1984

# Soil Survey Laboratory Data and Pedon Descriptions of Some South Dakota Soils

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and
Agricultural Experiment Station,
South Dakota State University

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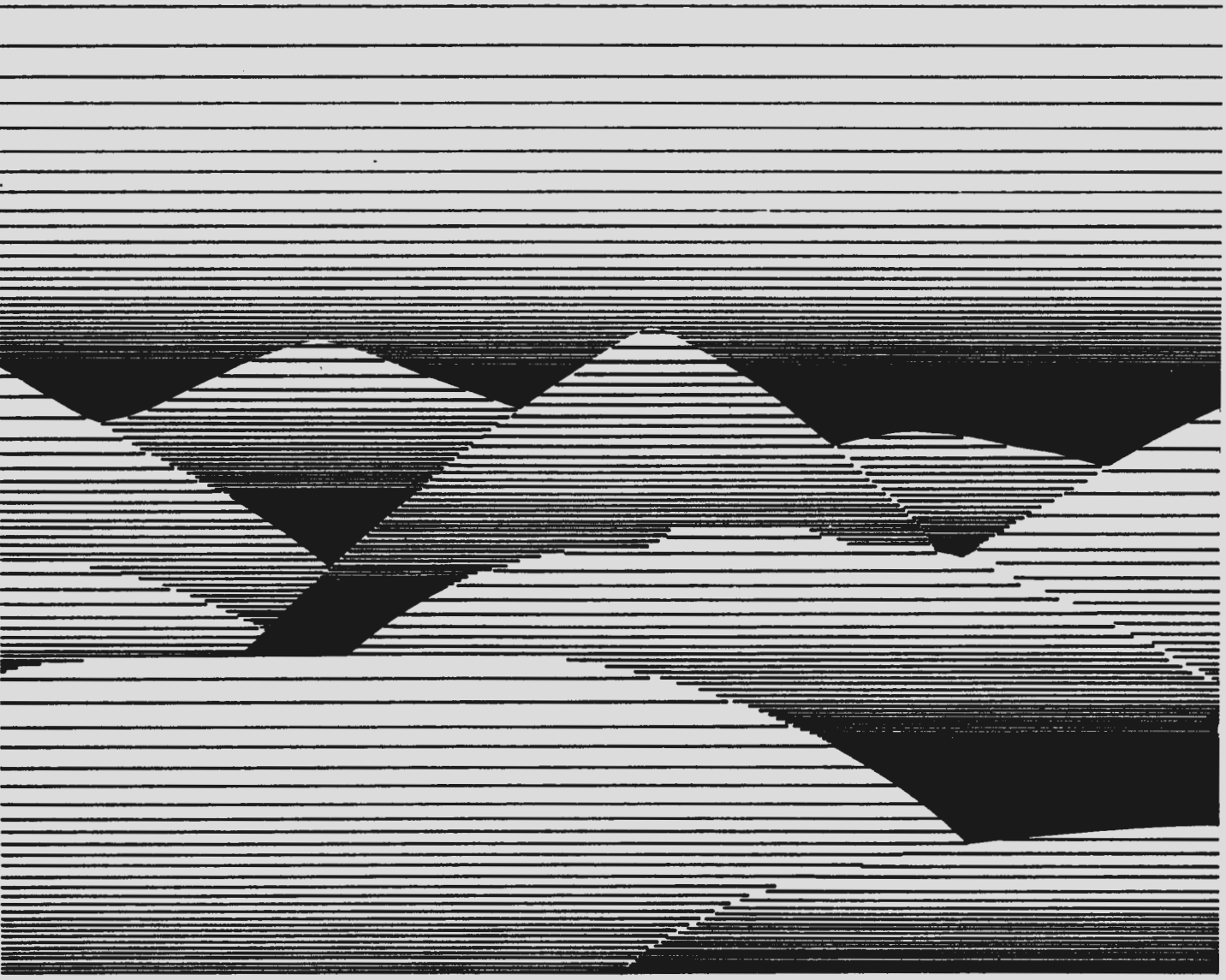

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# Soil Survey Laboratory Data and Pedon Descriptions of Some South Dakota Soils.[1]

G.D. Lemme, C.A. Dobie
and Soil Survey Staff-USDA[2]

The Plant Science Department of South Dakota State University and the soil survey staff of the Soil Conservation Service (SCS), and the U.S. Forest Service (USFS) in South Dakota cooperatively sampled and analyzed selected chemical and physical properties of some soils during 1983.

This report contains pedon descriptions prepared by SCS, USFS and SDSU personnel and corresponding laboratory data compiled by SDSU pedology staff. The soil series indicated within this publication are tentative at the time of its preparation.

Particle size analysis for the fine earth fraction was performed by the pipette method. Total clay content is expressed on a carbonate and organic matter free basis. Sand fractions were determined by sieving. Coarse fragments ( 2mm diameter) are expressed on a volume basis.

Calcium carbonate content was determined by Funely and Gremmer's method. The SAR and EC data are from water extracts. A modified Walkley method was used to obtain organic carbon values.

Individuals assisting with the lab analysis were as follows: D. Bennett, C. Miller, and S. Winter. Material was typed by B. Hartman. Standard SCS laboratory methods were followed throughout the study.

1. Funded in part by Soil ConservationService, and U.S. Forest Service and South Dakota Agricultural Experiment Station.

2. Assistant Professor and Undergraduate, Plant Science Department, South Dakota State University, SCS State Soil Scientist, State Office staff, and Survey Party Leaders.

Published in accordance with an Act passed in 1881 by the 14th Legislative Assembly, Dakota Territory, establishing the Dakota Agriculture College and with the Act of re-organization passed in 1887 by the 17th Legislative Assembly, which established the Agricultural Experiment Station at South Dakota State University

CONTENTS BY SAMPLE

# SAMPLES BY COUNTY

Series: Arnegard

Pedon No: S83SD031-13

Area: Corson County, South Dakota

Location: 600 ft east and 85 ft north of the southwest corner of Sec. 36, T20N, R28E

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-7 | 16.7 | 42.7 | 40.6 | 0.8 | 12.1 | 29.8 | 17.3 | 19.7 | 2.9 | 0.5 | 0.1 | | loam |
| 7-22 | 16.2 | 44.4 | 39.4 | 1.1 | 13.2 | 30.1 | 16.5 | 19.2 | 2.9 | 0.6 | 0.2 | | loam |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/ Clay | CEC meq/100gm | Organic Carbon % | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
|---|---|---|---|---|---|---|---|---|---|
| 7-22 | | | | | | 1.3 | | | |
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Soil Classification: Fine-loamy, mixed Pachic Haploborolls
Series: Arnegard
Pedon No.: S83SD031-13
Area: Corson County, South Dakota
Location: 600 feet east and 85 feet north of the southwest corner of sec. 36, T. 20 N., R. 28 E.
Vegetation: Corn stubble
Parent Material: Alluvium
Physiography: High terrace
Relief: Convex
Slope: 3 percent
Aspect: West
Permeability: Moderate
Drainage: Well
Ground Water: Below 6 feet
Moisture: Moist to 35 inches
Erosion: Slight
Date: October 1983
Profile by: Kenneth Heil

(Colors are for dry soil unless otherwise stated).

Ap--0 to 7 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure parting to weak medium and fine granular; slightly hard, friable; neutral; abrupt smooth boundary.

Bw1--7 to 11 inches; dark grayish brown (2.5Y 4/2) loam, very dark grayish brown (2.5Y 3/2) moist; weak medium prismatic structure parting to weak medium subangular blocky; slightly hard, friable; neutral; clear smooth boundary.

Bw2--11 to 16 inches; grayish brown (2.5Y 5/2) loam, very dark grayish brown (2.5Y 3/2) moist; weak medium prismatic structure parting to weak medium subangular blocky; slightly hard, friable; neutral; gradual smooth boundary.

B3--16 to 22 inches; grayish brown (2.5Y 5/2) loam, very dark grayish brown (2.5Y 3/2) moist; weak coarse subangular blocky; slightly hard, friable; neutral; clear smooth boundary.

C1--22 to 60 inches; grayish brown (2.5Y 5/2) loam, dark grayish brown (2.5Y 4/2) moist; massive; slightly hard; neutral.

Horizons sampled: Ap (0 to 7 inches)
B (7 to 22 inches)

Series: Barnum

Pedon No: S83SD033-8

Area: Custer County, South Dakota

Location: 175 ft south and 300 ft west of the northeast corner of Sec. 11, T6S, R1E

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-2 | 6.2 | 68.0 | 25.8 | 17.4 | 8.9 | 41.7 | 22.7 | 3.1 | 0.0 | 0.1 | 0.0 | | silt loam |
| 2-5 | 10.8 | 64.1 | 25.1 | 5.9 | 12.2 | 46.0 | 21.2 | 3.8 | 0.0 | 0.1 | 0.0 | | silt loam |
| 5-32 | 21.1 | 71.9 | 7.0 | 15.8 | 25.8 | 30.3 | 6.6 | 0.3 | 0.0 | 0.1 | 0.0 | | silt loam |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/ Clay | CEC meq/100gm | Organic Carbon % | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
|---|---|---|---|---|---|---|---|---|---|
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Soil Classification: Fine-loamy, mixed (calcareous), mesic Ustic Torrifluvent
Series: Barnum
Pedon No.: S83SD033-8
Area: Custer County, South Dakota
Location: 175 feet south and 300 feet west of the northeast corner of sec. 11, T. 6 S., R. 1 E.
Vegetation: Western wheatgrass, needleandthread, blue grama, prairie dropseed
Parent Material: Alluvium
Physiography: Low Terrace
Slope: 1 percent
Aspect: Southeast
Erosion: None to slight
Permeability: Moderate
Drainage: Well drained
Ground Water: Deep
Moisture: Moist to 5 inches, dry below
Root Distribution: Many to 5 inches, common to 12 inches; few to 30 inches
Elevation: 3850'
Sampled by: Ed Ensz and Scott Anderson

(Colors are for dry soil unless otherwise stated).

A1—0 to 2 inches; yellowish red (5YR 5/6) very fine sandy loam, reddish brown (5YR 4/4) moist; very weak medium granular structure; soft, very friable; strong effervescence; mildly alkaline; clear smooth boundary.

A2—2 to 5 inches; reddish yellow (5YR 6/6) loam, yellowish red (5YR 4/6) moist; weak fine and medium subangular blocky structure; soft, very friable; strong effervescence; mildly alkaline; gradual smooth boundary.

C1—5 to 32 inches; reddish yellow (5YR 6/6) loam, yellowish red (5YR 4/6) moist; massive; soft, very friable; strong effervescence; mildly alkaline; abrupt smooth boundary.

Ab—32 to 44 inches; brown (7.5YR 5/4) loam, dark brown (7.5YR 3/4) moist; massive; soft, very friable; strong effervescence; mildly alkaline; gradual wavy boundary.

C2—44 to 50 inches; yellowish red (5YR 5/6) loam, reddish brown (5YR 4/4) moist; massive; soft, very friable; strong effervescence; moderately alkaline; gradual wavy boundary.

C3—50 to 60 inches; yellowish red (5YR 5/8) loam, yellowish red (5YR 4/6) moist; massive; soft, very friable; strong effervescence; moderately alkaline.

Horizons sampled:

| For SDSU | | For Dept of Transportation | |
|---|---|---|---|
| A1 | 0-2 inches | A1, A2 | 0-5 inches |
| A2 | 2-5 inches | | |
| C1 | 5-32 inches | C1 | 5-32 inches |
| | | C2, C3 | 44-60 inches |

Series: Bullflat

Pedon No: S83SD033-3

Area: Custer County, South Dakota

Location: 1580 ft east and 260 ft south of the northwest corner of Sec. 16, T5S, R6E

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-7 | 26.3 | 56.5 | 17.3 | 3.8 | 19.9 | 32.8 | 5.0 | 3.4 | 4.2 | 2.8 | 1.9 | | silt loam |
| 7-10 | 34.3 | 52.2 | 13.6 | 5.2 | 16.9 | 30.1 | 4.0 | 2.7 | 3.2 | 2.3 | 1.4 | | silty clay loam |
| 10-16 | 44.1 | 43.9 | 12.0 | 2.7 | 16.1 | 25.1 | 6.1 | 1.6 | 2.1 | 1.3 | 0.9 | | silty clay |
| 16-21 | 33.1 | 38.3 | 28.6 | 5.3 | 13.5 | 19.4 | 7.0 | 6.9 | 8.1 | 3.9 | 2.7 | | clay loam |
| 21-26 | 31.9 | 31.5 | 36.6 | 3.7 | 10.6 | 17.2 | 8.0 | 9.5 | 11.0 | 5.2 | 2.8 | | clay loam |
| 26-34 | 24.2 | 18.1 | 57.7 | 0.0 | 6.9 | 11.2 | 8.8 | 15.8 | 17.7 | 9.3 | 6.1 | | sandy clay loam |
| 34-60 | 12.1 | 11.2 | 76.7 | 1.4 | 2.8 | 6.9 | 4.4 | 16.5 | 26.5 | 23.3 | 6.0 | | sandy loam |
| | | | | | | | | | | | | | |

| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/ Clay | CEC meq/100gm | Organic Carbon % | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
|---|---|---|---|---|---|---|---|---|---|
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Soil Classification: Fine-silty, mixed, Typic Argiboroll
Series: Bullflat
Pedon No.: S83SD033-3
Area: Custer County, South Dakota
Location: 1580 feet east and 260 feet south of the northwest corner of sec. 16 T. 5 S., R. 6 E.
Vegetation: Western wheatgrass, green needlegrass, Kentucky bluegrass
Parent Material: Alluvium of sedimentary rock
Physiography: High upland terrace
Relief: A flat
Slope: 1 percent
Aspect: Northeast
Erosion: Slight
Permeability: Moderate
Drainage: Well
Ground Water: Deep
Moisture: Moist to 21 inches; dry below
Root Distribution: Abundant to 8 inches; few to 34 inches
Elevation: 4330'
Sampled by: Ed Ensz

(Colors are for dry soil unless otherwise stated).

A—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, very friable; slightly acid; clear smooth boundary.

Bt1—7 to 10 inches; yellowish brown (10YR 5/4) silty clay loam, dark yellowish brown (10YR 3/4) moist; weak fine and medium subangular blocky structure parting to moderate medium granular hard, friable; neutral; clear smooth boundary.

Bt2—10 to 16 inches; dark yellowish brown (10YR 4/4) silty clay loam, dark brown (7.5Y 4/4) moist; weak medium prismatic structure parting to moderate medium subangular blocky; very hard, friable; neutral; clear smooth boundary.

Bt3—16 to 21 inches yellowish brown (10YR 5/4) silty clay loam, dark brown (10YR 4/3) moist; weak medium and coarse prismatic structure parting to weak medium subangular blocky; very hard,friable; neutral; abrupt wavy boundary.

BCk—21 to 26 inches; very pale brown (10YR 7/3) silty clay loam, pale brown (10YR 63) moist; weak coarse subangular blocky structure; hard, friable; strong effervescence; moderately alkaline; clear smooth boundary.

IIC1—26 to 34 inches; light yellowish brown (10YR 6/4) gravelly clay loam, dark brown (10YR 4/3) moist; massive; slightly hard, friable; 30 percent by volume of fragments of rock; strong effervescence; moderately alkaline; clear smooth boundary.

IIC2—34 to 60 inches; light yellowish brown (10YR 6/4) very cobbly clay loam, dark brown (10YR 4/3) moist; massive; slightly hard, friable; 40 percent by volume of fragments of rock; strong effervescence; moderately alkaline.

Horizons sampled:

| For SDSU | | For Dept. of Transportation | |
|---|---|---|---|
| A | 0-7 inches | A | 0-7 inches |
| Bt1 | 7-10 inches | Bt1 | 7-21 inches |
| Bt2 | 10-16 inches | Bt2 | |
| Bt3 | 16-21 inches | Bt3 | |
| BCk | 21-26 inches | IIC1 | 26-60 inches |
| IIC1 | 26-34 inches | IIC2 | |
| IIC2 | 34-60 inches | | |

Series: Buska

Pedon No: S82SD033-36

Area: Custer County, South Dakota

Location: 1800 ft south and 2280 ft east of the northwest corner of Sec. 28, T3S, R5E

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-24 | 12.1 | 31.2 | 56.7 | 2.5 | 15.3 | 13.4 | 19.3 | 22.6 | 7.8 | 3.8 | 3.3 | | sandy loam |
| 24-43 | 17.7 | 27.1 | 55.2 | 1.6 | 11.1 | 14.4 | 16.6 | 22.6 | 8.8 | 5.5 | 1.8 | | sandy loam |
| 43-60 | 6.2 | 17.8 | 76.0 | 2.0 | 7.5 | 8.4 | 24.1 | 31.0 | 10.2 | 6.3 | 4.3 | | loamy sand |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/ Clay | CEC meq/100gm | Organic Carbon % | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
|---|---|---|---|---|---|---|---|---|---|
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Soil Classification: Loamy-skeletal, micaceous Typic Eutroboralf
Series: Buska
Pedon No.: S82SD033-36
Area: Custer County, South Dakota
Location: 1800 feet south and 2280 feet east of the northwest corner of sec. 28 T. 3 S., R. 5 E.
Vegetation: Ponderosa pine, bearberry, poverty oatgrass, roughleaf ricegrass
Parent Material: Micaceous schist
Physiography: Mountain sideslope
Relief: D concave
Slope: 10 percent
Aspect: East
Erosion: Slight
Permeability: Moderate
Drainage: Well
Ground Water: Deep
Moisture: Moist to 5 inches; dry below
Root Distribution: Abundant to 20 inches; few to 40 inches
Elevation: 5380'
Sampled by: Scott Anderson

(Colors are for dry soil unless otherwise stated).

0—1 inch to 0; forest litter.

A—0 to 2 inches; dark gray (10YR 4/1) loam, black (10YR 2/1) moist; weak fine granular; soft, very friable; 5 percent by volume of fragments of rock; neutral; abrupt smooth boundary.

E—2 to 24 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; weak medium and fine platy structure; slightly hard, very friable; 10 percent by volume of fragments of rock; neutral; clear wavy boundary.

Bt—24 to 43 inches; yellowish brown (10YR 5/4) and light yellowish brown (10YR 6/4) very channery loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; hard, firm; 40 percent by volume of fragments of rock; slightly acid; gradual wavy boundary.

