimentary rocks are sandstones, shales, limestones, and conglomerates.

Silt—(1.) A soil separate consisting of particles between 0.05 and 0.002 mm in equivalent diameter. *See* Soil separates. (2.) A soil textural class. *See* Soil texture.

Slick spots—Small areas in a field that are slick when wet, due to alkali or high exchangeable sodium.

Sodium Adsorption Ratio (SAR)—A value representing the relative hazard of irrigation water because of a high sodium content relative to its calcium plus magnesium content.

$$SAR = \frac{Na^{+}}{\sqrt{\frac{Ca^{++} + Mg^{++}}{2}}}$$

The ions are in milliequivalents per liter.

Soil—(1.) The unconsolidated mineral and organic material on the immediate surface of the earth that serves as a natural medium for the growth of land plants. (2.) The unconsolidated mineral matter on the surface of the earth that has been subjected to and influenced by genetic and environmental factors of parent material climate, macro- and microorganisms, and topography, all acting over a period of time and producing a product—soil—that differs from the material from which it is derived in many physical, chemical, biological, and morphological properties and characteristics. The terms "the soil" and "soil" are collective terms used for all soils, equivalent to the word "vegetation" for all plants.

Soil Association—(1.) A group of defined and named taxonomic soil units occurring together in an individual and characteristic pattern over a geographic region; comparable to plant associations in many ways. (2.) A mapping unit used on general soil maps, composed of two or more defined taxonomic units geographically associated, but the scale and purpose of the map does not permit or require the delineation of the individual soils. A soil association is described in terms of the taxonomic units included, their relative proportions, and their pattern of association if one exists in the area. Sometimes called "natural land type." *See* soil complex.

Soil Classification—The systematic arrangement of soils into classes in one or more categories or levels of classification for a specific objective. Broad groupings are made on the basis of general characteristics and subdivisions on the basis of more detailed differences in specific properties. The name and number of categories of the system of soil classification used by the National Cooperative Soil Survey in the United States since 1965 are: Soil Orders—10; Soil Suborders—47; Soil Great Groups—185; Soil Subgroups—970; Soil Families—4500; Soil Series—10,466. The relationship between the orders of the present system and approximate equivalents of the previous system used in the United States are shown in Table G-1.

Order—The category at the highest level of generalization in the soil classification system. The properties selected to distinguish the orders are reflections of the degree of horizon development and the kinds of horizons present. The five soil orders in South Dakota are:

ALFISOLS—Soils with gray to brown surface horizons, medium to high supply of bases, and B horizons of illuvial clay accumulation. These soils form mostly under forest or savanna vegetation in climates with slight to pronounced seasonal moisture deficit.

Table G-1. A comparison of the present United States soil classification system adopted in 1965 with the approximate equivalents in use before 1965.

Soil Order (Adopted in 1965)	Approximate Equivalents (in use before 1965)
Alfisols	Gray Brown Podzolic, Gray Wooded soils, Noncalcic Brown soils, Degraded Chernozem and associated Planosols and some Half-Bog soils
Aridisols	Desert, Reddish Desert, Sierozem, Solonchak, some Brown and Reddish Brown soils, and associated Solonetz soils
Entisols	Azonal soils and some Low-Humic Gley soils
Histosols	Bog soils
Inceptisols	Ando, Sols, Bruns, Acides, some Brown Forest, Low-Humic Gley, and Humic Gley soils
Mollisols	Chestnut, Chernozem, Brunizem (Prairie), Rendzina, some Brown, Brown Forest, and associated Solonetz and Humic Gley soils
Oxisols	Laterite soils, Latosols
Spodosols	Podzols, Brown Podzolic soils, and Ground-Water Podzols
Ultisols	Red-Yellow Podzolic soils, Reddish Brown Lateritic soils of the U.S., and associated Planosols and Half-Bog soils
Vertisols	Grummusols

Source: Soil Survey Staff, *Soil Taxonomy: A Basic System of Soil Classification for Making and Interpreting Soil Surveys*, USDA-Soil Conservation Service Agriculture Handbook 436 (December 1975), pp. 433-35.

ARIDISOLS—Soils with pedogenic horizons, low in organic matter, that are never moist as long as three consecutive months. They have an ochric epipedon that is normally soft when dry or that has distinct structure. In addition, they have one or more of the following diagnostic horizons: argillic, natric, cambic, calcic, gypsic, or salic.