C—43 to 60 inches; light olive brown (2.5Y 5/4) very channery loam; dark grayish brown (2.5Y 4/2) moist; massive; loose, friable, 50 percent by volume of fragments of rock; slightly acid.

| Horizons sampled: | For SDSU | | For Dept. of Transportation | |
|---|---|---|---|---|
| | A } E } | 0-24 inches | A } E } | 0-24 inches |
| | Bt | 24-43 inches | Bt | 24-43 inches |
| | C | 43-60 inches | C | 43-60 inches |

Series: Conata

Pedon No: S82SD033-10

Area: Custer County, South Dakota

Location: 2300 ft east and 2000 ft north of the southwest corner of Sec. 24, T4S, R6E

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-3 | 49.7 | 42.6 | 7.7 | 9.3 | 19.0 | 14.3 | 1.7 | 1.7 | 1.7 | 1.7 | 0.9 | | silty clay |
| 3-8 | 51.6 | 44.2 | 4.1 | 15.5 | 19.7 | 9.0 | 1.6 | 1.0 | 1.6 | 0.4 | 0.4 | | silty clay |
| 8-18 | 30.8 | 47.4 | 21.8 | 11.2 | 24.1 | 12.1 | 5.1 | 5.0 | 4.8 | 4.1 | 2.7 | | clay loam |
| 18-32 | 22.7 | 39.1 | 38.2 | 8.9 | 17.4 | 12.8 | 6.9 | 11.5 | 9.0 | 6.7 | 4.2 | | loam |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/ Clay | CEC meq/100gm | Organic Carbon % | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
|---|---|---|---|---|---|---|---|---|---|
| 0-3 | 43.0 | 33.1 | 0.67 | | | | < 1 | 0.9 | 0.69 |
| 3-8 | 42.0 | 33.1 | 0.64 | | | | < 1 | 0.5 | 11.2 |
| 8-18 | 43.9 | 27.5 | 0.89 | | | | < 1 | 0.4 | 19.5 |
| 18-32 | 41.8 | 28.0 | 1.23 | | | | < 3 | 0.5 | 5.4 |
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Soil Classification: Loamy, mixed (calcareous), mesic, shallow Ustic Torriorthent
Series: Conata
Pedon No.: S82SD033-10
Area: Custer County, South Dakota
Location: 2300 feet east and 2000 feet north of the southwest corner of sec. 24 T. 4 S., R. 6 E.
Vegetation: Little bluestem, needleandthread, junegrass
Parent Material: White River materials that were reworked by water
Physiography: Sideslope of old terrace
Relief: F convex
Slope: 33 percent
Aspect: Southeast
Erosion: Slight
Permeability: Moderate
Drainage: Well
Ground Water: Deep
Moisture: Moist to 4 inches; dry below
Root Distribution: Abundant to 18 inches; few to 32 inches
Elevation: 4000'
Sampled by: Ed Ensz

(Colors are for dry soil unless otherwise stated).

A—0 to 3 inches; dark grayish brown (10YR 4/2) cobbly silty clay loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium granular structure; soft, 25 percent by volume of fragments of rock; mildly alkaline; clear smooth boundary.

AC—3 to 8 inches; brown (10YR 5/3) silty clay loam, dark brown (10YR 3/3) moist, dark grayish brown (10YR 4/2) moist crushed; weak medium prismatic structure parting to weak fine and medium subangular blocky; slightly hard, friable; strong effervescence; mildly alkaline; clear wavy boundary.

C1—8 to 18 inches; very pale brown (10YR 7/3) light silty clay loam, brown (10YR 5/3) moist; very weak coarse prismatic structure parting to weak fine and medium subangular blocky; hard, friable; violent effervescence; moderately alkaline; gradual wavy boundary.

Cr1—18 to 32 inches; very pale brown (10YR 8/3) loamy reworked mudstone; very pale brown (10YR 7/3) moist; massive; hard, friable; violent effervescence; moderately alkaline; gradual wavy boundary.

Cr2—32 to 60 inches; very pale brown (10YR 8/4) and white (10YR 8/1) stratified loamy reworked mudstone and cemented loamy and gravelly mudstone; massive; very hard, firm; violent effervescence; moderately alkaline.

| Horizons sampled: | For SDSU | | For Dept. of Transportation | |
|---|---|---|---|---|
| | A | 0-3 inches | A | 0-18 inches |
| | AC | 3-8 inches | AC | |
| | C1 | 8-18 inches | C1 | |
| | Cr1 | 18-32 inches | Cr1 | 18-32 inches |
| | | | Cr2 | 32-60 inches |

Series: Doland

Pedon No: S83SD101-42

Area: Moody County, South Dakota

Location: 2490 ft north and 127 ft east of the southwest corner of Sec. 17, T108N, R47W

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-8 | 31.0 | 49.2 | 19.8 | 6.0 | 25.0 | 18.2 | 4.6 | 8.2 | 5.7 | 1.1 | 0.1 | | clay loam |
| 8-13 | 28.9 | 50.2 | 20.6 | 6.5 | 18.8 | 25.2 | 5.4 | 8.0 | 6.0 | 1.1 | 0.1 | | clay loam |
| 13-23 | 21.2 | 49.1 | 29.6 | 2.9 | 16.5 | 29.7 | 8.6 | 11.3 | 8.5 | 1.1 | 0.1 | | silt loam |
| 23-28 | 27.8 | 51.6 | 20.6 | 5.0 | 17.8 | 28.8 | 5.1 | 7.0 | 6.0 | 2.0 | 0.5 | | silt loam |
| 28-37 | 36.0 | 33.0 | 30.9 | 4.9 | 14.3 | 13.8 | 5.5 | 11.8 | 9.2 | 3.6 | 0.9 | | clay loam |
| 37-60 | 34.4 | 33.1 | 32.5 | 4.4 | 14.4 | 14.3 | 6.3 | 13.0 | 8.5 | 3.5 | 1.2 | | clay loam |
| | | | | | | | | | | | | | |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/ Clay | CEC meq/100gm | Organic Carbon % | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
|---|---|---|---|---|---|---|---|---|---|
| 0-8 | | | | | | 2.7 | | | |
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Soil Classification: fine-loamy, mixed, Udic Haploborolls
Series: Doland
Pedon No.: S83SD101-42
Area: Moody County, South Dakota
Location: 2490 feet north and 127 feet east of the southwest corner of Sec. 17, T. 108 N., R. 47 W.
MLRA: 102A
Climate: Subhumid
Vegetation: Alfalfa
Parent Material: Loamy eolian material over glacial till
Physiography: Plane upland sideslope
Elevation: 1680 feet above sea level
Relief: Gently sloping
Slope: 3 percent
Aspect: South facing
Drainage: Well drained
Ground Water: Deeper than 60 inches
Erosion: Slight
Permeability: Moderate to 28 inches, Moderately slow 28 to 60 inches
Stoniness: None
pH Method: Meter
Date: November 10, 1983
Sampled by: Bruce O. Kunze
Horizons sampled:

| | |
|---|---|
| Ap | 0 to 8 inches |
| Bw1 | 8 to 13 inches |
| Bw2 | 13 to 23 inches |
| Bk | 23 to 28 inches |
| 2Bk | 28 to 37 inches |
| C2 | 37 to 60 inches |

(colors are for dry soil unless otherwise stated).

Ap--0 to 8 inches; very dark grayish brown (10YR 3/2) loam, very dark brown (10YR 2/2) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; slightly acid; abrupt smooth boundary.

Bw1--8 to 13 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium prismatic structure parting to weak medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; slightly acid; clear wavy boundary.

Bw2--13 to 23 inches; brown (10YR 5/3) loam, dark brown (10YR 4/3) moist; weak medium prismatic structure parting to weak medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; neutral; clear wavy boundary.

Bk--23 to 28 inches; pale yellow (2.5Y 7/4) silt loam, light olive brown (2.5Y 5/4) moist; weak medium prismatic structure parting to weak medium;subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common fine accumulations of carbonate; strong effervescence; moderately alkaline; clear smooth boundary.

2Bk--28 to 37 inches; pale yellow (2.5Y 7/4) clay loam, light olive brown (2.5Y 5/4) moist; common fine distinct yellowish brown (10YR 5/6) and very dark brown (10YR 2/2) mottles; weak medium prismatic structure parting to weak medium subangular blocky; very hard, firm, slightly sticky and slightly plastic; common fine accumulations of carbonate; strong effervescence; moderately alkaline; gradual wavy boundary.

2C--37 to 60 inches; pale yellow (2.5 7/4) clay loam, light olive brown (2.5Y 5/4) moist; common fine distinct yellowish brown (10YR 5/6) and very dark brown (10YR 2/20 mottles; massive; very hard, firm, slightly sticky and slightly plastic; few fine accumulations of carbonate; strong effervescence; moderately alkaline.

Series: Doland

Pedon No: S83SD101-43

Area: Moody County, South Dakota

Location: 1683 ft south and 77 ft west of the northeast corner of Sec. 3, T108N, R49W

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-8 | 30.7 | 45.6 | 23.8 | 4.7 | 24.5 | 16.3 | 4.1 | 8.7 | 7.6 | 3.1 | 0.3 | | clay loam |
| 8-15 | 31.3 | 54.6 | 14.1 | 6.3 | 22.9 | 25.4 | 3.6 | 3.6 | 4.9 | 1.7 | 0.2 | | silty clay loam |
| 15-28 | 23.7 | 51.2 | 25.2 | 6.3 | 18.1 | 26.8 | 7.2 | 7.6 | 7.7 | 2.3 | 0.2 | | silty loam |
| 28-37 | 41.3 | 26.5 | 32.2 | 7.8 | 5.4 | 13.3 | 6.5 | 11.3 | 9.1 | 3.5 | 1.8 | | clay |
| 37-60 | 43.2 | 23.3 | 33.5 | 2.0 | 13.3 | 8.0 | 4.6 | 11.9 | 10.9 | 5.2 | 0.9 | | clay |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/ Clay | CEC meq/100gm | Organic Carbon % | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
|---|---|---|---|---|---|---|---|---|---|
| 0-8 | | | | | | 2.7 | | | |
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Soil Classification: fine-loamy, mixed, Udic Haploborolls
Series: Doland
Pedon No.: S83SD101-43
Area: Moody County, South Dakota
Location: 1683 feet south and 77 feet west of the northeast corner of Sec. 3, T. 108 N., R. 49 W.
MLRA: 102A
Climate: Subhumid
Vegetation: Soybean stubble
Parent Material: Loamy eolian material over glacial till
Physiography: Plane upland sideslope
Elevation: 1640 feet above sea level
Relief: Gently sloping
Slope: 3 percent
Aspect: West facing
Drainage: Well drained
Ground Water: Deeper than 60 inches
Erosion: Slight
Permeability: Moderate to 28 inches, Moderately slow 28 to 60 inches
Stoniness: None
pH Method: Meter
Date: November 22, 1983
Sampled by: Bruce O. Kunze
Horizons Sampled:
Ap 0 to 8 inches
Bw1 8 to 15 inches
Bw2 15 to 28 inches
2Bk 28 to 37 inches
2C 37 to 60 inches
(colors are for dry soil unless otherwise stated).

Ap--0 to 8 inches; very dark grayish brown (10YR 3/2) loam, very dark brown (10YR 2/2) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; slightly acid; abrupt smooth boundary.

Bw1--8 to 15 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium prismatic structure parting to weak medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; neutral; clear wavy boundary.

Bw2--15 to 28 inches; brown (10YR 5/3) loam, dark brown (10YR 4/3) moist; weak medium prismatic structure parting to weak medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; neutral; clear smooth boundary.

2Bk--28 to 37 inches; light yellowish brown (2.5Y 6/4) clay loam, light olive brown (2.5Y 5/4) moist; common fine distinct yellowish brown (10YR 5/6) and gray (10YR 6/1) mottles; weak medium prismatic structure parting to weak medium subangular blocky; very hard, firm, slightly sticky and slightly plastic; common fine accumulations of carbonate; strong effervescence; moderately alkaline; gradual wavy boundary.

2C--37 to 60 inches; light yellowish brown (2.5 6/4) clay loam, light olive brown (2.5Y 5/4) moist; common fine distinct yellowish brown (10YR 5/6) and gray (10YR 6/1) mottles; massive; very hard, firm slightly sticky and slightly plastic; few fine accumulations of carbonate; strong effervescence; moderately alkaline.

Series: Epping

Pedon No: S83SD103P-14-RC

Area: Custer County, South Dakota

Location: 2425 ft east and 150 ft north of southwest corner of Sec. 1, T4S, R8E

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-3 | 20.4 | 26.6 | 53.0 | 4.1 | 8.2 | 14.4 | 16.4 | 28.4 | 6.7 | 1.4 | 0.2 | | sandy clay loam |
| 3-8 | 31.1 | 19.1 | 49.8 | 4.4 | 4.4 | 10.3 | 17.8 | 26.5 | 4.9 | 0.5 | 0.1 | | sandy clay loam |
| 8-14 | 31.8 | 22.4 | 45.7 | 4.5 | 9.1 | 8.8 | 16.3 | 25.5 | 3.9 | 0.1 | 0.0 | | sandy clay loam |
| 14-60 | 31.2 | 22.7 | 46.2 | 4.5 | 8.9 | 9.3 | 11.0 | 23.0 | 11.2 | 0.9 | 0.1 | | sandy clay loam |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/ Clay | CEC meq/100gm | Organic Carbon % | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
|---|---|---|---|---|---|---|---|---|---|
| 0-3 | 23.0 | 14.8 | 0.73 | 0.97 | 19.78 | | < 1 | 0.6 | 10.4 |
| 3-8 | 24.8 | 16.6 | 0.53 | 0.61 | 18.97 | | < 1 | 0.5 | 22.1 |
| 8-14 | 26.4 | 16.6 | 0.52 | 0.57 | 17.97 | | < 1 | 0.5 | 23.1 |
| 14-60 | 25.4 | 15.4 | 0.49 | 0.59 | 18.44 | | 5 | 0.5 | 27.0 |
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Date: 8-25-83

Soil Classification: Loamy, mixed (calcareous), mesic, shallow Ustic Torriorthent

Series: Epping
Pedon No.: S83SD103P-14-RC
Area: Custer County, South Dakota
Location: 2,425 feet east and 150 feet north of southwest corner, sec. 1,T. 4 S., R. 8 E.
Climate: Semi-arid
Native Vegetation: Blue grama, little bluestem, buffalograss, sideoats, grama, western wheatgrass.
Parent Material: Siltstone of White River Group
Physiography: Upland
Topography: Strongly sloping
Drainage: Well drained
Ground Water: Deep
Erosion: Slight
Permeability: Moderate
Moisture: Moist to 3 inches
Sampled by: Robert Nielsen and Kathleen Emerson
Date: 8/83

(Colors are for dry soil unless otherwise stated.)

A--0 to 3 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine and very fine granular structure; soft, very friable; strong effervescence; mildly alkaline; clear smooth boundary.

AC--3 to 8 inches; gray (10YR 5/1) loam, dark grayish brown (10YR 4/2) moist; weak medium and coarse subangular blocky structure; slightly hard, friable; strong effervescence; moderately alkaline; clear smooth boundary.

C--8 to 14 inches; light gray (10YR 7/2) loam, brown (10YR 5/3) moist; massive; slightly hard, friable; strong effervescence; moderately alkaline; gradual wavy boundary.

Cr--14 to 60 inches; very pale brown (10YR 8/3) bedded loamstone, pale brown (10YR 6/3) moist; strong effervescence; mildly alkaline.

Horizons sampled: A - 0 to 3 inches
AC - 3 to 8 inches
C - 8 to 14 inches
Cr - 14 to 60 inches

Series: Epping

Pedon No: S83SD1G3P-47

Area: Pennington County, South Dakota

Location: 240 ft west and 320 ft north of the southeast corner of Sec. 6, T4S, R14E

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-3 | 36.7 | 43.1 | 20.2 | 4.1 | 12.2 | 26.8 | 17.2 | 2.5 | 0.3 | 0.2 | 0.0 | | silty clay loam |
| 3-8 | 35.5 | 45.3 | 19.2 | 4.4 | 8.9 | 32.0 | 16.7 | 2.2 | 0.2 | 0.1 | 0.0 | | silty clay loam |
| 8-14 | 38.4 | 34.3 | 27.3 | 2.9 | 7.4 | 23.9 | 22.3 | 4.4 | 0.3 | 0.2 | 0.1 | | clay loam |
| 14-60 | 28.9 | 53.1 | 18.0 | 9.6 | 14.5 | 29.0 | 11.1 | 6.0 | 0.7 | 0.2 | 0.0 | | silty clay loam |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/ Clay | CEC meq/100gm | Organic Carbon % | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
|---|---|---|---|---|---|---|---|---|---|
| 0-3 | 29.9 | 18.8 | 0.51 | .36 | 13.45 | | < 1 | | |
| 3-8 | 28.1 | 16.8 | 0.47 | .43 | 15.25 | | < 1 | | 13.7 |
| 8-14 | 30.9 | 19.0 | 0.49 | .38 | 14.50 | | 4.5 | | 17.5 |
| 14-60 | | | | | | | | | 7.9 |
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Soil Classification: loamy, mixed (calcareous),mesic, shallow Ustic Torriorthents
Series: Epping
Pedon No: S83SD103P-47
Area: Pennington County, South Dakota
Location: 240 feet west and 320 feet north of the Southeast corner of Sec. 6, T. 4 S., R. 14 E.
Climate: Semi-arid
Vegetation: Shallow rangesite: Little bluestem, Green Needlegrass, Needleandthread, Threadleaf sedge, Blue grama, Sideoats grama, June grass, Three awn, forbs, Yucca
Parent Material: Loamy Brule and Chadron mudstone of the White River For.
Physiography: Upland, deeply entrenched, steep
Topography: Complex, convex, hilly
Drainage: Somewhat excessive
Ground Water: Deep
Erosion: None to slight
Permeability: Moderate
Moisture: Dry throughout
Sampled by: rdn
Date: 11/83

(Colors are for dry soil unless otherwise stated.)

A--0 to 3 inches; grayish brown (10YR 5/2) silt loam, dark grayish brown (10YR 4/2) moist; weak medium and fine granular structure; slightly hard, friable, slightly sticky; many fine and medium roots; slight effervescence; clear smooth boundary.

AC--3 to 8 inches; grayish brown (10YR 5/2) silty clay loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky; common fine and medium roots; strong effervescence; gradual wavy boundary.

C--8 to 14 inches;light brownish gray (10YR 6/2) shaley silty clay loam, grayish brown (10YR 5/2) moist; massive; slightly hard, friable, slightly sticky, few fine roots; strong effervescence; gradual wavy boundary.

Cr--14 to 60 inches; grayish brown (10YR 5/2) loamy mudstone; extremely hard; slight effervescence.

All horizons sampled.