ENTISOLS—Soils that have no diagnostic pedogenic horizons. They may be found in virtually any climate on very recent geomorphic surfaces, either on steep slopes that are undergoing active erosion or on fans and floodplains where the recently eroded materials are deposited. They may also be on older geomorphic surfaces if the soils have been recently disturbed to such depths that the horizons have been destroyed or if the parent materials are resistant to alteration, as is quartz.

INCEPTISOLS—Soils that are usually moist with pedogenic horizons of alteration of parent materials but not of illuviation. Generally, the direction of soil development is not yet evident from the marks left by the various soil-forming processes or the marks are too weak to classify in another soil order.

MOLLISOLS—Soils with nearly black, organic-rich horizons and high supply of bases. These are soils that have decomposition and accumulation of relatively large amounts of organic matter in the presence of calcium. They have mollic epipedons and base saturation greater than 50% (NH_4OAc) in any cambic or argillic horizon.

Suborder—This category narrows the ranges in soil moisture and temperature regimes, kinds of horizons, and composition, according to which of these is most important. Moisture and/or temperature or soil properties associated with them are used to define suborders of Alfisols, Mollisols, Oxisols, Ultisols, and Vertisols. Kinds of horizons are used for Aridisols, composition for Histosols and Spodosols, and combinations for Entisols and Inceptisols.

Great Group—The classes in this category contain soils that have the same kinds of horizons in the same sequence and have similar moisture and temperature regimes. Exceptions to the horizon sequences are made for horizons near the surface that may get mixed or lost by erosion if plowed.

Subgroup—The great groups are subdivided into subgroups that show the central properties of the great group, intergrade subgroups that show properties of more than one great group, and other subgroups for soils with atypical properties that are not characteristic of any great group.

Family—Families are defined largely on the basis of physical and mineralogic properties of importance to plant growth.

Series—The soil series is a group of soils having horizons similar in differentiating characteristics and arrangement in the soil profile, except for texture of the surface, slope, and erosion.

Soil Complex—A mapping unit used in detailed soil surveys where two or more defined taxonomic units are so intimately associated geographically that they cannot be separated by boundaries at the scale used.

Soil-Formation Factors—The variables, usually interrelated natural agencies that are active in and responsible for the formation of soil. The factors are usually grouped into five major categories as follows: parent rock, climate, organisms, topography, and time.

Soil Genesis—The mode of origin of the soil with special reference to the processes or soil-forming factors responsible for the development of the solum or true soil from the unconsolidated parent material. Synonym: pedogenesis.

Soil Geography—A subspecialization of physical geography concerned with the areal distributions of soil types.

Soil Horizon—A layer of soil or soil material approximately parallel to the land surface and differing from adjacent genetically related layers in physical, chemical, and biological properties or characteristics such as color, structure, texture, consistency, kinds and numbers of organisms present, degree of acidity or alkalinity, etc. A complete description of and designation of master soil horizons and layers can be found in *Soil Taxonomy*, USDA Agriculture Handbook No. 436 p. 459-62. Appendix Figure G-1 also gives a brief description of soil profile and horizon nomenclature.

Soil Map—A map designed to show the distribution of soil types or other soil mapping units in relation to the prominent physical and cultural features of the earth's surface. The following are among the kinds of soil maps recognized in the United States.

Detailed soil map—A soil map on which the boundaries between all soil types that are significant to potential use (generally field-management systems) are shown. The scale of the map depends upon the purpose to be served, the intensity of land use, the pattern of soils, and the scale of other cartographic materials available. Traverses are usually made at one-quarter mile or more frequent intervals. Commonly a scale of 3.13 inches equals 1 mile (1:20,000) is now used for field mapping in eastern South Dakota and a scale of 2.63 inches equals 1 mile (1:24,000) is used for western South Dakota.

Generalized soil map—Small scale maps made to bring out the contrasts within large areas by generalization of more detailed maps. They vary from soil association maps of a county on a scale of 1 inch = 1 mile (1:63,000) to maps of larger regions showing associations dominated by one or more great soil groups.

Reconnaissance soils maps—Made by observation of the area at intervals such that the complete land area is not examined as is the case with detailed surveys. The intervals of traversing vary from about one-half mile to several miles. The units shown are soil associations. The maps are usually made for exploratory purposes to outline areas of soil suitable for more intensive development. The scale is usually smaller than for detailed maps.

Soil Mapping Unit—A kind of soil, a combination of kinds of soil, or miscellaneous land type or types, that can be shown at the scale of mapping for the defined purposes and objectives of the survey. (Combination of kinds of soil includes soil association, complexes, undifferentiated soils, or any class or combination of classes at the family level or higher categories of the soil classification system.) Soil mapping units are the basis for the delineations of a soil survey map. A soil survey identification legend lists all mapping units for the survey of an area (any size area from a small plot to a county, a nation, or the world). Mapping units normally contain inclusions of soils outside the limits of the taxonomic name, or names, used as the name for the mapping unit. Mapping units are generally designed to reflect significant differences in use and management.

Soil Monolith—A vertical section taken out of a soil profile and mounted for display or study.

Soil Morphology—(1.) The constitution of the soil body as expressed in the kinds, thicknesses, and arrangement of the horizons in the profile, and in the texture, structure, consistence, porosity, and color of each horizon. (2.) The properties, collectively, of the soil body or any of its parts. (Includes physical, chemical, mineralogical, and biological properties.)

Soil Organic Matter—The organic fraction of the soil that includes plant and animal residues at various stages of decomposition, cells and tissues of soil organisms, and substances synthesized by the soil population. Commonly determined as the amount of organic material contained in a soil sample passed through a 2-mm sieve. The organic matter in the surface soils of most cropped fields contains about 5% total nitrogen and 50% organic carbon.

Soil Salinity—The amount of soluble salts in a soil, expressed in terms of percentage, parts per million, or other convenient unit.

Soil Science—That science dealing with soils as a natural resource on the surface of the earth, including soil formation, classification and mapping, and the physical, chemical, biological, and fertility properties of soils per se; and these properties in relation to their management for crop production and to cleanse the environment.

Soil Separates—Mineral particles, less than 2.0 mm in equivalent diameter, ranging between specified size limits. The names and size limits of separates recognized by the National Cooperative Soil Survey in the United States are: very coarse sand, 2.0 to 1.0 mm (called fine gravel prior to 1947, now fine gravel includes particles between 2.0 mm and about 12.5 mm in diameter); coarse sand, 1.0 to 0.5 mm; medium sand, 0.5 to 0.25 mm; fine sand, 0.25 to 0.10 mm; very fine sand, 0.10 to 0.05 mm; silt, 0.05 to 0.002 mm; and clay, less than 0.002 mm. (Before 1937, clay included particles less than 0.005 mm in diameter and silt, those particles from 0.05 to 0.005 mm.) The soil separates recognized by the International Society of Soil Science are: coarse sand, 2.0 to 0.2 mm; fine sand, 0.2 to 0.02 mm; silt, 0.02 to 0.002 mm; and clay, less than 0.002 mm in diameter.

Soil Structure—The combination or arrangement of primary soil particles into secondary particles, units, or peds.

Soil Structure Types—A classification of soil structure based on the shape of the aggregates or peds and thin arrangement in the profile. Generally the shape of soil structure types is referred to as either platy, prismatic, columnar, blocky, granular, or crumb. A more complete description of each structural type can be found in the *Soil Survey Manual.*

Soil Survey—A general term for the systematic examination of soils in the field and in laboratories; their description and classification; the mapping of kinds of soil; the interpretation of soils according to their adaptability for various crops, grasses, and trees; their behavior under use or treatment for plant production or for engineering purposes; and their productivity under different management systems.

Soil Test—A chemical, physical, or microbiological operation that estimates a property of the soil pertinent to the suitability of the soil to support plant growth. Sometimes used as an adjective to define fractions of soil components, for example, soil-test phosphorus.

Soil Texture—The relative proportions of the various soil separates in a soil material. The sands, loamy sands, and sandy loams are further subdivided on the basis of the proportions of the various sand separates. All these textural soil class names are modified by the addition of suitable adjectives to the name where coarse fragments are also present in the soil material. A more complete description of soil textural classes is found in the *Soil Survey Manual.*

Solodized Soil—A soil that has been subjected to the processes responsible for the development of a Soloth and having at least some of the characteristics of a Soloth. A category in the 1938 system of soil classification.

Solonchak—A great soil group of the intrazonal order and halomorphic suborder, consisting of soils with gray, thin, salty crust on the surface, and with fine granular mulch immediately below being underlain with grayish friable, salty soil; formed under subhumid to arid, hot or cool climate, under conditions of poor drainage, and under a sparse growth of halophytic grasses, shrubs, and some trees. A category in the 1938 system of soil classification.