Series: Farnuf

Pedon No: S83SD031-15

Area: Corson County, South Dakota

Location: 240 ft east and 100 ft west of the southeast corner of Sec. 20, T22N, R28E

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-7 | 34.0 | 48.5 | 17.6 | 6.6 | 25.4 | 16.5 | 6.6 | 9.7 | 0.9 | 0.2 | 0.2 | | silty clay loam |
| 7-24 | 28.0 | 36.9 | 35.1 | 5.3 | 12.5 | 19.1 | 12.5 | 21.5 | 1.1 | 0.1 | 0.0 | | clay loam |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/ Clay | CEC meq/100gm | Organic Carbon % | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
|---|---|---|---|---|---|---|---|---|---|
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Soil Classification: Fine-loamy, mixed Typic Argiborolls
Series: Farnuf
Pedon No.: S83SD031-15
Area: Corson County, South Dakota
Location: 240 feet east and 100 feet west of the southeast corner of sec. 20, T. 22 N., R. 28 E.
Vegetation: Stubble
Parent Material: Alluvium
Physiography: Upland terrace
Relief: Convex
Slope: 1 percent
Aspect: West
Permeability: Moderate
Drainage: Well
Ground Water: Below 6 feet
Moisture: Moist to 30 inches
Erosion: Slight
Date: October 1983
Profile by: Kenneth Heil

(Colors are for dry soil unless otherwise stated).

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

Bt--7 to 24 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable; neutral; gradual wavy boundary.

B3--24 to 32 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; weak medium prismatic structure parting to weak medium and coarse subangular blocky; mildly alkaline; clear wavy boundary.

Bk--32 to 42 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; weak coarse subangular blocky structure; slightly hard, friable; common, medium accumulations of carbonates; strong effervescence; mildly alkaline; clear wavy boundary.

C--42 to 60 inches; grayish brown (2.5Y 5/2) loam, olive brown (2.5Y 4/4) moist; massive; slightly hard, friable; slight effervescence; mildly alkaline.

Horizons sampled: A (0 to 7 inches)
B (7 to 24 inches)

Series: Farnuf

Pedon No: S83SD031-105

Area: Corson County, South Dakota

Location: 1700 ft west and 2500 ft north of the southeast corner of Sec. 4, T19N, R29E

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-5 | 22.9 | 47.5 | 29.6 | 4.1 | 12.8 | 30.7 | 17.1 | 10.5 | 1.2 | 0.4 | 0.4 | | loam |
| 5-15 | 24.8 | 36.6 | 38.7 | 3.6 | 8.0 | 24.9 | 19.7 | 16.5 | 2.0 | 0.4 | 0.1 | | loam |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/ Clay | CEC meq/100gm | Organic Carbon % | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
|---|---|---|---|---|---|---|---|---|---|
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Soil Classification: Fine-loamy, mixed Typic Argiborolls
Series: Farnuf
Pedon No.: S83SD031-105
Area: Corson County, South Dakota
Location: 1,700 feet west and 2,500 feet north of the southeast corner of sec. 4, T. 19 N., R. 29 E.
Vegetation: Native grass
Parent Material: Alluvium
Physiography: Upland terrace
Relief: Convex
Slope: 4 percent
Aspect: East
Permeability: Moderate
Drainage: Well
Ground Water: Below 6 feet
Moisture: Moist to 40 inches
Erosion: Slight
Date: October 1983
Profile by: Kim Kempton

(Colors are for dry soil unless otherwise stated).

A--0 to 5 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic structure parting to moderate fine granular; slightly hard, friable; neutral; clear wavy boundary.

Bt--5 to 15 inches; brown (10YR 4/3) clay loam, dark brown (10YR 3/3) moist; strong medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable; neutral, clear wavy boundary.

Bk--15 to 23 inches; light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist; moderate medium prismatic structure parting to weak medium subangular blocky; slightly hard, friable; few fine accumulations of carbonates; strong effervescence; moderately alkaline; gradual wavy boundary.

BCk--23 to 41 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; weak medium prismatic structure; soft, friable; few fine accumulations of carbonates; strong effervescence; moderately alkaline; diffuse boundary.

C--41 to 60 inches; grayish brown (2.5Y 5/2) loam, dark grayish brown (2.5Y 4/2) moist; massive; soft, friable; strong effervescence; strongly alkaline.

Horizons sampled: A (0 to 5 inches)
B (5 to 15 inches)

Series: Farnuf loam

Pedon No: S83SD137-5

Area: Ziebach County, South Dakota

Location: 70 ft north and 1420 ft of the southeast corner of Sec. 17, T14N, R19E

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-6 | 20.0 | 48.0 | 32.0 | 4.0 | 16.0 | 27.9 | 24.8 | 6.2 | 0.4 | 0.4 | 0.3 | | loam |
| 6-13 | 25.5 | 46.3 | 28.2 | 3.6 | 10.9 | 31.8 | 20.1 | 6.7 | 0.6 | 0.4 | 0.3 | | loam |
| 13-20 | 19.6 | 51.8 | 28.6 | 7.0 | 8.4 | 36.4 | 20.8 | 6.6 | 0.5 | 0.5 | 0.2 | | silt loam |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/ Clay | CEC meq/100gm | Organic Carbon % | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
|---|---|---|---|---|---|---|---|---|---|
| 0-6 | 19.1 | 14.8 | 0.74 | | | 1.9 | | | |
| 6-13 | 23.1 | 12.36 | 0.48 | | | 1.1 | | | |
| 13-20 | 20.5 | 11.3 | 0.58 | | | | | | |
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Soil Classification: Fine-loamy, mixed Typic Argiborolls
Series: Farnuf loam
Pedon No.: S83SD137-5
Area: Ziebach County, South Dakota
Location: 70 feet north and 1420 feet of the southeast corner of sec. 17, T. 14 N., R. 19 E.
Vegetation: Wheat stubble
Parent Material: Alluvium
Physiography: High terrace
Relief: Nearly level
Slope: 2 percent
Aspect: South
Permeability: Moderate
Drainage: Well
Ground Water: Below 6 feet
Moisture: Moist to 48 inches
Erosion: None to slight
Salt: None
Stoniness: None
Date: April 18, 1983
Sampled by: Wayne Bachman and Alan Hardison

(Colors are for dry soil unless otherwise stated).

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to moderate medium granular; slightly hard, friable, slightly sticky, slightly plastic; clear smooth boundary.

Bt1—6 to 13 inches; dark brown (10YR 4/3) clay loam, very dark grayish brown (10YR 3/2) moist; weak coarse prismatic structure parting to moderate medium subangular blocky; hard, friable; slightly sticky and plastic; clear wavy boundary.

Bt2—13 to 20 inches; brown (10YR 5/3) clay loam, dark brown (10YR 4/3) moist; weak coarse prismatic structure parting to moderate medium subangular blocky; hard, friable, slightly sticky and plastic; clear wavy boundary.

Bk—20 to 30 inches; light brownish gray (2.5Y 6/2) loam, grayish brown (2.5Y 5/2) moist; weak coarse subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few fine accumulations of carbonate; strong effervescence; gradual wavy boundary.

C—30 to 60 inches; light gray (2.5Y 7/2) loam, grayish brown (2.5Y 5/2) moist; massive; hard, friable, slightly sticky and slightly plastic; strong effervescence.

Horizons sampled: Ap (0 to 6 inches)
Bt1 (6 to 13 inches)
Bt2 (13 to 20 inches)

Series: Farnuf loam

Pedon No: S77SD137-18

Area: Ziebach County, South Dakota

Location: 970 ft south and 2110 ft east of the northwest corner of Sec. 34, T15N, R20E

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-8 | 21.9 | 53.9 | 24.2 | 3.6 | 14.6 | 35.7 | 14.1 | 4.8 | 1.6 | 3.0 | 0.6 | | silt loam |
| 8-15 | 30.1 | 48.8 | 21.1 | 3.8 | 15.1 | 30.0 | 12.6 | 3.6 | 1.7 | 2.7 | 0.5 | | clay loam |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/ Clay | CEC meq/100gm | Organic Carbon % | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
|---|---|---|---|---|---|---|---|---|---|
| 0-8 | 20.6 | 11.5 | 0.53 | | | 2.2 | | | |
| 8-15 | 23.6 | 13.7 | 0.46 | | | 1.1 | | | |
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Soil Classification: Fine-loamy, mixed Typic Argiborolls
Series: Farnuf loam
Pedon No.: S77SD131-18
Area: Ziebach County, South Dakota
Location: 970 feet south and 2110 feet east of the northwest corner of sec. 34, T. 15 N., R. 20 E.
Vegetation: Western wheatgrass, needleandthread, green needlegrass
Parent Material: Alluvium
Physiography: High terrace
Relief: Nearly level
Slope: 1 percent
Aspect: Northwest
Permeability: Moderate
Drainage: Well
Ground Water: Below 6 feet
Moisture: Moist to 18 inches
Erosion: None
Salt: None
Stoniness: None
Date: October 21,1977
Sampled by: Wayne Bachman and Alan Hardison

(Colors are for dry soil unless otherwise stated).

A—0 to 8 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium and fine subangular blocky structure parting to moderate medium granular; hard, very friable, slightly sticky and slightly plastic; many roots; clear wavy boundary.

Bt1—8 to 11 inches; brown (10YR 4/3) silty clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure parting to moderate fine subangular blocky; hard, friable, sticky and slightly plastic; many roots; clear wavy boundary.

Bt2—11 to 15 inches; brown (10YR 5/3) silty clay loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to weak medium subangular blocky; hard, friable, sticky and plastic; common roots; clear wavy boundary.

Bk1—15 to 24 inches; pale brown (10YR 6/3) silt loam, pale brown (10YR 5/3) moist; moderate coarse prismatic structure parting to weak medium subangular blocky; hard, friable, slightly sticky and slightly plastic; common roots; few fine accumulations of carbonates; strong effervescence; gradual wavy boundary.

Bk2—24 to 44 inches; pale brown (10YR 6/3) silt loam, brown (10YR 5/3) moist; weak coarse subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few roots; few fine accumulations of carbonate; strong effervescence; gradual wavy boundary.

C—44 to 60 inches; brown (10YR 5/3) loam, dark brown (10YR 4/3) moist; massive; hard, friable, slightly sticky and slightly plastic; few roots to 48 inches; slight effervescence.

Horizons sampled: A (0 to 8 inches)
Combined Bt1 and Bt2 (8 to 15 inches)

Series: Glenberg loam

Pedon No: S82SD137-15

Area: Ziebach County, South Dakota

Location: 1870 ft north and 1200 ft west of the southeast corner of Sec. 14, T8N, R22E

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 10-40 | 15.0 | 37.7 | 47.3 | 3.7 | 7.5 | 26.5 | 37.9 | 9.1 | 0.2 | 0.1 | 0.0 | | loam |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/ Clay | CEC meq/100gm | Organic Carbon % | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
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Soil Classification: Coarse-loamy, mixed (calcareous) mesic, Ustic Torrifluvents
Series: Glenberg loam
Pedon No.: S82SD137-15
Area: Ziebach County, South Dakota
Location: 1870 feet north and 1200 feet west of the southeast corner of sec. 14, T. 8 N., R. 22 E.
Vegetation: Kochia, sunflower, Japanese brome
Parent Material: Alluvium
Physiography: Low terrace
Relief: Nearly level
Slope: 1 percent
Aspect: None
Permeability: Moderate
Drainage: Well
Ground Water: Below 6 feet
Moisture: Moist to 17 inches
Erosion: Slight to none
Salt: None
Stoniness: None
Date: August 26, 1982
Sampled by: Wayne Bachman and Alan Hardison

(Colors are for dry soil unless otherwise stated).

Ap—0 to 4 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure parting to weak fine granular; slightly hard, friable, slightly sticky, slightly plastic; strong effervescence, clear smooth boundary.

C1—4 to 10 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; strong effervescence; clear wavy boundary.

C2—10 to 17 inches; grayish brown (10YR 5/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; weak thin and medium plates and single grained; loose; very friable; strong effervescence; clear wavy boundary.

C3—17 to 25 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate thin plates; slightly hard, friable, slightly sticky and plastic; strong effervescence; clear wavy boundary.

C4—25 to 40 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; weak thin plates; slightly hard, friable, slightly sticky and slightly plastic; strong effervescence; gradual wavy boundary.

C5—40 to 55 inches; grayish brown (10YR 5/2) silt loam, dark grayish brown (10YR 4/2) moist; weak thin plates; slightly hard, friable, slightly sticky and slightly plastic; strong effervescence; clear wavy boundary.

C6—55 to 60 inches; grayish brown (10YR 5/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; weak medium plates; loose, very friable; strong effervescence.

Horizons sampled: Combined 10 to 40 inch control section

Series: Gurney

Pedon No: S82SD033-12

Area: Custer County, South Dakota

Location: 1700 ft east and 1200 ft south of the northwest corner of Sec. 22, T5S, R2E

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-5 | 26.3 | 53.1 | 20.6 | 15.1 | 0.0 | 38.0 | 13.5 | 6.6 | 0.3 | 0.1 | 0.1 | | silt loam |
| 5-8 | 28.8 | 48.8 | 22.4 | 2.6 | 11.6 | 34.6 | 14.8 | 7.3 | 0.2 | 0.0 | 0.1 | | clay loam |
| 8-14 | 26.1 | 46.2 | 27.7 | 2.5 | 10.5 | 33.1 | 20.8 | 6.3 | 0.5 | 0.1 | 0.0 | | loam |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/ Clay | CEC meq/100gm | Organic Carbon % | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
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Soil Classification: Fine-silty, mixed, mesic Typic Argiboroll
Series: Gurney
Pedon No.: S82SD033-12
Area: Custer County, South Dakota
Location: 1700 feet east and 1200 feet south of the northwest corner of sec. 22 T. 5 S., R. 2 E.
Vegetation: Needleandthread, western wheatgrass, carex
Parent Material: Limestone
Physiography: Upland open meadow in forest
Relief: D concave
Slope: 8 percent
Aspect: Northeast
Erosion: Slight
Permeability: Moderate
Drainage: Well
Ground Water: Deep
Moisture: Moist to 5 inches; dry below
Root Distribution: Abundant to 8 inches; few to 20 inches
Elevation: 4680'
Sampled by: Ed Ensz

(Colors are for dry soil unless otherwise stated).

A—0 to 5 inches; dark grayish brown (10YR 4/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium granular structure; soft, friable; mildly alkaline; clear smooth boundary.

Bt—5 to 8 inches; brown (10YR 4/3) light silty clay, dark brown (10YR 3/3) moist; weak medium and fine subangular blocky structure; slightly hard, friable; mildly alkaline; abrupt wavy boundary.

Btk—8 to 14 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; moderate medium prismatic structure parting to moderate medium and coarse subangular blocky; slightly hard, friable; strong effervescence; moderately alkaline; gradual wavy boundary.

BC—14 to 20 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; weak coarse prismatic structure; slightly hard, friable; strong effervescence; moderately alkaline; gradual wavy boundary.

C1—20 to 32 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; massive; slightly hard, friable; strong effervescence; moderately alkaline; abrupt wavy boundary.

R—32 to 60 inches; white and pink indurated limestone.

Horizons sampled:

| For SDSU | |
|---|---|
| A | 0-5 inches |
| Bt | 5-8 inches |
| Btk | 8-14 inches |

Series: Haverson silt loam

Pedon No: S83SD137-10

Area: Ziebach County, South Dakota

Location: 2490 ft north and 550 ft west of the southeast corner of Sec. 17, T9N, R19E

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-3 | 29.4 | 43.7 | 26.9 | 7.4 | 14.7 | 21.6 | 14.6 | 11.4 | 0.6 | 0.3 | 0.0 | | clay loam |
| 10-40 | 28.4 | 42.5 | 29.0 | 7.1 | 10.7 | 24.7 | 18.2 | 10.4 | 0.3 | 0.2 | 0.0 | | clay loam |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/ Clay | CEC meq/100gm | Organic Carbon % | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
|---|---|---|---|---|---|---|---|---|---|
| 0-3 | 21.0 | 16.9 | 0.57 | | | | | | 3.2 |
| 10-40 | 24.0 | 13.0 | 0.46 | | | | | | 2.6 |
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Soil Classification: Fine-loamy, mixed (calcareous), mesic Ustic Torrifluvents
Series: Haverson silt loam
Pedon No.: S83SD137-10
Area: Ziebach County, South Dakota
Location: 2,490 feet north and 550 feet west of the southeast corner of section 17, T. 9 N., R. 19 E.
Vegetation: Western wheatgrass, blue grama
Parent Material: Alluvium
Physiography: Floodplain
Relief: Level
Slope: 0 to 1 percent
Aspect: West
Permeability: Moderate
Drainage: Well
Ground Water: Below 6 feet
Moisture: Dry
Erosion: None to slight
Salt: None
Stoniness: None
Date: July 12,1983
Sampled by: Wayne Bachman and Alan Hardison

(Colors are for dry soil unless otherwise stated).

A—0 to 3 inches; dark grayish brown (10YR 4/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, slightly plastic; common roots; slight effervescence; clear smooth boundary.

C1—3 to 16 inches; grayish brown (10YR 5/2) silty clay loam stratified with thin lenses of silt loam; dark grayish brown (10YR 4/2) moist; weak medium prismatic structure parting to weak fine and medium platy; slightly hard, friable, slightly sticky and slightly plastic; common roots to 7 inches; few roots below 7 inches; strong effervescence; gradual wavy boundary.

C2—16 to 49 inches; grayish brown (10YR 5/2) silt loam stratified with thin lenses of silty clay loam, dark grayish brown (10YR 4/2) moist; weak medium platy structure; soft, friable; slightly plastic; few roots; strong effervescence; gradual wavy boundary.

C3—47 to 60 inches; grayish brown (10YR 5/2) loam stratified with thin lenses of fine sandy loam and loam, dark grayish brown (10YR 4/2) moist; soft, very friable, slightly plastic; violent effervescence.

Horizons sampled: A (0 to 3 inches)
10 to 40 inch control section

Series: LaDelle - loam

Pedon No: S83SD039-15

Area: Deuel County, South Dakota

Location: 900 ft east and 800 ft north of the southwest corner of Sec. 8, T117N, R47W

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-8 | 31.7 | 29.5 | 38.8 | 5.0 | 21.3 | 3.2 | 7.2 | 17.4 | 11.1 | 2.7 | 0.4 | | clay loam |
| 8-17 | 32.2 | 28.6 | 39.2 | 2.0 | 4.4 | 22.2 | 10.6 | 16.9 | 9.6 | 1.8 | 0.4 | | clay loam |
| 17-34 | 33.2 | 44.4 | 22.4 | 4.7 | 16.6 | 23.1 | 8.5 | 9.7 | 3.5 | 0.6 | 0.1 | | clay loam |
| 34-46 | 40.3 | 44.9 | 14.8 | 7.8 | 21.2 | 15.9 | 4.6 | 2.0 | 1.4 | 5.1 | 1.7 | | silty clay |
| 46-60 | 35.5 | 48.6 | 15.9 | 8.9 | 12.7 | 27.0 | 10.5 | 3.9 | 0.3 | 0.4 | 0.7 | | silty clay loam |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/ Clay | CEC meq/100gm | Organic Carbon % | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
|---|---|---|---|---|---|---|---|---|---|
| 0-8 | | | | | | 2.4 | | | |
| 8-17 | | | | | | 2.0 | | | |
| 17-34 | | | | | | | | | |
| 34-46 | | | | | | | 3 | | |
| 46-60 | | | | | | | | 3.9 | |
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Soil Classification: Fine Silty, mixed, Cumulic Udic Haploborolls
Series: LaDelle Loam
Pedon No.: S83SD039-15
Area: Deuel County, South Dakota
Location: 900 feet east and 800 feet north of the southwest corner of Sec. 8, T. 117 N, R. 47 W.
Climate: Mean annual precipitation is about 22 inches and mean annual air temperature is about 44 degrees F.
Vegetation: Cultivated
Parent Material: Silty and loamy alluvium
Physiography: Broad flat bottom land below prairie coteau
Topography: Nearly level, 1/2 to 1 percent east aspect.
Drainage: Moderately well
Ground water: Below 5 feet
Erosion: Slight
Permeability: Moderate
Moisture: Moist throughout
Date: November 3, 1983
Sampled by: Kenneth F. Miller
AP--0 to 8 inches; dark gray (10YR4/1) loam, black (10YR2/1) moist, moderate fine and medium granular structure; slightly hard, friable; slight effervescence; mildly alkaline, abrupt smooth boundary.