Solonetz—A great soil group of the intrazonal order and halomorphic suborder, consisting of soils with a very thin, friable, surface soil underlain by a dark, hard columnar layer usually highly alkaline; formed under subhumid to arid, hot to cool climates, under better drainage than Solonchaks, and under a native vegetation of halophytic plants. A category of the 1938 system of soil classification.

Solum—The upper part of a soil profile, above the parent material, in which the processes of soil formation are active and in which plant roots and animal life characteristics of the soil are largely confined. This includes the A and B horizons.

Strip Cropping—The practice of growing crops that require different types of tillage, such as row and sod, in alternate strips along contours or at right angles to the prevailing direction of erosive winds.

Stubble Mulch—The stubble of crops or crop residues left essentially in place on the land as a surface cover before and during the preparation of the seed bed and at least partly during the growing of a succeeding crop.

Subsoil—The B horizon of soils with distinct illuviation; the soil below plowed soils in which roots normally grow.

Subsoiling—The tillage of subsurface soil (subsoil), without inversion, for the purpose of breaking up dense layers that restrict water movement and root penetration.

Surface soil—The uppermost part of the soil ordinarily moved in tillage or its equivalent in uncultivated soils, ranging in depth from about 5 to 8 inches(13 to 20 cm). Frequently designated as the plow layer, the Ap layer, or the A horizon.

Taxonomy—The part of classification that deals with relationships.

Tile Drain—Pipe made of burned clay or concrete, in short lengths, usually laid at depths of 1 to 5 feet (30-152 cm) with open joints to collect and carry excess water from the soil. Perforated flexible plastic pipe in lengths of several hundred feet has now largely replaced other materials.

Till—(1.) Unstratified glacial drift deposited directly by the ice and consisting of clay, sand, gravel, and boulders intermingled in any proportion. (2.) To plow and prepare for seeding; to seed or cultivate the soil.

Tilth—The physical conditions of soil relative to its response to tillage machinery and its mechanical impedance to root penetration.

Toposequence—A sequence of related soils that differ, one from the other, primarily because of *topography* as a soil-formation factor.

Topsoil—(1.) Earthy material used as top-dressing for house lots, grounds for large buildings, gardens, road cuts, or similar areas to enhance plant growth. (2.) The surface plow layer of a soil. (3.)

The original or present dark-colored A horizon.

Value, Color—One of the three variables of color. The relative intensity of the reflected light increases as the value increases. *See* Munsell Color notation.