A--8 to 17 inches; Dark gray (10YR4/1) loam, black (10YR2/1) moist; moderate medium subangular blocky structure; hard, friable; common fine and medium accumulations of carbonate; strong effervescence; mildly alkaline, clear wavy boundary.

BW--17 to 34 inches; Gray (10YR5/1) silty clay loam, very dark gray (10YR3/1) moist; weak medium prismatic structure parting to moderate medium subangular blocky; hard, friable; slightly sticky and slightly plastic, few fine accumulations of carbonate; strong effervescence; mildly alkaline; abrupt wavy boundary.

CZ--34 to 46 inches; light gray (25Y7/2 silty clay loam, grayish brown (25Y5/2) moist; common fine distinct strong brown (75YR5/6) mottles; weak coarse and medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common fine accumulations of salts; few fine accumulations of carbonate; strong effervescence; moderately alkaline; clear wavy boundary.

C--46 to 60 inches; light brownish gray (25Y6/2) silty clay loam, grayish brown (25Y5/2) moist; common fine and medium prominent yellowish red (5YR4/6) mottles; massive; very hard, firm; slightly sticky and slightly plastic; common fine and medium accumulations of carbonate; strong effervescence; moderately alkaline.

All horizons were sampled.

Series: Larson

Pedon No: S83SD13-57

Area: Brown County, South Dakota

Location: 2220 ft north and 525 ft east of the southwest corner of Sec. 20, T126N, R61W

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-15 | 13.4 | 36.0 | 50.6 | 1.1 | 11.2 | 23.7 | 32.3 | 18.0 | 0.2 | 0.1 | 0.0 | | loam |
| 15-19 | 6.8 | 35.5 | 57.7 | 1.8 | 15.0 | 18.7 | 40.9 | 16.3 | 0.3 | 0.1 | 0.1 | | very fine sandy loam |
| 19-27 | 21.5 | 36.3 | 42.2 | 1.5 | 10.9 | 24.0 | 30.7 | 10.4 | 0.7 | 0.2 | 0.1 | | loam |
| 27-41 | 22.3 | 45.1 | 32.6 | 4.6 | 13.1 | 27.4 | 20.0 | 12.2 | 0.2 | 0.1 | 0.1 | | loam |
| 41-47 | 19.1 | 30.3 | 50.6 | 7.2 | 23.0 | 0.2 | 23.5 | 26.3 | 0.5 | 0.1 | 0.1 | | fine sandy loam |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/Clay | CEC meq/100gm | pH | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
|---|---|---|---|---|---|---|---|---|---|
| 0-15 | | | | | | 5.8 | | | |
| 15-19 | | | | | | 7.1 | | | |
| 19-27 | | | | | | 8.9 | 22.0 | 2.3 | 1.0 |
| 27-41 | | | | | | 9.0 | 29.4 | 2.6 | 2.8 |
| 41-47 | | | | | | 9.1 | 34.9 | 3.0 | 9.1 |
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Soil Classification: Fine-loamy, mixed Udic Natriboroll
Series: Larson
Pedon No.: S83SD013-57
Area: Brown County, South Dakota
Location: 2220 feet north and 525 feet east of the southwest corner of sec. 20, T. 126 N., R. 61 W.
Climate: Mean annual temperature 43°F; mean annual precipitation 19"
Vegetation: Alfalfa
Parent Material: Lacustrine
Physiography: Nearly level Lake Plain
Topography: Plain
Drainage; Moderately well
Ground Water: Greater than 5 feet
Erosion: None
Permeability: Slow
Moisture: Moist throughout
Sampled by: Loren Schultz, Steve Fischer, Jim Clausen, and Tom Martin
Described by: James Clausen

(Colors are for dry soil unless otherwise stated).

Ap--0 to 6 inches; dark gray (10YR 4/1) very fine sandy loam, black (10YR 2/1) moist; weak very fine granular structure; slightly hard, friable; slightly acid; abrupt smooth boundary.

A--6 to 15 inches; dark gray (10YR 4/1) very fine sandy loam, black (10YR 2/1) moist; weak medium subangular blocky structure parting to weak very fine granular; slightly hard, friable; slightly acid; clear smooth boundary.

E--15 to 19 inches; gray (10YR 5/1) very fine sandy loam, very dark grayish brown (10YR 3/2) moist; common fine faint yellowish brown (10YR 5/6) mottles; weak very thin platy structure; slightly hard, very friable; neutral; abrupt wavy boundary.

Bt1--19 to 23 inches; grayish brown (2.5Y 5/2) clay loam, very dark grayish brown (2.5Y 3/2) moist; strong coarse and medium columnar structure parting to moderate coarse and medium angular blocky; very hard, friable; thin continuous gray (10YR 5/1) coatings on the tops of columns; tongues of bleached sand grains on faces of peds; moderately alkaline; clear wavy boundary.

Bt2--23 to 27 inches; grayish brown (2.5Y 5/2) clay loam, very dark grayish brown (2.5Y 3/2) moist; moderate coarse and medium prismatic structure parting to moderate coarse and medium angular blocky; very hard, friable; tongues of bleached sand grains on faces of peds; strongly alkaline; clear wavy boundary.

Btk--27 to 41 inches; grayish brown (2.5Y 5/2) clay loam, very dark grayish brown (2.5Y 3/2) moist; moderate coarse and medium prismatic structure parting to moderate medium angular blocky; very hard, friable; common medium and fine accumulations of carbonate; strong effervescence; strongly alkaline; clear wavy boundary.

Bk--41 to 47 inches; light brownish gray (2.5Y 6/2) silt loam, dark grayish brown (2.5Y 4/2) moist; weak coarse and medium prismatic structure parting to weak medium angular blocky; hard, friable; many fine, medium and coarse accumulations of carbonate; violent effervescence; very strongly alkaline; gradual wavy boundary.

C--47 to 60 inches; light gray (2.5Y 7/2) silt loam, light brownish gray (2.5Y 6/2) moist; common fine and medium faint gray (10YR 6/1) and common fine distinct yellowish brown (!0YR 5/6) mottles; massive; slightly hard, friable; strong effervescence; strongly alkaline.

Horizons sampled: A & Ap, 0 to 15 inches
E, 15 to 19 inches
Bt1 & Bt2, 19 to 27 inches
Btk, 27 to 41 inches
Bk, 41 to 47 inches

Series: Larson

Pedon No: S83SD013-59

Area: Brown County, South Dakota

Location: 1320 ft east and 105 ft north of the southwest corner of Sec. 29, T126N, R61W

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-15 | 15.7 | 31.5 | 52.7 | 1.8 | 12.1 | 17.6 | 40.2 | 12.3 | 0.2 | 0.1 | 0.0 | | very fine sandy loam |
| 21-30 | 18.4 | 37.6 | 44.1 | 1.4 | 11.8 | 24.4 | 35.4 | 8.4 | 0.2 | 0.1 | 0.0 | | loam |
| 30-37 | 19.8 | 50.2 | 30.0 | 8.1 | 21.3 | 20.8 | 23.9 | 5.0 | 0.3 | 0.5 | 0.3 | | loam |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/ Clay | CEC meq/100gm | pH | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
|---|---|---|---|---|---|---|---|---|---|
| 0-15 | | | | | | 6.0 | | | |
| 21-30 | | | | | | 8.3 | 26.3 | 3.2 | 0.6 |
| 30-37 | | | | | | 8.8 | 31.5 | 4.1 | 2.2 |
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Soil Classification: Fine-loamy, mixed Udic Natriboroll
Series: Larson
Pedon No.: S83SD013-59
Area: Brown County, South Dakota
Location: 1320 feet east and 105 feet north of the southwest corner of sec. 29, T. 126 N., R. 61 W.
Climate: Mean annual temperature 43°F; mean annual precipitation 19"
Vegetation: Alfalfa
Parent Material: Lacustrine
Physiography: Nearly level Lake Plain
Topography: Plain
Drainage; Moderately well
Ground Water: Greater than 5 feet
Erosion: None
Permeability: Slow
Moisture: Moist to 6 inches
Sampled by: Steve Fischer and Jim Clausen
Described by: James Clausen

(Colors are for dry soil unless otherwise stated).

Ap--0 to 7 inches; dark gray (10YR 4/1) very fine sandy loam, black (10YR 2/1) moist; weak fine and very fine subangular blocky structure; slightly hard, friable; slightly acid; abrupt smooth boundary.

A--7 to 15 inches; dark gray (10YR 4/1) very fine sandy loam, black (10YR 2/1) moist; weak medium and fine subangular blocky structure; slightly hard, friable; slightly acid; clear wavy boundary.

E--15 to 21 inches; grayish brown (10YR 5/2) very fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak thick platy structure; slightly hard, very friable; neutral; abrupt wavy boundary.

Bt--21 to 30 inches; grayish brown (2.5Y 5/2) silty clay loam, very dark grayish brown (2.5Y 3/2) moist; moderate medium columnar structure parting to moderate medium angular blocky; hard, friable; thin continuous grayish brown (10YR 5/2) coatings on tops of columns; mildly alkaline clear wavy boundary.

Btk--30 to 37 inches; dark grayish brown (2.5Y 4/2) silty clay loam, very dark grayish brown (2.5Y 3/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, friable; common very fine and fine accumulations of carbonate; strong effervescence; moderately alkaline; clear wavy boundary.

Bk--37 to 42 inches; dark grayish brown (2.5Y 4/2) silty clay loam, very dark grayish brown (2.5Y 3/2) moist; weak coarse and medium subangular blocky structure; slightly hard, friable; many fine and medium accumulations of carbonate; violent effervescence; strongly alkaline; clear wavy boundary.

C1--42 to 51 inches; light gray (2.5Y 7/2) silt loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, friable; strong effervescence; moderately alkaline; gradual wavy boundary.

C2--51 to 60 inches; light gray (2.5Y 7/2) silt loam, olive brown (2.5Y 4/4) moist; common fine and medium faint gray (10YR 6/1) and few fine distinct yellowish brown (10YR 5/6) mottles; massive; slightly hard, friable; strong effervescence; moderately alkaline.

Horizons sampled: A & Ap, 0 to 15 inches
Bt, 21 to 30 inches
Btk1, 30 to 37 inches

Series: Larson Variant

Pedon No: S83SD013-56

Area: Brown County, South Dakota

Location: 2442 ft north and 1131 ft west of the southeast corner of Sec. 19, T126N, R61W

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-8 | 10.5 | 23.4 | 66.0 | 0.7 | 6.9 | 15.8 | 45.0 | 20.6 | 0.2 | 0.1 | 0.1 | | very fine sandy loam |
| 8-15 | 14.3 | 22.4 | 63.4 | 6.2 | 0.0 | 16.2 | 38.0 | 23.9 | 1.3 | 0.1 | 0.0 | | very fine sandy loam |
| 15-24 | 18.9 | 38.3 | 42.7 | 1.1 | 15.7 | 21.6 | 29.5 | 12.4 | 0.1 | 0.7 | 0.0 | | loam |
| 24-34 | 15.5 | 35.1 | 49.4 | 1.0 | 22.8 | 11.3 | 23.3 | 25.5 | 0.4 | 0.1 | 0.1 | | loam |
| 34-45 | 13.3 | 37.4 | 49.2 | 0.9 | 18.9 | 17.6 | 24.4 | 23.2 | 1.3 | 0.2 | 0.1 | | loam |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/ Clay | CEC meq/100gm | pH | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
|---|---|---|---|---|---|---|---|---|---|
| 0-8 | | | | | | 6.5 | | | |
| 8-15 | | | | | | 9.0 | 65.2 | 2.6 | 1.2 |
| 15-24 | | | | | | 9.7 | 43.2 | 4.0 | 1.0 |
| 24-34 | | | | | | 9.9 | 298.8 | | 29.3 |
| 34-45 | | | | | | 9.7 | 84.1 | 4.0 | 24.0 |
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Soil Classification: Coarse-loamy, mixed Leptic Natriboroll
Series: Larson Variant
Pedon No.: S83SD013-56
Area: Brown County, South Dakota
Location: 2442 feet north and 1131 feet west of the southeast corner of sec. 19, T. 126 N., R. 61 W.
Climate: Mean annual temperature 43°F; mean annual precipitation 19"
Vegetation: Alfalfa
Parent Material: Lacustrine
Physiography: Nearly level Lake Plain
Topography: Concave
Drainage; Somewhat poorly drained
Ground Water: Greater than 5 feet
Erosion: None
Permeability: Slow
Moisture: Moist throughout
Sampled by: Loren Schultz and Tom Martin
Described by: James Clausen

(Colors are for dry soil unless otherwise stated).

Ap--0 to 8 inches; dark gray (10YR 4/1) very fine sandy loam, black (10YR 2/1) moist; weak medium and fine subangular blocky structure parting to weak fine granular ; slightly hard, very friable; neutral; abrupt smooth boundary.

Bt 1--8 to 15 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate coarse columnar structure parting to weak coarse and medium subangular blocky; very hard, friable; thin continuous gray (10YR 6/1) coatings on tops of columns; few fine nests of salt; slight effervescence; strongly alkaline; clear wavy boundary.

Bt 2--15 to 24 inches; grayish brown (2.5Y 5/2) loam, dark grayish brown (2.5Y 4/2) moist; moderate coarse prismatic structure parting to moderate medium and fine subangular blocky; very hard, friable; few fine nests of salt; bleached sand grains on faces of peds; slight effervescence; strongly alkaline; clear wavy boundary.

Bk1--24 to 34 inches; white (2.5Y 8/0) loam, light gray (2.5Y 7/2) moist; weak coarse prismatic structure parting to weak medium and fine subangular blocky; hard, friable; grayish brown (2.5Y 5/2) tongues on faces of peds; violent effervescence; very strongly alkaline; clear wavy boundary.

Bk2--34 to 45 inches; white (2.5Y 8/2) silt loam, light brownish gray (2.5Y 6/2) moist; common fine faint gray (10YR 6/1) and common fine distinct yellowish brown (10YR 5/6) mottles; weak coarse and medium subangular blocky structure; hard, friable; grayish brown (2.5Y 5/2) tongues on faces of peds; few manganese concretions, violent effervescence; very strongly alkaline; gradual wavy boundary.

C--45 to 60 inches; white (2.5Y 8/2) silt loam, light brownish gray (2.5Y 6/2) moist; many medium and fine faint gray (10YR 6/1), many medium and fine distinct yellowish brown (10YR 5/6), and few fine prominent dark brown (7.5YR 3/4) mottles; massive; slightly hard, friable; laminations 1 to 2 mm thick; few manganese concretions; strong effervescence; strongly alkaline.

Horizons sampled:
Ap 0 to 8 inches
Bt1, 8 to 15 inches
Bt2, 15 to 24 inches
Bk1, 24 to 34 inches
Bk2, 34 to 45 inches

Series: Larson Variant

Pedon No: S83SD13-58

Area: Brown County, South Dakota

Location: 1280 ft east and 90 ft north of the southwest corner of Sec. 29, T126N, R61W

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-6 | 14.9 | 33.4 | 51.7 | 1.1 | 12.7 | 19.6 | 37.9 | 13.4 | 0.2 | 0.1 | 0.1 | | loam |
| 8-16 | 15.9 | 30.7 | 53.3 | 2.8 | 14.2 | 13.8 | 40.6 | 12.5 | 0.1 | 0.1 | 0.0 | | very fine sandy loam |
| 16-31 | 23.5 | 47.9 | 28.6 | 6.1 | 16.3 | 25.5 | 22.9 | 5.5 | 0.1 | 0.1 | 0.1 | | loam |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/ Clay | CEC meq/100gm | pH | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
|---|---|---|---|---|---|---|---|---|---|
| 0-6 | | | | | | 6.3 | | | |
| 8-16 | | | | | | 8.7 | 39.4 | 4.5 | 1.0 |
| 16-31 | | | | | | 8.7 | 35.8 | 5.3 | 0.4 |
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Soil Classification: Coarse-loamy, mixed Leptic Natriboroll
Series: Larson Variant
Pedon No.: S83SD013-58
Area: Brown County, South Dakota
Location: 1280 feet east and 90 feet north of the southwest corner of sec. 29, T. 126 N., R. 61 W.
Climate: Mean annual temperature 43°F; mean annual precipitation 19"
Vegetation: Alfalfa
Parent Material: Lacustrine
Physiography: Nearly level Lake Plain
Topography: Concave
Drainage; Somewhat poorly
Ground Water: Greater than 5 feet
Erosion: None
Permeability: Slow
Moisture: Moist throughout
Sampled by: Steve Fischer, Jim Clausen, and Tom Martin
Described by: James Clausen

(Colors are for dry soil unless otherwise stated).

Ap--0 to 6 inches; dark gray (10YR 4/1) very fine sandy loam, black (10YR 2/1) moist; weak medium and fine subangular blocky structure parting to weak fine granular; slightly hard, friable; slightly acid; abrupt smooth boundary.

E--6 to 8 inches; gray (10YR 5/1) very fine sandy loam, very dark grayish brown (10YR 3/2) moist; common fine faint yellowish brown (10YR 5/6) mottles; weak very thin platy structure parting to weak fine granular; slightly hard, friable; neutral; abrupt wavy boundary.

Bt--8 to 12 inches; grayish brown (2.5Y 5/2) loam, dark grayish brown (2.5Y 4/2) moist; few fine faint yellowish brown (10YR 5/6) mottles; moderate coarse and medium columnar structure parting to moderate coarse and medium subangular blocky; very hard, friable; thin continuous gray (10YR 5/1) coatings on tops of columns; few manganese stains; moderately alkaline; clear wavy boundary.

Btk1--12 to 16 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; moderate coarse and medium prismatic structure parting to moderate medium and fine subangular blocky; very hard, friable; common medium and fine accumulations of carbonate ; strong effervescence; strongly alkaline; clear wavy boundary.

Btk2--16 to 31 inches; gray (10YR 6/1) silty clay loam, very dark grayish brown (10YR 3/2) moist; moderate coarse and medium prismatic structure parting to moderate medium and fine subangular blocky; hard, friable; few fine accumulations of carbonate; violent effervescence; very strongly alkaline; gradual wavy boundary.

Bk--31 to 45 inches; light gray (5Y 7/1) silty clay loam, olive gray (5Y 5/2) moist; weak coarse and medium subangular blocky structure parting to weak medium and fine subangular blocky; slightly hard, friable; violent effervescence; strongly alkaline; gradual wavy boundary.

C--45 to 60 inches; white (2.5Y 8/2) silt loam, light brownish gray (2.5Y 6/2) moist; common medium and fine faint gray (10YR 6/1) and few fine faint yellowish brown (10YR 5/6) mottles; massive; slightly hard, friable; strong effervescence; moderately alkaline.

Horizons sampled: Ap, 0 to 6 inches
Bt & Btk1, 8 to 16 inches
Btk2, 16 to 31 inches

Series: Larson Variant

Pedon No: S83SD13-60

Area: Brown County, South Dakota

Location: 1420 ft east and 250 ft north of the southwest corner of Sec. 23, T126N, R61W

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-4 | 13.2 | 34.3 | 52.4 | 2.6 | 21.2 | 10.5 | 2.9 | 33.2 | 13.5 | 2.4 | 0.3 | | fine sandy loam |
| 4-16 | 16.0 | 29.0 | 55.0 | 3.0 | 13.4 | 12.7 | 21.4 | 32.5 | 0.8 | 0.2 | 0.0 | | sandy loam |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/Clay | CEC meq/100gm | pH | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
|---|---|---|---|---|---|---|---|---|---|
| 0-4 | | | | | | 6.9 | | | |
| 4-16 | | | | | | 9.5 | 91.6 | 4.8 | 2.5 |
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Soil Classification: Coarse-loamy, mixed Leptic Natriboroll
Series: Larson Variant
Pedon No.: S83SD013-60
Area: Brown County, South Dakota
Location: 1420 feet east and 250 feet north of the southwest corner of sec. 23, T. 126 N., R. 61 W.
Climate: Mean annual temperature 43°F; mean annual precipitation 19"
Vegetation: Native Grass-Saltgrass
Parent Material: Lacustrine
Physiography: Nearly level Lake Plain
Topography: Concave
Drainage; Somewhat poorly drained
Ground Water: Greater than 5 feet
Erosion: None
Permeability: Slow
Moisture: Moist throughout
Sampled by: Steve Fischer and Jim Clausen
Described by: James Clausen

(Colors are for dry soil unless otherwise stated).

A--0 to 4 inches; dark gray (10YR 4/1) loam, black (10YR 2/1) moist; weak medium and fine subangular blocky structure parting to weak very fine granular; slightly hard, friable; neutral; abrupt wavy boundary.

Bt1--4 to 10 inches; dark gray (10YR 4/1) loam, black (10YR 2/1) moist; strong coarse and medium columnar structure; very hard, friable; thin continuous gray (10YR 5/1) coatings on tops of columns; few medium and fine accumulations of carbonate; slight effervescence; very strongly alkaline; clear wavy boundary.

Bt2--10 to 16 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate coarse and medium prismatic structure parting to moderate medium subangular blocky; very hard, friable, sticky; few fine and medium accumulations of carbonate; slight effervescence; very strongly alkaline; clear wavy boundary.

Bk--16 to 28 inches; light gray (2.5Y 7/2) silt loam, light yellowish brown (2.5Y 6/4) moist; few fine distinct strong brown (7.5YR 4/6) and common fine distinct yellowish brown (10YR 5/6) mottles; weak coarse and medium subangular blocky structure; hard, friable, sticky; dark grayish brown (10YR 4/2) tongues on faces of peds; strong effervescence; very strongly alkaline; gradual wavy boundary.

C1--28 to 48 inches; light gray (2.5Y 7/2) silt loam, light olive brown (2.5Y 5/4) moist; few fine distinct strong brown (7.5YR 4/6), common medium and fine faint gray (10YR 6/1) and many medium and fine distinct yellowish brown (10YR 5/6) mottles; massive; slightly hard, friable; slight effervescence; very strongly alkaline; gradual wavy boundary.

C2--48 to 60 inches; light gray (2.5Y 7/2) silt loam, light olive brown (2.5Y 5/4) moist; few fine distinct strong brown (7.5YR 4/6), common medium and fine faint gray (10YR 6/1) and many medium and fine distinct yellowish brown (10YR 5/6) mottles; massive; slightly hard, friable; laminations 1 to 2 mm thick; slight effervescence; very strongly alkaline.

Horizons sampled: A , 0 to 4 inches
Bt, 4 to 16 inches

Series: Metre-like

Pedon No: S82SD033-11

Area: Custer County, South Dakota

Location: 1400 ft south and 200 ft west of the northeast corner of Sec. 26, T4S, R6E

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-5 | 64.9 | 20.3 | 14.8 | 4.3 | 12.5 | 3.4 | 4.4 | 7.1 | 2.1 | 0.9 | 0.3 | | clay |
| 5-10 | 68.3 | 16.6 | 15.2 | 4.8 | 9.5 | 2.3 | 4.2 | 7.5 | 2.1 | 1.0 | 0.4 | | clay |
| 10-18 | 64.2 | 19.4 | 16.5 | 7.6 | 10.6 | 1.2 | 5.2 | 7.9 | 2.3 | 0.8 | 0.3 | | clay |
| 18-26 | 64.4 | 24.2 | 11.3 | 14.0 | 9.3 | 0.9 | 3.2 | 5.9 | 1.4 | 0.7 | 0.2 | | clay |
| 26-36 | 73.9 | 17.9 | 8.2 | 8.6 | 10.1 | 0.7 | 2.6 | 3.5 | 1.2 | 0.6 | 0.4 | | clay |
| 36-60 | 74.9 | 22.9 | 2.2 | 6.1 | 8.4 | 8.3 | 0.7 | 0.5 | 0.4 | 0.4 | 0.3 | | clay |
| | | | | | | | | | | | | | |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/ Clay | CEC meq/100gm | Organic Carbon % | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | 49.7 | 36.5 | 0.56 | | | 4.1 | <1 | 1.2 | |
| 5-10 | 53.1 | 37.9 | 0.55 | | | 2.7 | <1 | 0.6 | |
| 10-18 | 51.1 | 34.9 | 0.54 | | | 2.0 | 1 | 0.5 | |
| 18-26 | 54.3 | 37.6 | 0.58 | | | 0.9 | 2 | 0.5 | |
| 26-36 | 46.0 | 31.6 | 0.43 | | | .3 | 1.5 | 0.4 | |
| 36-60 | 44.3 | 34.7 | 0.46 | | | 1.2 | 2.5 | 0.7 | |
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Soil Classification: Very-fine, montmorillonitic, mesic Torrertic Haplustoll
Series: Metre-like
Pedon No.: S82SD033-11
Area: Custer County, South Dakota
Location: 1400 feet south and 100 feet west of the northeast corner of sec. 26 T. 4 S., R. 6 E.
Vegetation: Western wheatgrass, Kentucky bluegrass, green needlegrass, blue grama
Parent Material: White River formation
Physiography: Swales and toeslopes
Relief: D concave
Slope: 10 percent
Aspect: South
Erosion: Slight
Permeability: Very slow
Drainage: Well
Ground Water: Deep
Moisture: Moist to 5 inches; dry below
Root Distribution: Common to 10 inches; few to 26 inches
Elevation: 4000'
Sampled by: Ed Ensz

(Colors are for dry soil unless otherwise stated).

A--0 to 5 inches; very dark grayish brown (10YR 3/2) clay, very dark brown (10YR 2/2) moist; moderate fine and medium, subangular blocky structure; hard, friable; neutral; clear smooth boundary.

B1--5 to 10 inches; very dark gray (10YR 3/1) clay, black (10YR 2/1) moist; moderate medium prismatic structure parting to strong medium subangular blocky; very hard, very firm; mildly alkaline; clear wavy boundary.

B2--10 to 18 inches; dark gray (10YR 4/1) clay, very dark grayish brown (10YR 3/2) moist; moderate medium and coarse prismatic structure parting to moderate medium subangular blocky; very hard, extremely firm; weak effervescence; moderately alkaline; clear wavy boundary.

B3--18 to 26 inches; dark gray (10YR 4/1) and light reddish brown (5YR 6/4) clay, very dark grayish brown (10YR 3/2) and reddish brown (5YR 5/4) moist; weak coarse prismatic structure; very hard, extremely firm; strong effervescence; moderately alkaline; clear wavy boundary.

BCk--26 to 36 inches; reddish brown (5YR 5/4) and reddish gray (5YR 5/2) clay, reddish brown (5YR 4/4) and dark reddish gray (5YR 4/2) moist; weak very coarse prismatic structure; very hard; extremely firm; strong effervescence; common medium accumulations of carbonates; moderately alkaline; gradual wavy boundary.

Cr--36 to 60 inches; reddish brown (5YR 5/4) clayey mudstone; very hard, extremely firm; strong effervescence, few fine accumulations of carbonates; mildly alkaline.

Horizons sampled:

| For SDSU | | For Dept. of Transportation | |
|---|---|---|---|
| A | 0-5 inches | A | 0-18 inches |
| B1 | 5-10 inches | B1 | |
| B2 | 10-18 inches | B2 | |
| B3 | 18-26 inches | B3 | 18-60 inches |
| BCk | 26-36 inches | BCk | |
| Cr | 36-60 inches | Cr | |

Series: Mocmont

Pedon No: S82SD033-28

Area: Custer County, South Dakota

Location: 1340 ft north and 1000 ft east of the southwest corner of Sec. 11, T3S, R5E

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 1-15 | 20.8 | 49.3 | 29.9 | 3.8 | 14.9 | 30.6 | 7.3 | 3.8 | 5.2 | 7.0 | 6.6 | | loam |
| 20-33 | 16.9 | 11.4 | 71.7 | 5.3 | 0.0 | 6.1 | 4.5 | 10.7 | 14.2 | 20.9 | 21.3 | | silt loam |
| 33-43 | 25.8 | 33.5 | 40.8 | 5.2 | 14.6 | 13.6 | 4.6 | 6.9 | 8.0 | 10.5 | 10.8 | | loam |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/Clay | CEC meq/100gm | Organic Carbon % | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
|---|---|---|---|---|---|---|---|---|---|
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Soil Classification: Loamy-skeletal, mixed Typic Eutroboralf
Series: Mocmont
Pedon No.: S82SD033-28
Area: Custer County, South Dakota
Location: 1340 feet north and 1000 feet east of the southwest corner of sec. 11, T. 3 S., R. 5 E.
Vegetation: Ponderosa pine, bearberry, poverty oatgrass, junegrass, sedges
Parent Material: Pegmatite
Physiography: Mountain sideslope
Relief: E convex
Slope: 25 percent
Aspect: North
Erosion: Slight
Permeability: Moderate
Drainage: Well
Ground Water: Deep
Moisture: Moist to 5 inches; dry below
Root Distribution: Abundant to 20 inches; few to 48 inches
Elevation: 5200'
Sampled by: Scott Anderson

(Colors are for dry soil unless otherwise stated).

A—0 to 1 inch; dark gray (10YR 4/1) gravelly loam, very dark gray (10YR 3/1) moist; weak fine and medium granular structure; soft, very friable; 15 percent by volume of fragments of rock; neutral; abrupt smooth boundary.

E1—1 to 10 inches; light brownish gray (10YR 6/2) gravelly loam, brown (10YR 4/3) moist; weak fine platy structure parting to weak fine granular; soft, very friable; 20 percent by volume of fragments of rock; slightly acid; abrupt smooth boundary.

E2—10 to 15 inches; very pale brown (10YR 7/3) gravelly loam, light yellowish brown (10YR 6/4) moist; weak fine platy structure parting to moderate medium granular; soft, very friable; 20 percent by volume of fragments of rock; slightly acid; clear wavy boundary.

B/E—15 to 20 inches; light yellowish brown (10YR 6/4) gravelly clay loam, yellowish brown (10YR 5/4) moist (Bt); very pale brown (10YR 7/3) gravelly loam, light yellowish brown (10YR 6/4) moist (E); moderate medium subangular blocky structure; slightly hard, friable; 30 percent by volume of fragments of rock; slightly acid; gradual wavy boundary.

Bt1—20 to 33 inches; strong brown (7.5YR 5/6) very gravelly clay loam, brown (7.5YR 4/4) moist; weak medium prismatic structure parting to moderate fine and medium subangular blocky; hard, firm; 40 percent by volume of fragments of rock; medium acid; gradual wavy boundary.

Bt2—33 to 43 inches; light yellowish brown (10YR 6/4) very gravelly clay loam, yellowish brown (10YR 5/4) moist; weak medium prismatic structure parting to moderate medium subangular blocky; very hard, firm; 45 percent by volume of fragments of rock; medium acid; gradual wavy boundary.

Br3—43 to 47 inches; light yellowish brown (10YR 6/4) very gravelly clay loam, yellowish brown (10YR 5/4) moist; weak coarse prismatic structure parting to moderate medium subangular blocky; very hard, firm; 45 percent by volume of fragments of rock; medium acid; gradual wavy boundary.

C--47 to 60 inches; brownish yellow (10YR6/6) sandy gravel, yellowish brown (10YR5/6) moist; loose, loose; 75 percent by volume of fragments of rock; medium acid.

| Horizons sampled: | For SDSU | | For Dept. of Transportation | |
|---|---|---|---|---|
| | E1 | 1-15 inches | A | 0-15 inches |
| | E2 | | E1 | |
| | Bt1 | 20-33 inches | E2 | |
| | Bt2 | 33-43 inches | B/E | 15-47 inches |
| | | | Bt1 | |
| | | | Bt2 | |
| | | | Bt3 | |
| | | | C1 | 47-60 inches |

Series: Mocmont

Pedon No: S82SD033-29

Area: Custer County, South Dakota

Location: 1250 ft east and 1960 ft north of the southwest corner of Sec. 10, T3S, R5E

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 11-22 | 38.9 | 33.7 | 27.6 | 5.8 | 11.9 | 15.9 | 4.6 | 6.8 | 6.3 | 5.1 | 4.9 | | clay loam |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/Clay | CEC meq/100gm | Organic Carbon % | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
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Soil Classification: Loamy-skeletal, mixed Typic Eutroboralf
Series: Mocmont
Pedon No.: S82SD033-29
Area: Custer County, South Dakota
Location: 1250 feet east and 1960 feet north of the southwest corner of sec. 10, T. 3 S., R. 5 E.
Vegetation: Pine, bearberry, poverty oatgrass, junegrass
Parent Material: Pegmatite
Physiography: Broad mountain ridge
Relief: B convex
Slope: 5 percent
Aspect: Northeast
Erosion: Slight
Permeability: Moderate
Drainage: Well
Ground Water: Deep
Moisture: Dry to 11 inches; moist below
Root Distribution: Abundant to 22 inches; few to 40 inches
Elevation: 5400'
Sampled by: Scott Anderson

(Colors are for dry soil unless otherwise stated).

0—1 inch to 0; forest litter.

A—0 to 1 inch; very dark gray (10YR 3/1) sandy loam, black (10YR 2/1) moist; weak fine granular structure; soft, very friable; 15 percent by volume of fragments of rock; abrupt smooth boundary.

E—1 to 8 inches; pale brown (10YR 6/3) gravelly loam, yellowish brown (10YR 5/4) moist; weak fine platy structure; soft, very friable; 20 percent by volume of fragments of rock; clear smooth boundary.

B/E—8 to 11 inches; yellowish brown (10YR 5/4) gravelly clay loam, dark yellowish brown (!0YR 4/4) moist, (Bt); very pale brown (10YR 7/3) gravelly loam, yellowish brown (10YR 5/4) moist (E); weak medium and fine subangular blocky structure; hard, firm; 30 percent by volume of fragments of rock; clear wavy boundary.

Bt1—11 to 22 inches; yellowish brown (10YR 5/4) gravelly clay loam, dark yellowish brown (10YR 4/4) moist; weak coarse prismatic structure parting to moderate medium subangular blocky; very hard, firm; 40 percent by volume of fragments of rock; clear wavy boundary.

Bt2—22 to 34 inches; light yellowish brown (10YR 6/4) gravelly clay loam, strong brown (7.5YR 5/6) moist; weak coarse prismatic structure parting to moderate medium subangular blocky; very hard, firm; 45 percent by volume of fragments of rock; gradual wavy boundary.

Bt3—34 to 43 inches; light yellowish brown (10YR 6/4) gravelly clay loam, yellowish brown (10YR 5/6) moist; weak coarse prismatic structure parting to weak medium subangular blocky; very hard, firm; weak effervescence; 45 percent by volume of fragments of rock; gradual wavy boundary.

C—43 to 60 inches; white (10YR 8/2) very gravelly loam, light yellowish brown (10YR 6/4) moist; slightly hard, very friable; 60 percent by volume of fragments of rock; violent effervescence.

Horizons sampled: For SDSU
Btl 11-22 inches

Series: Morton

Pedon No: S83SD137-13

Area: Ziebach County, South Dakota

Location: 520 ft south and 235 ft east of the northwest corner of Sec. 5, T11N, R23E

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-7 | 22.5 | 23.8 | 53.7 | 3.7 | 7.5 | 12.6 | 40.8 | 12.1 | 0.6 | 0.3 | 0.0 | | sandy clay loam |
| 7-15 | 27.1 | 16.7 | 56.2 | 4.5 | 4.5 | 7.7 | 35.2 | 20.5 | 0.3 | 0.1 | 0.1 | | sandy clay loam |
| 15-19 | 25.7 | 19.3 | 54.9 | 3.7 | 7.4 | 8.3 | 37.1 | 16.9 | 0.7 | 0.3 | 0.0 | | sandy clay loam |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/ Clay | CEC meq/100gm | Organic Carbon % | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
|---|---|---|---|---|---|---|---|---|---|
| 0-7 | 20.1 | 11.2 | 0.50 | | | 1.4 | | | |
| 7-15 | 23.0 | 13.6 | 0.50 | | | 1.0 | | | |
| 15-19 | 23.7 | 14.0 | 0.54 | | | 0.8 | | | |
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Soil Classification: Fine-silty, mixed Typic Argiboroll
Series: Morton
Pedon No.: S83SD137-13
Area: Ziebach County, South Dakota
Location: 520 feet south and 235 feet east of the northwest corner of sec. 5, T. 11 N., R. 23 E.
Vegetation: Wheat stubble
Parent Material: Sandstone
Physiography: Upland
Relief: Gently sloping
Slope: 3 percent
Aspect: South
Permeability: Moderate
Drainage: Well
Ground Water: Below 6 feet
Moisture: Moist to 6 inches
Erosion: Slight
Salt: None
Stoniness: None
Date: August 24, 1983
Sampled by: Alan Hardison

(Colors are for dry soil unless otherwise stated).