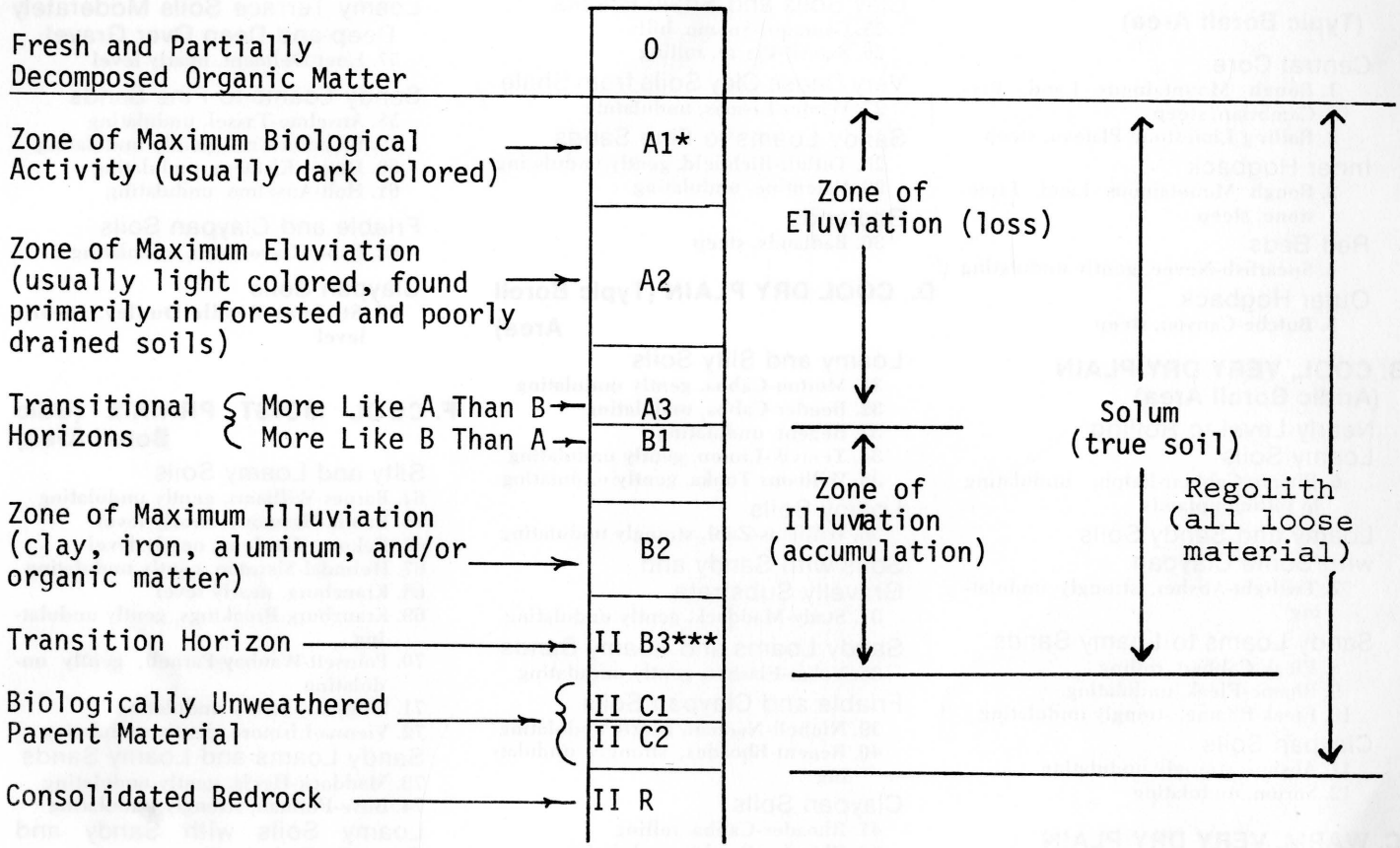
Waterlogged—Saturated with water. A condition where a high or perched water table is detrimental to plant growth, resulting from overirrigation, seepage, or inadequate drainage; the replacement of most of the soil air by water. Waterlogging may be natural or induced by humans.

Water Table—The upper surface of groundwater; that level below which the soil is saturated with water.

Water Table, Perched—The surface of a local zone of saturation held above the main body of groundwater by an impermeable layer, usually clay or rock, and separated from the main body of groundwater by an unsaturated zone.

Weathering—The group of processes (such as chemical action of air and rainwater, the biological action of plants and animals, and the mechanical action of changes in temperature) whereby rocks and minerals, on exposure to the weather, change in character, disintegrate, decompose, and synthesize new compounds and clay minerals in the process of making parent materials of soils.

Appendix Figure G-1. SOIL PROFILE AND HORIZON NOMENCLATURE**



* Special Horizon Subdivisons and Nomenclature

1,2,3	- arabic numbers after capital letters indicate a subdivision of a master horizon
b	- buried soil horizon
ca	- an accumulation of carbonates of alkaline earths, commonly calcium
cs	- an accumulation of calcium sulfate
g	- strong gleying activity
sa	- an accumulation of salts more soluble than calcium sulfate
t	- illuvial clay
p	- plowing activity

** Not all soil profiles have all these horizons present. This is an idealized diagram. Unique combinations of soil horizons give rise to individual soil series.

***Roman numerals are used as horizon prefixes to indicate changes in the nature of soil parent materials. As shown here the A1 thru B2 horizons are formed in one kind of parent material while the rest of the profile is formed in another kind of material.