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak medium granular structure; slightly hard, very friable, slightly plastic, clear smooth boundary.

Bt1—7 to 15 inches; brown (10YR 4/3) silty clay loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; very hard, friable, slightly sticky and plastic; clear wavy boundary.

Bt2—15 to 19 inches; brown (10YR 4/3) silty clay loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure parting to moderate fine subangular, very hard, friable, slightly sticky and plastic; clear wavy boundary.

Bk—19 to 32 inches; light olive brown (2.5Y 5/4) silt loam, dark grayish brown (2.5Y 4/2) moist; moderate medium subangular blocky structure; very hard, friable, slightly plastic; common medium accumulations of carbonate; violent effervescence; gradual wavy boundary.

Cr—32 to 60 inches; light olive brown (2.5Y 5/4) sandstone, dark grayish brown (2.5Y 4/2) moist; strong effervescence.

Horizons sampled: Ap (0 to 7 inches)
Bt1 (7 to 15 inches)
Bt2 (15 to 19 inches)

Series: M.U. 214

Pedon No: S83SD031-11

Area: Corson County, South Dakota

Location: 1600 ft east and 455 ft north of the southwest corner of Sec. 30, T22N, R28E

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-8 | 28.1 | 55.6 | 16.3 | 6.3 | 16.7 | 32.7 | 11.0 | 4.5 | 0.6 | 0.1 | 0.1 | | silty clay loam |
| 8-22 | 29.5 | 46.0 | 24.5 | 2.5 | 13.8 | 29.6 | 19.4 | 4.7 | 0.3 | 0.1 | 0.0 | | clay loam |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/ Clay | CEC meq/100gm | Organic Carbon % | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
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Soil Classification: Unclassified
Series: M.U. 214
Pedon No.: S83SD031-11
Area: Corson County, South Dakota
Location: 1,600 feet east and 455 feet north of the southwest corner of sec. 30, T. 22 N., R. 28 E.
Vegetation: Small grain stubble
Parent Material: Silty alluvium
Physiography: Undulating upland
Relief: Convex
Slope: 3 percent
Aspect: South
Permeability: Moderate
Drainage: Well
Ground Water: Below 6 feet
Moisture: Moist to 35 inches
Erosion: Slight
Date: October 1983
Profile by: Kenneth Heil

(Colors are for dry soil unless otherwise stated).

Ap--0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure parting to weak medium and fine granular; slightly hard, friable; slightly acid; abrupt smooth boundary.

Bw1--8 to 11 inches; dark brown (10YR 4/3) silt loam, dark grayish brown (10YR 4/2) moist; moderate medium and fine prismatic structure parting to moderate fine subangular blocky; hard, friable; slightly acid; gradual smooth boundary.

Bw2--11 to 22 inches; dark brown (10YR 4/3) silt loam, dark grayish brown (10YR 4/2) moist; weak medium and fine prismatic structure parting to moderate fine subangular blocky; hard, friable; neutral; clear wavy boundary.

Bk--22 to 27 inches; light brownish gray (2.5Y 6/2) silt loam, dark grayish brown (10YR 4/2) moist; weak coarse prismatic structure; slightly hard, friable; common fine and medium accumulations of carbonates; strong effervescence; mildly alkaline; gradual wavy boundary.

Ck--27 to 35 inches; light brownish gray (2.5Y 6/2) silt loam, grayish brown (2.5Y 5/2) moist; weak coarse subangular blocky structure; slightly hard, friable; common fine and medium accumulations of carbonates; strong effervescence; mildly alkaline; clear wavy boundary.

C1--35 to 53 inches; olive (5Y 5/3) silt loam; olive (5Y 4/3) moist; massive; slightly hard, friable; strong effervescence; moderately alkaline; gradual wavy boundary.

C2--53 to 60 inches; olive (5Y 5/3) silt loam, olive (5Y 4/3) moist; massive; slightly hard, friable; strong effervescence; moderately alkaline.

Horizons sampled: Ap (0 to 8 inches)
B (8 to 22 inches)

Series: Nevee

Pedon No: S83SD033-14

Area: Custer County, South Dakota

Location: 2600 ft south and 2000 ft east of the northwest corner of Sec. 7, T6S, R2E

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-8 | 21.8 | 58.1 | 20.1 | 5.3 | 14.5 | 38.3 | 15.3 | 3.6 | 0.7 | 0.3 | 0.1 | | silt loam |
| 8-36 | 18.6 | 63.5 | 17.9 | 8.4 | 23.5 | 31.6 | 15.1 | 2.4 | 0.3 | 0.0 | 0.0 | | silt loam |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/ Clay | CEC meq/100gm | Organic Carbon % | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
|---|---|---|---|---|---|---|---|---|---|
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Soil Classification: Coarse-silty, mixed (calcareous) mesic Ustic Torriorthent
Series: Nevee
Pedon No.: S83SD033-14
Area: Custer County, South Dakota
Location: 2600 feet south and 2000 feet east of the northwest corner of sec. 7, T. 6 S., R. 2 E.
Vegetation: Blue grama, needleandthread, sedges
Parent Material: Residuum of spearfish formation
Physiography: Upland
Relief: B complex
Slope: 4 percent
Aspect: Northwest
Erosion: Moderate
Permeability: Moderate
Drainage: Well
Ground Water: Deep
Moisture: Moist to 7 inches, dry below
Root Distribution: Common to 5 inches, few to 20 inches
Elevation: 3985'
Sampled by: Rod Krauss

(Colors are for dry soil unless otherwise stated).

A1—0 to 4 inches; yellowish red (5YR 5/6) silt loam, reddish brown (5YR 4/4) moist; weak fine granular structure; slightly hard, very friable; strong effervescence; clear wavy boundary.

A2—4 to 8 inches; yellowish red (5YR 5/6) silt loam, yellowish red (5YR 4/6) moist; weak medium subangular blocky structure parting to weak fine granular structure; slightly hard, very friable; strong effervescence; gradual wavy boundary.

C1—8 to 18 inches; yellowish red (5YR 5/6) silt loam, yellowish red (5YR 4/6) moist; massive; slightly hard, very friable; violent effervescence; gradual wavy boundary.

C2—18 to 36 inches; reddish yellow (5YR 6/6) silt loam, yellowish red (5YR 5/6) moist; massive; slightly hard, very friable; violent effervescence, common fine distinct masses of carbonates; gradual wavy boundary.

C3—36 to 60 inches; yellowish red (5YR 5/6) silt loam, yellowish red (5YR 4/6) moist; massive; slightly hard, very friable; violent effervescence.

| Horizons sampled: | For SDSU | | For Dept of Transportation | |
|---|---|---|---|---|
| | A1, A2 | 0-8 inches | A1, A2 | 0-8 inches |
| | C1, C2 | 8-36 inches | C1, C2 | 8-36 inches |

Series: Nevee

Pedon No: S81SD103-6

Area: Pennington County, South Dakota

Location: 1150 ft west and 50 ft south of the northeast corner of Sec. 21, T1N, R7E

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-4 | 21.8 | 62.8 | 15.3 | 5.1 | 14.0 | 43.6 | 13.0 | 1.4 | 0.5 | 0.3 | 0.1 | | silt loam |
| 8-36 | 21.5 | 60.8 | 17.7 | 5.4 | 22.0 | 33.4 | 16.5 | 0.8 | 0.3 | 0.1 | 0.1 | | silt loam |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/ Clay | CEC meq/100gm | Organic Carbon % | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
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Soil Classification: Coarse-silty, mixed (calcareous) mesic Ustic Torriorthent
Series: Nevee
Pedon No.: S81SD103-6
Area: Pennington County, South Dakota
Location: 1150 feet west and 50 feet south of the northeast corner of sec. 21, T. 1 N., R. 7 E.
Vegetation: Blue grama, little bluestem, brome
Parent Material: Residuum of spearfish formation
Physiography: Uplands
Relief: D convex
Slope: 15 percent
Aspect: North
Erosion: Moderate
Permeability: Moderate
Drainage: Well
Ground Water: Deep
Moisture: Dry throughout
Root Distribution: Abundant to 8 inches; few to 18 inches
Elevation: 3480'
Sampled by: Ed Ensz

(Colors are for dry soil unless otherwise stated).

A1—0 to 4 inches; yellowish red (5YR 4/6) loam, reddish brown (5YR 4/4) moist; weak fine granular structure; soft, very friable; strong effervescence; moderately alkaline; clear smooth boundary.

A2—4 to 8 inches; yellowish red (5YR 5/6) loam, reddish brown (5YR 4/4) moist; weak medium subangular blocky structure; slightly hard, friable; strong effervescence; moderately alkaline; clear smooth boundary.

C1—8 to 18 inches; reddish yellow (5YR 6/6) loam, yellowish red (5YR 4/6) moist; very weak medium and coarse subangular blocky structure; hard, firm; strong effervescence; moderately alkaline; gradual wavy boundary.

C2—18 to 36 inches; reddish yellow (5YR 6/6) loam, yellowish red (5YR 4/6) moist; massive; hard, firm; strong effervescence; moderately alkaline; gradual wavy boundary.

C3—36 to 60 inches; light red (2.5YR 6/6) loam, red (2.5YR 4/6) moist; massive; very hard, very firm; strong effervescence; moderately alkaline.

Horizons sampled:

| For SDSU | | For Dept of Transportation | |
|---|---|---|---|
| A1 | 0-4 inches | A1, A2 | 0-8 inches |
| C1, C2 | 8-36 inches | C1, C2, C3 | 8-60 inches |

Series: Reeder

Pedon No: S82SD137-5

Area: Ziebach County, South Dakota

Location: 140 ft south and 2340 ft west of the northeast corner of Sec. 26, T12N, R23E

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-5 | 23.6 | 35.7 | 40.7 | 6.7 | 6.7 | 22.2 | 33.3 | 6.1 | 0.6 | 0.5 | 0.2 | | loam |
| 5-12 | 31.7 | 33.8 | 34.6 | 3.5 | 10.6 | 19.7 | 29.1 | 3.8 | 0.7 | 0.8 | 0.2 | | clay loam |
| 12-20 | 28.4 | 37.8 | 33.8 | 4.1 | 12.2 | 21.6 | 30.1 | 2.8 | 0.5 | 0.4 | 0.0 | | clay loam |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/ Clay | CEC meq/100gm | Organic Carbon % | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | 18.4 | 14.2 | 0.60 | | | 1.7 | | | |
| 5-12 | 19.2 | 15.6 | 0.49 | | | 1.1 | | | |
| 12-20 | 18.4 | 15.2 | 0.54 | | | | | | |
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Soil Classification: Fine-loamy, mixed Typic Argiboroll
Series: Reeder
Pedon No.: S82SD137-5
Area: Ziebach County, South Dakota
Location: 140 feet south and 2340 feet west of the northeast corner of sec. 26, T. 12 N., R. 23 E.
Vegetation: Wheat stubble
Parent Material: Sandstone
Physiography: Upland
Relief: Gently sloping
Slope: 4 percent
Aspect: North
Permeability: Moderate
Drainage: Well
Ground Water: Below 6 feet
Moisture: Moist throughout
Erosion: Slight
Salt: None
Stoniness: None to few on surface
Date: June 28, 1982
Sampled by: Wayne Bachman and Alan Hardison

(Colors are for dry soil unless otherwise stated).

Ap--0 to 5 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to moderate medium granular; hard, friable, slightly sticky and slightly plastic, clear smooth boundary.

Bt1--5 to 12 inches; brown (10YR 4/3) clay loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, friable, slightly sticky and plastic; gradual wavy boundary.

Bt2--12 to 20 inches; light olive brown (2.5Y 5/4) clay loam, olive brown (2.5Y 4/4) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; very hard, friable, slightly sticky and plastic; gradual wavy boundary.

Bk--20 to 35 inches; light yellowish brown (2.5Y 6/4) loam, olive brown (2.5Y 4/4) moist; weak coarse subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few medium accumulations of carbonate; strong effervescence; gradual wavy boundary.

Cr--35 to 60 inches; light yellowish brown (2.5Y 6/4) sandstone, olive brown (2.5Y 4/4) moist; few fine accumulations of carbonate; strong effervescence.

Horizons sampled: Ap (0 to 5 inches)
Bt1 (5 to 12 inches)
Bt2 (12 to 20 inches)

Series: Reliance

Pedon No: S83SD137-14

Area: Ziebach County, South Dakota

Location: 440 ft south, 345 ft east of the northwest corner of Sec. 29, T7N, R19E

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-7 | 29.8 | 58.7 | 11.5 | 7.5 | 14.9 | 36.4 | 2.2 | 3.8 | 1.9 | 2.9 | 0.7 | | silty clay loam |
| 7-14 | 41.0 | 46.8 | 12.3 | 7.5 | 14.9 | 24.4 | 5.6 | 2.2 | 1.5 | 2.4 | 0.6 | | silty clay |
| 14-23 | 42.4 | 44.2 | 13.5 | 4.0 | 13.4 | 26.8 | 8.7 | 1.8 | 1.0 | 1.5 | 0.4 | | silty clay |
| 23-38 | 32.7 | 52.4 | 15.0 | 3.3 | 16.5 | 32.5 | 13.4 | 1.0 | 0.4 | 0.2 | 0.0 | | silty clay loam |
| 38-49 | 32.3 | 50.5 | 17.2 | 4.0 | 12.1 | 34.4 | 14.7 | 1.3 | 0.5 | 0.5 | 0.2 | | silty clay loam |
| 49-60 | 40.7 | 36.1 | 23.2 | 5.9 | 18.0 | 14.2 | 20.8 | 1.3 | 0.5 | 0.4 | 0.1 | | clay |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/ Clay | CEC meq/100gm | Organic Carbon % | pH | EC mmhos/cm | Carbonate as $CaCO_3$ % |
|---|---|---|---|---|---|---|---|---|---|
| 0-7 | 26.3 | 13.6 | 0.46 | | | 2.3 | 5.7 | | |
| 7-14 | 31.0 | 18.5 | 0.45 | | | 1.3 | 6.3 | | |
| 14-23 | 29.7 | 17.1 | 0.40 | | | 1.1 | 6.9 | | 0.9 |
| 23-38 | 18.0 | 13.6 | 0.42 | | | | 8.2 | | 14.8 |
| 38-49 | 18.2 | 14.0 | 0.43 | | | | 8.3 | | 14.9 |
| 49-60 | 30.3 | 17.1 | 0.42 | | | | 8.2 | | 9.0 |
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Soil Classification: Fine, montmorillonitic, mesic, Typic Argiustolls
Series: Reliance
Pedon No.: S83SD137-14
Area: Ziebach County, South Dakota
Location: 440 ft south, 345 ft east of the northwest corner of Sec. 29, T7N, R19E
Vegetation: Western wheatgrass, blue gramma, needleandthread
Parent Material: Alluvium
Physiography: High Terrace
Relief: Nearly level
Slope: 1 percent
Aspect: South
Permeability: Moderately slow
Drainage: Well
Ground Water: Below 6 feet
Moisture: Moist below 50 inches
Erosion: None to slight
Salt: None
Stoniness: None
Date: September 7, 1983
Sampled By: Wayne Bachman and Alan Hardison

(Colors are for dry soil unless other wise stated).

A -- 0 to 7 inches; dark grayish brown (10YR4/2) silty clay loam, very dark grayish brown (10YR3/2) moist; weak medium subangular blocky structure parting to moderate medium granular; slightly hard, friable, sticky and plastic; many fine roots; slightly acid; clear wavy boundary. (5 to 10 inches thick).

Bt1 -- 7 to 14 inches; dark brown (10YR4/3) silty clay, very dark grayish brown (10YR3/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; very hard, firm, sticky and plastic; common fine roots; neutral; clear wavy boundary.

Bt2 -- 14 to 23 inches; grayish brown (10YR5/2) silty clay, dark grayish brown (10YR4/2) moist; weak medium prismatic structure parting to moderate medium subangular blocky; very hard, firm, sticky and plastic; few fine roots; neutral; clear wavy boundary. (Combined thickness of the Bt horizon is 10 to 25 inches).

Bk1 -- 23 to 38 inches; grayish brown (2.5Y5/2) silty clay loam, dark grayish brown (2.5Y4/2) moist; moderate medium subangular blocky structure parting to moderate fine subangular blocky; hard, friable, slightly sticky and plastic; few fine roots; common medium accumulations of carbonate; violent effervescence; moderately alkaline; gradual wavy boundary.

Bk2 -- 38 to 49 inches; grayish brown (2.5Y5/2) silty clay loam, dark grayish brown (2.5Y4/2) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and plastic; few fine roots; few medium accumulations of carbonate; strong effervescence; moderately alkaline; gradual wavy boundary. (Combined thickness of the Bk horizon is 15 to 30 inches).

C -- 49 to 60 inches; grayish brown (2.5Y5/2) silty clay loam, dark grayish brown (2.5Y4/2) moist; massive; hard, friable, slightly sticky and plastic; few fine roots; strong effervescence; moderately alkaline.

Series: Shambo

Pedon No: S83SD031-116

Area: Corson County, South Dakota

Location: 150 ft north and 2485 ft east of the southwest corner of Sec. 35, T22N, R28E

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-5 | 24.3 | 33.0 | 42.7 | 2.6 | 10.5 | 20.0 | 18.1 | 22.4 | 2.0 | 0.1 | 0.1 | | loam |
| 5-14 | 24.2 | 30.6 | 45.2 | 2.3 | 10.6 | 17.8 | 42.8 | 2.0 | 0.2 | 0.3 | 0.0 | | loam |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/ Clay | CEC meq/100gm | Organic Carbon % | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
|---|---|---|---|---|---|---|---|---|---|
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Soil Classification: Fine-loamy, mixed Typic Haploborolls
Series: Shambo
Pedon No.: S83SD031-116
Area: Corson County, South Dakota
Location: 150 feet north and 2,485 feet east of the southwest corner of sec. 35, T. 22 N., R. 28 E.
Vegetation: Native grass
Parent Material: Alluvium
Physiography: Upland terrace
Relief: Convex
Slope: 3 percent
Aspect: North
Permeability: Moderate
Drainage: Well
Ground Water: Below 6 feet
Moisture: Moist to 24 inches
Erosion: Slight
Date: October 1983
Profile by: Kim Kempton

(Colors are for dry soil unless otherwise stated).

A--0 to 5 inches; dark grayish brown (2.5Y 4/2) loam, very dark grayish brown (2.5Y 3/2) moist; weak medium subangular blocky structure parting to moderate fine granular; slightly hard, friable; neutral; clear wavy boundary.

Bw1--5 to 10 inches; dark grayish brown (2.5Y 4/2) loam, very dark grayish brown (2.5Y 3/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable; neutral; gradual wavy boundary.

Bw2--10 to 14 inches; grayish brown (2.5Y 5/2) loam, dark grayish brown (2.5Y 4/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable; neutral; clear wavy boundary.