Figure 8. Soil Association Map of South Dakota

Legend for Colored Map

A. BLACK HILLS Cool, Moist Forest (Typic Boralf Area)

Central Core
1. Rough Mountainous Land, Pre-Cambrian, steep
2. Rolling Limestone Plateau, steep

Inner Hogback
3. Rough Mountainous Land, Limestone, steep

Red Beds
4. Spearfish-Nevee, gently undulating

Outer Hogback
5. Butche-Canyon, steep

B. COOL, VERY DRY PLAIN (Aridic Boroll Area)

Nearly Level to Rolling Loamy Soils
6. Rhame-Cabbart-Ralph, undulating to rolling uplands

Loamy and Sandy Soils with Some Claypan
7. Twilight-Absher, strongly undulating

Sandy Loams to Loamy Sands
8. Fleak-Cabbart, rolling
9. Rhame-Fleak, undulating
10. Fleak-Rhame, strongly undulating

Claypan Soils
11. Absher, strongly undulating
12. Sorum, undulating

C. WARM, VERY DRY PLAIN (Aridic Ustoll Area)

Silty Soils
13. Kadoka-Epping, strongly undulating
14. Kadoka-Huggins, strongly undulating
15. Keith-Colby, gently undulating
16. Ralph-Cabbart-Regent, undulating

Loamy Soils with Some Claypan
17. Cabbart-Absher, rolling

Silty and Loamy High Terrace Soils
18. Satanta, gently undulating
19. Ree, nearly level

Loamy Soils and Limestone and Sandstone Breaks
20. Epping-Kadoka, rolling
21. Oglala-Canyon, strongly undulating

Clay Soils from Shale
22. Pierre-Kyle, undulating
23. Pierre-Lismas, strongly undulating
24. Pierre-Samsil, undulating

Clay Soils and Shale Breaks
25. Grummit-Snomo, hilly
26. Samsil-Pierre, rolling

Very Dense Clay Soils from Shale
27. Winler-Lismas, undulating

Sandy Loams to Fine Sands
28. Tuthill-Richfield, gently undulating
29. Valentine, undulating

Badlands
30. Badlands, steep

D. COOL DRY PLAIN (Typic Boroll Area)

Loamy and Silty Soils
31. Morton-Cabba, gently undulating
32. Reeder-Cabba, undulating
33. Regent, undulating
34. Temvik-Linton, gently undulating
35. Williams-Tonka, gently undulating

Loamy Soils
36. Williams-Zahl, strongly undulating

Soils with Sandy and Gravelly Substrata
37. Stady-Maddock, gently undulating

Sandy Loams and Loamy Sands
38. Vebar-Flasher, gently undulating

Friable and Claypan Soils
39. Niobell-Noonan, gently undulating
40. Regent-Rhoades, strongly undulating

Claypan Soils
41. Rhoades-Cabba, rolling
42. Rhoades-Reeder, undulating
43. Rhoades-Vebar, undulating

E. WARM DRY PLAIN (Typic Ustoll Area)

Silt Loam to Clay Loam Soils
44. Beadle, gently undulating
45. Highmore-Eakin, gently undulating
46. Houdek-Prosper, gently undulating
47. Kadoka-Huggins, undulating
48. Lowry, gently undulating
49. Reliance, gently undulating

Loamy Soils
50. Clarno-Ethan, undulating
51. Ethan-Clarno-Betts, strongly undulating
52. Glenham-Hoven-Java, undulating

Clayey Soils
53. Millboro-Lakoma, gently undulating
54. Opal-Promise, undulating

Clayey Soils and Shale Breaks
55. Sansarc-Opal, rolling
56. Sansarc-Shale land, hilly

Loamy Terrace Soils Moderately Deep and Deep Over Gravel
57. Enet-Delmont, nearly level

Sandy Loams to Fine Sands
58. Anselmo-Tassel, undulating
59. Blendon-Enet, gently undulating
60. Doger-Elsmere, undulating
61. Holt-Anselmo, undulating

Friable and Claypan Soils
62. Raber-Cavo-Peno, undulating

Claypan Soils
63. Stickney-Beadle-Dudley, nearly level

F. COOL MOIST PRAIRIE (Udic Boroll Area)

Silty and Loamy Soils
64. Barnes-Williams, gently undulating
65. Beotia-Harmony, nearly level
66. Eckman-Gardena, nearly level
67. Heimdal-Sisseton, gently undulating
68. Kranzburg, nearly level
69. Kranzburg-Brookings, gently undulating
70. Poinsett-Waubay-Parnell, gently undulating
71. Singsaas, gently undulating
72. Vienna-Lismore, gently undulating

Sandy Loams and Loamy Sands
73. Maddock-Hecla, gently undulating
74. Buse-Forman, strongly undulating

Loamy Soils with Sandy and Gravelly Substrata
75. Renshaw-Fordville-Sioux, undulating