Bk--14 to 20 inches; grayish brown (2.5Y 5/2) loam, dark grayish brown (2.5Y 4/2) moist; moderate medium prismatic structure parting to weak medium subangular blocky; slightly hard, friable; few fine and common accumulations of carbonates; slight effervescence; mildly alkaline; gradual wavy boundary.

BCk--20 to 41 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; weak medium subangular blocky structure; slightly hard, friable; strong effervescence; mildly alkaline; gradual wavy boundary.

C--41 to 60 inches; grayish brown (2.5Y 5/2) loam, dark grayish brown (2.5Y 4/2) moist; massive; soft, very friable; strong effervescence; moderately alkaline.

Horizons sampled: A (0 to 5 inches)
B (5 to 14 inches)

Series: Shingle

Pedon No: S83SD013P-46

Area: Pennington County, South Dakota

Location: 1050 ft south and 590 ft west of the northeast corner of Sec. 35, T4N, R15E

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-3 | 21.4 | 39.6 | 39.1 | 1.6 | 9.9 | 28.1 | 16.6 | 20.9 | 1.6 | 0.1 | 0.0 | | loam |
| 3-7 | 38.6 | 20.3 | 41.0 | 7.4 | 13.0 | 4.3 | 35.9 | 4.4 | 0.3 | 0.4 | | | clay loam |
| 7-12 | 30.3 | 24.0 | 45.6 | 8.1 | 16.1 | 4.9 | 41.2 | 3.6 | 0.4 | 0.3 | | | clay loam |
| 12-60 | 15.5 | 40.0 | 44.5 | 2.4 | 11.3 | 26.2 | 41.0 | 2.5 | 0.5 | 0.5 | | | loam |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/ Clay | CEC meq/100gm | Organic Carbon % | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
|---|---|---|---|---|---|---|---|---|---|
| 0-3 | 15.1 | 11.7 | 0.55 | | | | < 1 | 0.6 | |
| 3-7 | 16.1 | 13.2 | 0.34 | | | | < 1 | 0.5 | 3.9 |
| 7-12 | 18.7 | 14.2 | 0.47 | | | | < 1 | 0.5 | 10.9 |
| 12-60 | 10.0 | 12.6 | 0.81 | | | | | | 5.3 |
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Soil Classification: Loamy, mixed (calcareous), mesic, shallow Ustic Torriorthents
Series: Shingle
Pedon No: S83SD103P-46
Area: Pennington County, South Dakota
Location: 1,050 feet south and 590 feet west of the NE corner of sec. 35, T. 4 N., R. 15 E.
Climate: Semi-arid
Vegetation: Needleandthread, Blue grama, Little bluestem, Western wheatgrass, prairie sandreed, plains muhly, dotted gayfeather
Parent Material: Fox Hills - interbedded sandstones and silty shales
Physiography: Upland
Topography: Complex, hilly
Drainage: Well drained
Ground Water: Deep
Erosion: None to slight
Permeability: Moderate
Moisture: Moist to 3 inches
Sampled by: Janet Oertly
Date: 9/83

(Colors are for dry soil unless otherwise stated).

A--0 to 3 inches; light olive brown (2.5Y 5/3) loam, dark brown (10YR 3/3) moist; moderate fine and very fine granular structure; soft, very friable; many fine and medium roots; slight effervescence; abrupt smooth boundary.

AC--3 to 7 inches; light yellowish brown (10YR 6/4) clay loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable; common fine roots; strong effervescence; clear wavy boundary.

C--7 to 12 inches; light yellowish brown (2.5Y 6/4) silty clay loam, light olive brown (2.5Y 5/4) moist; massive; slighty hard friable; few to common fine shale chips; common fine roots; violent effervescence; diffuse wavy boundary.

Cr--12 to 60 inches; light gray (10YR 7/2) and yellow (10YR 7/6) interbedded sandstones, silty shales and shales; light brownish gray (2.5Y 6/3) and yellowish brown (10YR 5/6) moist; soft; strong effervescence.

All horizons sampled.

Series: Sutley

Pedon No: S83SD031-14

Area: Corson County, South Dakota

Location: 1850 ft north and 185 ft east of the southwest corner of Sec. 30, T22N, R30E

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-6 | 24.0 | 61.9 | 14.1 | 3.3 | 17.1 | 41.6 | 10.5 | 2.9 | 0.5 | 0.1 | 0.1 | | silt loam |
| 6-40 | 23.2 | 59.7 | 17.1 | 6.4 | 13.6 | 39.7 | 11.5 | 5.2 | 0.3 | 0.1 | 0.1 | | silt loam |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/ Clay | CEC meq/100gm | Organic Carbon % | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
|---|---|---|---|---|---|---|---|---|---|
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Soil Classification: Coarse-silty, mixed Entic Haploborolls
Series: Sutley
Pedon No.: S83SD031-14
Area: Corson County, South Dakota
Location: 1,850 feet north and 185 feet east of the southwest corner of sec. 30, T. 22 N., R. 30 E.
Vegetation: Sunflowers
Parent Material: Loess
Physiography: Gently rolling upland
Relief: Convex
Slope: 7 percent
Aspect: West
Permeability: Moderate
Drainage: Well
Ground Water: Below 6 feet
Moisture: Moist to 35 inches
Erosion: Moderate
Date: October 1983
Profile by: Kenneth Heil

(Colors are for dry soil unless otherwise stated).

Ap--0 to 6 inches; grayish brown (2.5Y 5/2) silt loam, very dark grayish brown (2.5Y 3/2) moist; weak fine granular structure; slightly hard, friable; slight effervescence; mildly alkaline; abrupt smooth boundary.

Ck--6 to 14 inches; light brownish gray (2.5Y 6/2) silt loam, dark grayish brown (2.5Y 4/2) moist; moderate medium and coarse subangular blocky structure; slightly hard, friable; few fine and medium accumulations of carbonates; strong effervescence; moderately alkaline; clear wavy boundary.

C--14 to 60 inches; light brownish gray (2.5Y 6/2) silt loam, dark grayish brown (2.5Y 4/2) moist; massive; slightly hard, friable; strong effervescence; moderately alkaline.

Horizons sampled: A (0 to 6 inches)
B (6 to 40 inches)

Series: Thedalund

Pedon No: S83SD103P-48

Area: Pennington County, South Dakota

Location: 350 ft west and 500 ft north of the southeast corner of Sec. 6, T4S, R14E

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-5 | 49.8 | 23.5 | 26.7 | 4.5 | 12.7 | 6.3 | 23.3 | 2.7 | 0.5 | 0.2 | 0.0 | | clay |
| 5-11 | 52.1 | 22.5 | 25.5 | 6.4 | 8.9 | 7.1 | 21.8 | 3.4 | 0.2 | 0.0 | 0.0 | | clay |
| 11-23 | 56.4 | 25.0 | 18.6 | 6.3 | 10.6 | 8.1 | 15.4 | 2.7 | 0.3 | 0.1 | 0.0 | | clay |
| 23-31 | 47.2 | 38.7 | 14.1 | 4.9 | 10.2 | 23.7 | 11.8 | 2.1 | 0.1 | 0.0 | 0.0 | | clay |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/Clay | CEC meq/100gm | Organic Carbon % | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | 32.6 | 23.5 | 0.47 | | | | < 1 | | 5.6 |
| 5-11 | 28.1 | 18.0 | 0.35 | | | | < 1 | | 19.8 |
| 11-23 | 34.6 | 22.4 | 0.40 | | | | 2 | | 17.5 |
| 23-31 | 35.2 | 21.3 | 0.45 | | | | 4 | | 19.2 |
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Soil Classification: loamy, mixed (calcareous), mesic Ustic Torriorthents
Series: Thedalund
Pedon No: S83SD103P-48
Area: Pennington County, South Dakota
Location: 350 feet west and 500 feet north of the Southeast corner of Sec. 6, T. 4 S., R. 14 E.
Climate: Semi-Arid
Vegetation: Thin Upland Rangesite: Green Needlegrass, Needleandthread, Sideoats grama, Blue grama, Threadleaf sedge, June grass, Little Bluestem
Parent Material: Loamy Brule and Chadron mudstone of the White River For.
Physiography: Deeply entrenched steep uplands
Topography: Complex, convex, hilly
Drainage: Somewhat excessive
Ground Water: Deep
Erosion: None to slight
Permeability: Moderate
Moisture: Dry throughout
Sampled by: rdn
Date: 11/83

(Colors are for dry soil unless otherwise stated.)

A--0 to 5 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; weak medium and fine granular structure; slightly hard, friable, slightly sticky; many fine and medium roots; strong effervescence; clear smooth boundary.

AC--5 to 11 inches; light brownish gray (10YR 6/2) clay loam, grayish brown (10YR 5/2) moist;weak medium subangular blocky structure; slightly hard, friable, slightly sticky; many fine and medium roots; strong effervescence; gradual smooth boundary.

C1--11 to 23 inches; grayish brown (10YR 5/2) clay loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, friable, slightly sticky, common fine roots in the upper part and few fine roots in the lower part; strong effervescence, gradual wavy boundary.

C2--23 to 31 inches; light brownish gray (10YR 6/2) shaley clay loam, grayish brown (10YR 5/2) moist; massive,slightly hard, friable, slightly sticky; strong effervescence; gradual wavy boundary.

Cr--31 to 60 inches;light brownish gray (10YR6/2) loamy mudstone, grayish brown (10YR 5/2) moist; extremely hard; slight effervescence.

Horizons Sampled:
A
AC
C1
C2

Series: Tilford-like

Pedon No: S83SD033-13

Area: Custer County, South Dakota

Location: 800 ft west and 2400 ft south of the northeast corner of Sec. 29, T5S, R2E

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-4 | 26.4 | 57.8 | 15.8 | 5.5 | 15.3 | 37.0 | 11.8 | 3.4 | 0.3 | 0.3 | 0.1 | | silt loam |
| 4-6 | 26.3 | 59.8 | 13.8 | 5.0 | 17.0 | 37.8 | 10.6 | 3.0 | 0.2 | 0.0 | 0.0 | | silt loam |
| 6-10 | 28.5 | 56.6 | 14.8 | 3.9 | 16.7 | 36.0 | 11.7 | 3.0 | 0.1 | 0.0 | 0.0 | | silty clay loam |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/ Clay | CEC meq/100gm | Organic Carbon % | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
|---|---|---|---|---|---|---|---|---|---|
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Soil Classification: Fine-silty, mixed, mesic Torriorthentic Haplustoll
Series: Tilford-like
Pedon No.: S83SD033-13
Area: Custer County, South Dakota
Location: 800 feet west and 2400 feet south of the northeast corner of sec. 29, T. 5 S., R. 2 E.
Vegetation: Western wheatgrass, green needlegrass
Parent Material: Residuum of spearfish formation
Physiography: Upland
Relief: A-smooth
Slope: 1 percent
Aspect: Southeast
Erosion: Slight
Permeability: Moderate
Drainage: Well
Ground Water: Deep
Moisture: Dry
Root Distribution: Abundant to 10", few to 16"
Elevation: 4230'
Sampled by: Scott Anderson

(Colors are for dry soil unless otherwise stated).

Ap—0 to 4 inches; dark brown (7.5YR 4/4) loam, dark reddish brown (5YR 3/3) moist; weak medium granular structure; slightly hard, very friable; slight effervescence; abrupt wavy boundary.

Bw1—4 to 6 inches; dark brown (7.5YR 4/4) loam, dark reddish brown (5YR 3/4) moist; weak medium subangular blocky structure; slightly hard, friable; slight effervescence; clear wavy boundary.

Bw2—6 to 10 inches; brown (7.5YR 5/4) silty clay loam, reddish brown (5YR 4/4) moderate medium subangular blocky structure; very hard, firm; strong effervescence; gradual wavy boundary.

BC—10 to 16 inches; yellowish red (5YR 5/6) silty clay loam, yellowish red (5YR 4/6) moist; strong medium subangular blocky structure; very hard, firm; violent effervescence; gradual wavy boundary.

C1—16 to 47 inches; reddish yellow (5YR 6/6) loam, red (2.5YR 4/6) moist; massive; slightly hard, very friable; violent effervescence; gradual wavy boundary.

C2—47 to 60 inches; red (2.5YR 5/6) loam, red (2.5YR 4/6) moist; massive; slightly hard; very friable; violent effervescence.

Horizons sampled:

| For SDSU | |
|---|---|
| Ap | 0-4 inches |
| Bw1 | 4-6 inches |
| Bw2 | 6-10 inches |

Series: Unnamed I

Pedon No: S83SD031-12

Area: Corson County, South Dakota

Location: 1/2 mile west and 100 ft north of the southeast corner of Sec. 24, T23N, R27E

| | TOTAL % | | | SILT % | | | SAND % | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (inches) | Clay <.002mm | Silt .002-.05mm | Sand .05-2mm | Fine .002-.005 | Med .005-.02 | Coar .02-.05 | VF .05-.10mm | F .10-.25mm | M .25-.50mm | C .5-1mm | VC 1-2mm | >2mm | Textural Class |
| 0-8 | 25.3 | 53.0 | 21.7 | 4.9 | 17.6 | 30.5 | 10.8 | 9.7 | 1.2 | 0.0 | 0.0 | | silt loam |
| 8-20 | 33.8 | 42.9 | 23.3 | 4.1 | 15.6 | 23.3 | 12.2 | 9.4 | 1.5 | 0.2 | 0.0 | | clay loam |
| 20-49 | 34.7 | 52.4 | 12.9 | 15.5 | 27.8 | 9.1 | 6.2 | 5.5 | 1.0 | 0.2 | 0.0 | | silty clay loam |
| | | | | | | | | | | | | | |
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| Depth (inches) | 1/3 Bar θm | 15 Bar θm | 15 Bar θm/Clay | CEC/ Clay | CEC meq/100gm | Organic Carbon % | SAR | EC mmhos/cm | Carbonate as $CaCO_3$ % |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
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Soil Classification: Unclassified
Series: Unnamed I
Pedon No.: S83SD031-12
Area: Corson County, South Dakota
Location: ½ mile west and 100 feet north of the southeast corner of sec. 24, T. 23 N., R. 27 E.
Vegetation: Small grain stubble
Parent Material: Loess over alluvium
Physiography: Undulating upland
Relief: Convex
Slope: 2 percent
Aspect: Southwest
Permeability: Moderate
Drainage: Well
Ground Water: Below 6 feet
Moisture: Moist to 36 inches
Erosion: Slight
Date: October 1983
Profile by: Kenneth Heil

(Colors are for dry soil unless otherwise stated).

Ap--0 to 8 inches; dark brown (10YR 3/3) silt loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure parting to weak fine and medium granular; slightly hard, friable; slightly acid; abrupt smooth boundary.

Bw1--8 to 13 inches; olive brown (2.5Y 4/4) silt loam, dark grayish brown (10YR 4/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable; neutral; clear smooth boundary.

Bw2--13 to 20 inches; light olive brown (2.5Y 5/4) silt loam, olive brown (2.5Y 4/4) moist; weak medium and coarse prismatic structure parting to weak fine and medium subangular blocky; slightly hard, friable; neutral; clear smooth boundary.

Bk--20 to 27 inches; grayish brown (2.5Y 5/2) silt loam, dark grayish brown (2.5Y 4/2) moist; weak coarse subangular blocky structure; slightly hard, friable; few fine to coarse accumulations of carbonates; strong effervescence; moderately alkaline; abrupt smooth boundary.

2Ck--27 to 49 inches; light brownish gray (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; hard, friable; common medium and coarse accumulations of carbonates; strong effervescence; moderately alkaline; smooth boundary.

2C--49 to 60 inches; light brownish gray (2.5Y 6/2) clay loam, grayish brown (25Y 5/2) moist; massive; hard, friable; slight effervescence; moderately alkaline.

Horizons sampled: Ap (0 to 8 inches)
B (8 to 20 inches)
2Ck (27 to 49 inches)

Pactola (north aspect) - Site #64

Taxonomic Class: Loamy-skeletal, mixed Typic Eutroboralfs

Pedon Description: Pactola channery silt loam, 24% backslope, aspect 339°N azimuth, under a dense forest canopy of ponderosa pine at 1512 meters elevation, S½, Sec. 16, T1S, R6E, Pennington County. (Colors are for dry soil unless otherwise stated).

Oe 2-0cm; decomposed and partially decomposed pine needles and twigs.

A 0-4cm; dark grayish brown (10YR4/2) channery silt loam, black (10YR2/1) moist; weak very fine granular structure; soft, very friable; 25% by volume coarse fragments of slate; very strongly acid; abrupt wavy boundary.

E 4-22cm; pale brown (10YR6/3) channery silt loam, yellowish brown (10YR5/4) moist; moderate very fine granular structure; soft, very friable; 30% by volume coarse fragments of slate; many fine and common medium roots; strongly acid; clear wavy boundary.

Bt 22-52cm; brown and light brown (7.5YR5/4 and 6/4) very channery clay loam, dark brown (7.5YR4/4) moist; strong very fine subangular blocky structure; slightly hard, friable; 40% by volume coarse fragments of slate; common fine and few coarse roots; thin clay films on faces of some peds; moderately acid; clear wavy boundary.

BC 52-72cm; brown (10YR5/3) very channery loam, dark brown (10YR4/3) moist; weak very fine subangular blocky structure, slightly hard, friable; 50% by volume coarse fragments of slate; few fine and few common roots; strongly acid; gradual wavy boundary.