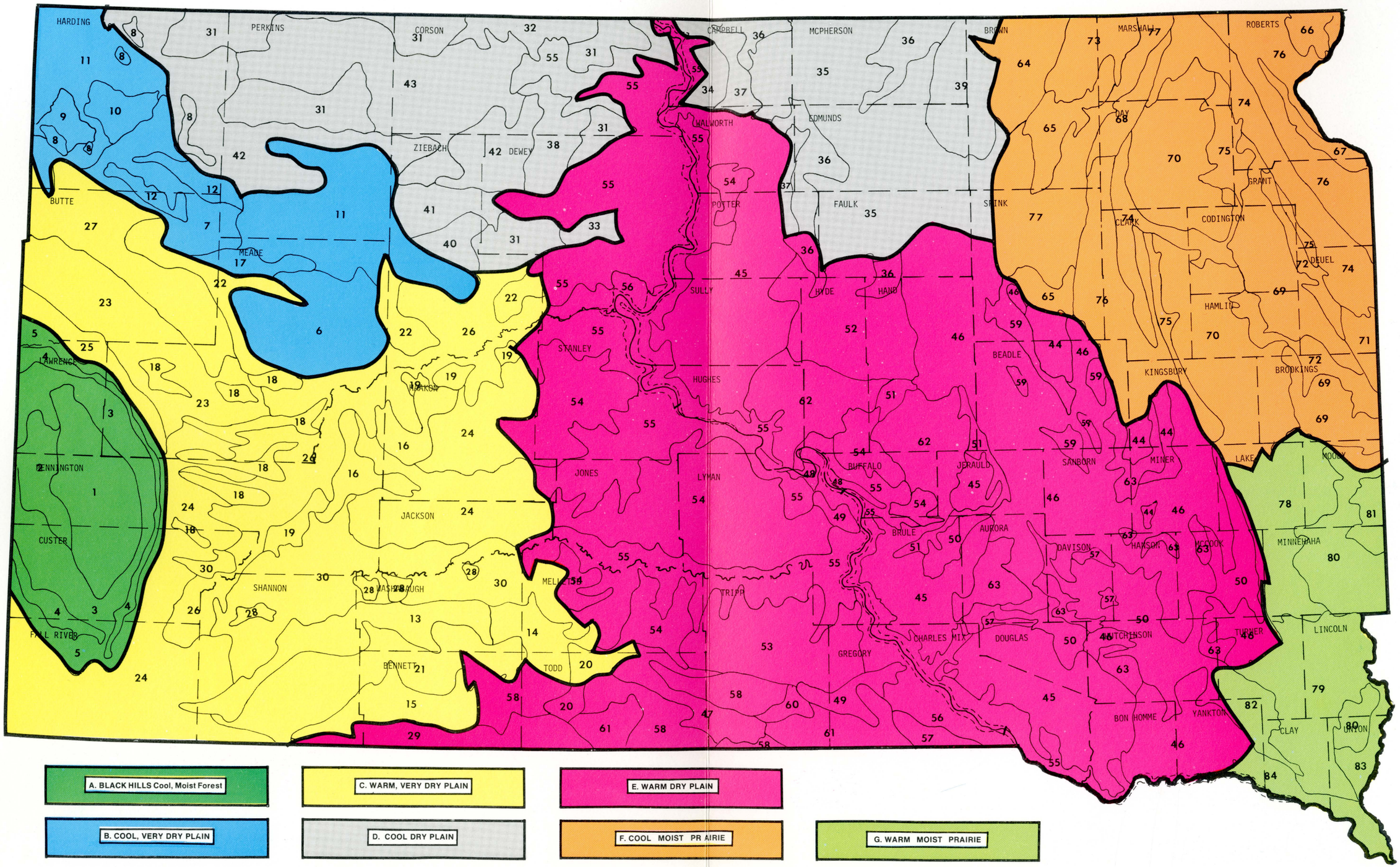
Clayey Soils
76. Peever-Forman, gently undulating

Claypan and Friable Soils
77. Harmony-Aberdeen-Beotia, nearly level

G. WARM MOIST PRAIRIE (Udic Ustoll Area)

Silty Soils
78. Egan-Wentworth-Clarno, undulating
79. Egan-Wentworth-Viborg, gently undulating
80. Moody-Nora, undulating
81. Moody-Trent, gently undulating
82. Egan-Clarno, undulating
83. Nora-Moody-Crofton, strongly undulating

Clayey Soils
84. Luton-Lamo-Albaton, nearly level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