C $72\text{-}90^{+}$cm; brown (10YR5/3) very channery very coarse sandy loam, dark brown (10YR4/3) moist; massive; soft, very friable; 70% by volume coarse fragments of slate; strongly acid.

| SOIL | HORIZON | DEPTH (cm) | PARTICLE SIZE (% of TOTAL) TOTAL Sand | TOTAL Silt | TOTAL Clay | SAND FRACTION VC | SAND FRACTION C | SAND FRACTION M | SAND FRACTION F | SAND FRACTION VF | SILT FRACTION C | SILT FRACTION M | SILT FRACTION F | C. FRAG. % by Vol. | CLAY RATIO Bt/E | RATIO Sa to Si+Cl |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | 0-4 | 25.5 | 61.1 | 13.3 | 2.4 | 4.6 | 4.8 | 6.9 | 6.8 | 31.4 | 22.5 | 7.2 | 25 | | 0.34 |
| Pactola | E | 4-22 | 30.0 | 57.2 | 12.8 | 6.5 | 6.9 | 5.4 | 5.2 | 6.0 | 34.8 | 15.9 | 6.5 | 30 | | 0.43 |
| | Bt | 22-52 | 30.4 | 41.0 | 28.6 | 5.9 | 9.6 | 5.5 | 4.4 | 4.9 | 28.3 | 8.8 | 3.8 | 40 | 2.23 | 0.44 |
| (north) | BC | 52-72 | 39.4 | 40.5 | 20.1 | 10.1 | 10.9 | 6.3 | 5.7 | 6.3 | 23.0 | 15.1 | 2.4 | 50 | | 0.65 |
| #64 | C | 72-90+ | 54.3 | 33.5 | 12.2 | 15.0 | 13.9 | 8.5 | 8.7 | 8.2 | 24.5 | 8.6 | 0.4 | 70 | | 1.19 |
| | A | 0-4 | 21.1 | 65.1 | 13.8 | 1.6 | 3.5 | 4.4 | 5.0 | 6.5 | 33.3 | 24.3 | 7.5 | 35 | | 0.27 |
| Pactola | E | 4-23 | 28.8 | 62.4 | 8.8 | 2.2 | 4.4 | 5.3 | 7.3 | 9.6 | 40.9 | 16.8 | 4.7 | 40 | | 0.40 |
| | BE | 23-36 | 23.5 | 52.3 | 24.2 | 3.9 | 4.3 | 3.9 | 5.0 | 6.4 | 35.8 | 12.2 | 4.4 | 40 | | 0.31 |
| (north) | Bt | 36-64 | 30.9 | 41.4 | 27.7 | 6.9 | 6.3 | 4.9 | 6.2 | 6.6 | 25.8 | 12.2 | 3.3 | 50 | 3.1 | 0.45 |
| #50 | BC | 64-84 | 32.8 | 41.7 | 25.5 | 4.1 | 6.2 | 5.5 | 8.1 | 8.9 | 21.2 | 15.5 | 5.0 | 60 | | 0.49 |
| | C | 84-104+ | 36.1 | 50.3 | 13.6 | 5.5 | 7.8 | 6.3 | 7.8 | 8.7 | 30.6 | 16.9 | 2.8 | 75 | | 0.56 |

| SOIL | HORIZON | EXTRACTABLE BASES Ca | Mg | Na | K | CEC (NaOAc) | pH (1:1) | OM | $CaCO_3$ | RATIO CEC/Clay | WATER CONTENT .03 MPa | 1.5 MPa | RATIO 1.5 MPa to Clay |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | cmol $(p^+)kg^{-1}$ | | | | | | % | % | | % | | |
| | A | 17.2 | 3.8 | 0.0 | 0.8 | 21.3 | 4.9 | 7.7 | | 1.6 | 37.1 | 20.1 | 1.51 |
| Pactola | E | 6.1 | 1.8 | 0.0 | 0.2 | 5.7 | 5.1 | 1.6 | | 0.44 | 20.4 | 6.5 | 0.51 |
| (north) | Bt | 11.1 | 4.1 | 0.0 | 0.5 | 11.0 | 5.8 | 1.1 | | 0.38 | 20.4 | 12.7 | 0.44 |
| #64 | BC | 8.1 | 3.1 | 0.0 | 0.3 | 8.3 | 5.3 | 0.6 | | 0.41 | 23.5 | 9.7 | 0.48 |
| | C | 7.1 | 2.3 | 0.0 | 0.2 | 6.3 | 5.5 | 0.9 | | 0.52 | 15.9 | 7.6 | 0.62 |
| Pactola | A | 14.1 | 2.6 | tr | 1.0 | 29.6 | 4.3 | 7.7 | | 2.1 | 37.0 | 24.7 | 1.79 |
| (north) | E | 4.0 | 1.2 | 0.0 | 0.3 | 6.1 | 5.0 | 1.2 | | 0.69 | 19.2 | 4.4 | 0.50 |
| #50 | BE | 9.1 | 3.0 | 0.0 | 0.5 | 12.6 | 5.1 | 0.9 | | 0.52 | 19.3 | 10.6 | 0.44 |
| | Bt | 12.1 | 4.1 | 0.0 | 0.6 | 15.9 | 5.1 | 0.6 | | 0.57 | 23.3 | 12.7 | 0.46 |
| | BC | 14.1 | 4.4 | 0.0 | 0.5 | 13.7 | 5.4 | 0.4 | | 0.53 | 22.4 | 10.1 | 0.40 |
| | C | 14.1 | 4.6 | 0.0 | 0.4 | 11.8 | 5.6 | 0.5 | | 0.87 | 16.1 | 9.1 | 0.67 |

Pactola (north aspect) - Site #50

Taxonomic Class: Loamy-skeletal, mixed Typic Eutroboralfs

Pedon Description: Pactola very channery silt loam, 30% backslope, aspect 3°N azimuth within a clearing of ponderosa pine forest at 1573 m elevation, N½, Sec. 21, T1S, R6E, Pennington County. (Colors are for dry soil unless otherwise stated).

Oe 6-0cm; decomposed and partially decomposed pine twigs and bearberry leaves.

A 0-4cm; very dark grayish brown (10YR3/2) very channery silt loam, black (10YR2/1) moist; moderate very fine granular structure; soft, very friable; 35% by volume coarse fragments of slate; many very fine and medium roots; extremely acid; clear wavy boundary.

E 4-23cm; light brownish gray (10YR6/2) very channery silt loam, brown (10YR5/3) moist; weak very fine subangular blocky structure; soft, very friable; 40% by volume coarse fragments of slate; many very fine and medium roots; very strongly acid; clear wavy boundary.

BE 23-36cm; strong brown and pinkish gray (7.5YR5/6 and 7/2) very flaggy silt loam, dark brown and yellowish brown (7.5YR4/4 and 10YR5/4) moist; moderate very fine subangular blocky structure; slightly hard, friable; 40% by volume coarse fragments of slate; common fine and medium roots; strongly acid; clear wavy boundary.

Bt 36-64cm; strong brown (7.5YR5/6) very flaggy clay loam, dark brown (7.5YR4/4) moist; moderate, medium subangular blocky structure; slightly hard, friable; 50% by volume coarse fragments of slate; common fine to few medium roots; thin clay films on faces of some peds; strongly acid; gradual wavy boundary.

BC 64-84cm; yellowish brown (10YR5/4) very flaggy loam, dark brown (10YR4/3) moist; weak fine subangular blocky structure; slightly hard, friable; 60% by volume coarse fragments of slate; few medium roots; strongly acid; clear wavy boundary.

C 84-104$^{+}$cm; brown (10YR5/3) extremely stony loam, dark brown (10YR4/3) moist; massive; slightly hard, friable; 75% by volume coarse fragments of slate; moderately acid.

Remarks: Intermittent accumulations of transported material from Bt adhering to coarse fragments in BC horizon.

The A horizon is highly variable in thickness, ranging from 1 to 4 cm across face of pedon.

Pactola (south aspect) - Site #59

Taxonomic Class: Loamy-skeletal, mixed Typic Eutroboralfs.

Pedon Description: Pactola silt loam, 23% backslope, aspect 133°N azimuth, under a sparse forest canopy of ponderosa pine-bur oak at 1524 meters elevation, NW¼, Sec. 22, T1S, R6E, Pennington County. (Colors are for dry soil unless otherwise stated).

Oa 2-0cm; decomposed and partially decomposed pine needles and grass litter.

A 0-2cm; very dark gray (10YR3/1) silt loam, black (10YR2/1) moist; moderate fine granular structure; soft, very friable; 5% by volume coarse fragments of slate; common very fine to fine roots; very strongly acid; abrupt wavy boundary.

E1 2-21cm; brown (10YR4/3) channery loam, very dark gray (10YR3/1) moist; weak very fine subangular blocky structure; soft, very friable; 20% by volume coarse fragments of slate; common very fine and few medium roots; moderately acid; clear wavy boundary.

E2 21-28cm; brown (10YR4/3) very channery loam, very dark grayish brown (10YR3/2) moist; weak very fine granular structure; soft, very friable; 35% by volume coarse fragments of slate; common very fine and few medium roots; moderately acid; abrupt wavy boundary.

Bt 38-50cm; dark yellowish brown (10YR4/4) very stony silt loam, dark brown (10YR3/3) moist; moderate fine subangular blocky structure; slightly hard, friable; 55% by volume coarse fragments of slate; common very fine to fine roots; moderately acid; abrupt wavy boundary.

C 50-70$^{+}$cm; light olive brown (2.5YR5/4) extremely stony fine sandy loam, dark brown (10YR3/3) moist; massive; soft, very friable; 65% by volume coarse fragments of slate; few very fine to fine roots; slightly acid.

Remarks: 'A' Horizon thickness varies from 2 to 5 cm across pedon face.

Pactola (south aspect) - Site #84

Taxonomic Class: Loamy-skeletal, mixed, Typic Eutroboralfs.

Pedon Description: Pactola channery silt loam, 36% backslope, aspect 106°N azimuth, under moderately dense forest canopy of ponderosa pine-bur oak at 1500 meters elevation. 5½, Sec. 16, T1S, R6E, Pennington County. (Colors are for dry unless otherwise indicated).

Oe 4-0cm; decomposed and partially decomposed pine needles, oak leaves, and twigs.

A 0-4cm; very dark grayish brown (10YR3/2) channery silt loam, black (10YR2/1) moist; moderate fine granular and moderate fine subangular blocky structure; soft, very friable; 10% by volume coarse fragments of slate; common fine and very fine roots; moderately acid; clear wavy boundary.

E 4-9cm; brown (10YR5/3) channery silt loam, dark brown (10YR4/2) moist; moderate fine subangular blocky structure; soft, very friable; 30% by volume coarse fragements of slate; common fine and very fine roots; moderately acid; clear wavy boundary.

Bt1 9-50cm; brown (7.5YR5/3) extremely flaggy clay loam, dark brown (7.5YR4/4) moist; strong medium and fine subangular blocky structure; slightly hard, friable; 60% by volume coarse fragments of slate; few medium and fine roots; thin clay films on faces of peds; moderately acid; clear wavy boundary.

Bt2 50-74cm; yellowish brown (10YR5/4) extremely flaggy clay loam, dark yellowish brown (10YR4/4) moist; moderate medium subangular blocky structure; slightly hard, firm; 60% by volume coarse fragments of slate; few medium and fine roots; thin clay films on faces of peds; moderately acid; clear wavy boundary.

2BC 74-85cm; strong brown (7.5YR5/6) very channery loam, dark brown (7.5YR4/4) moist; weak very fine subangular blocky structure; slightly hard, friable; 50% by volume coarse fragments of slate; few fine roots, moderately acid; clear wavy boundary.

2C 85-107+; strong brown and yellowish brown (7.5YR5/6 and 10YR6/6) channery loam, brown and dark brown (10YR4/4 and 7.5YR4/4) moist; weak very fine subangular blocky structure; soft, very friable; 30% by volume coarse fragments of slate; few fine roots; slightly acid.

Remarks: Transported material from Bt1 into Bt2, Bt2 into BC, and from BC into C horizon is evident in cracks adjacent to coarse fragments.

Pactola (south aspect) - Site #84 (continued)

Remarks: (Continued) Discontinuous E horizon occurs below A horizon, described as brown (10YR5/3) channery silt loam, moderate fine and very fine subangular blocky structure; soft, very friable, abrupt wavy boundary.

Pressure faces evident on some peds within Bt1 and Bt2 horizons.

| SOIL | HORIZON | DEPTH (cm) | PARTICLE SIZE (% of TOTAL) TOTAL Sand | TOTAL Silt | TOTAL Clay | SAND FRACTION VC | SAND FRACTION C | SAND FRACTION M | SAND FRACTION F | SAND FRACTION VF | SILT FRACTION C | SILT FRACTION M | SILT FRACTION F | C. FRAG. % by Vol. | CLAY RATIO Bt/E | RATIO Sa to Si+Cl |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pactola (south) #59 | A | 0-2 | 32.2 | 51.1 | 16.7 | 1.5 | 3.2 | 6.7 | 10.6 | 10.3 | 23.4 | 21.1 | 6.6 | 5 | | 0.47 |
| | E1 | 2-21 | 37.3 | 48.1 | 14.6 | 2.3 | 4.0 | 7.4 | 12.4 | 11.3 | 27.6 | 17.4 | 3.2 | 20 | | 0.59 |
| | E2 | 21-38 | 42.6 | 44.8 | 12.7 | 1.7 | 4.5 | 8.5 | 14.7 | 13.1 | 26.3 | 15.4 | 3.1 | 35 | | 0.74 |
| | Bt | 38-50 | 49.5 | 31.6 | 18.9 | 3.8 | 9.0 | 11.9 | 14.9 | 10.0 | 17.0 | 11.7 | 3.0 | 55 | 1.4 | 0.98 |
| | C | 50-70+ | 46.3 | 46.9 | 6.8 | 1.4 | 3.7 | 8.3 | 16.7 | 16.3 | 29.3 | 14.8 | 2.7 | 65 | | 0.86 |
| Pactola (south) #84 | A | 0-4 | 36.2 | 47.1 | 16.7 | 3.6 | 6.4 | 6.9 | 10.2 | 9.2 | 20.6 | 19.2 | 7.3 | 10 | | 0.57 |
| | E | 4-9 | 36.3 | 44.2 | 19.5 | 4.4 | 6.2 | 6.7 | 10.0 | 9.0 | 23.6 | 14.5 | 6.0 | 30 | | 0.57 |
| | Bt1 | 9-50 | 21.7 | 44.9 | 33.4 | 2.2 | 3.7 | 3.5 | 5.2 | 7.0 | 24.5 | 11.9 | 8.5 | 60 | 1.6 | 0.28 |
| | Bt2 | 50-74 | 35.4 | 37.5 | 27.1 | 7.3 | 8.5 | 5.8 | 5.5 | 8.3 | 21.7 | 12.0 | 3.8 | 60 | | 0.55 |
| | 2BC | 74-85 | 56.4 | 34.4 | 9.1 | 4.6 | 17.0 | 13.9 | 12.5 | 8.4 | 17.8 | 12.9 | 3.7 | 50 | | 1.3 |
| | 2C | 85-107 | 66.8 | 24.9 | 8.4 | 10.7 | 21.2 | 15.1 | 11.9 | 7.9 | 12.7 | 10.5 | 1.7 | 30 | | 2.0 |

| SOIL | HORIZON | EXTRACTABLE BASES Ca | Mg | Na | K | CEC (NaOAc) | pH (1:1) | OM % | $CaCO_3$ % | RATIO CEC/Clay | WATER CONTENT .03 MPa | 1.5 MPa | RATIO 1.5 MPa to Clay |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | cmol $(p^+)kg^{-1}$ | | | | | | | | | % | | |
| Pactola (south) #59 | A | 19.2 | 3.6 | tr | 0.5 | 21.9 | 5.0 | 5.9 | | 1.31 | 36.8 | 18.7 | 1.12 |
| | E1 | 11.1 | 2.5 | 0.0 | 0.4 | 10.7 | 5.6 | 2.6 | | 0.72 | 22.0 | 9.2 | 0.63 |
| | E2 | 9.1 | 2.1 | 0.0 | 0.3 | 8.7 | 5.6 | 1.5 | | 0.69 | 19.3 | 7.7 | 0.61 |
| | Bt | 11.3 | 4.8 | tr | 0.3 | 10.7 | 5.9 | 0.8 | | 0.57 | 17.2 | 7.7 | 0.41 |
| | C | 13.1 | 3.8 | 0.0 | 0.2 | 6.1 | 6.1 | 0.6 | | 0.90 | 15.6 | 6.5 | 0.96 |
| Pactola (south) #84 | A | 22 | 4.6 | 0.0 | 1.3 | 22.6 | 5.9 | 6.2 | | 1.35 | 33.3 | 16.9 | 1.01 |
| | E | 11 | 4.3 | 0.0 | 0.8 | 11.0 | 5.6 | 2.5 | | 0.56 | 19.7 | 10.6 | 0.54 |
| | Bt1 | 11 | 5.6 | 0.0 | 0.7 | 13.7 | 5.6 | 1.1 | | 0.41 | 26.2 | 15.5 | 0.46 |
| | Bt2 | 14 | 6.8 | tr | 0.2 | 20.6 | 5.6 | 0.5 | | 0.52 | 23.0 | 12.8 | 0.47 |
| | 2BC | 17 | 7.1 | 0.0 | 0.2 | 11.4 | 5.9 | 0.4 | | 1.25 | 19.2 | 11.0 | 1.21 |
| | 2C | 15 | 6.4 | 0.0 | 0.2 | 10.4 | 6.1 | 0.9 | | 1.24 | 16.0 | 8.0 | 0.95 |

## Virkula - Site #75

Taxonomic Class: Fine, montmorillonitic, Typic Eutroboralfs

Pedon Description: Virkula silt loam, 9% concave grassed footslope, aspect 15°N azimuth, under a moderate forest canopy of ponderosa pine at 1524 meters elevation, S½, Sec. 10, T1S, R5E, Pennington County. (Colors are for dry soil unless otherwise stated).

A 0-3cm; very dark grayish brown (10YR3/2) silt loam, black (10YR2/1) moist; weak fine granular structure; soft, very friable; many very fine to fine roots; very strongly acid; abrupt smooth boundary.

E 3-22cm; pale brown (10YR6/3) silt loam, dark brown (10YR4/3) moist; weak very fine subangular blocky and weak very fine granular structure; soft, very friable; many very fine to fine roots; strongly acid; clear wavy boundary.

Bt1 22-64cm; brown (7.5YR5/4) silty clay loam, dark brown (7.5YR4/4) moist; strong fine and medium subangular blocky structure; slightly hard, friable; common fine and medium roots; thin clay films on faces of peds; strongly acid; clear wavy boundary.

Bt2 64-78cm; light yellowish brown (10YR6/4) silty clay loam, dark yellowish brown (10YR4/4) moist; moderate very fine subangular blocky structure; slightly hard, friable; few very fine roots; thin clay films on faces of peds; strongly acid; clear wavy boundary.

C 78-100$^{+}$cm, brown (10YR5/3) loam, brown (10YR5/3) moist; massive; slightly hard, friable; 10% by volume coarse fragments of slate; moderately acid.

Remarks: Coarse fragments of slate not encountered until 90 cm depth.

## Virkula Site - #71

Taxonomic Class: Fine, montmorillonitic, Typic Eutroboralfs

Pedon Description: Virkula silt loam, 9% slope, aspect 309°N azimuth, under a dense forest canopy of ponderosa pine at 1463 meters elevation, N½, Sec. 13, T1S, R5E, Pennington County. (Colors are for dry soil unless otherwise stated).

Oe 2-0cm; partially decomposed and decomposed pine needles and litter.

A 0-2cm; very dark gray (10YR3/1) silt loam, black (10YR2/1) moist; weak very fine granular structure; soft, very friable; many very fine to medium root; strongly acid; abrupt wavy boundary.

E 2-15cm; pale brown (10YR6/3) silt loam, dark yellowish brown (10YR4/4) moist; weak medium platy parting to medium fine subangular blocky structure; soft, very friable; common very fine to few fine roots; strongly acid; clear wavy boundary.

Bt1 15-41cm; brown (7.5YR5/4) silty clay loam, dark brown (7.5YR4/4) moist; strong very fine and fine subangular blocky structure; slightly hard, friable; few very fine to fine roots; thin clay films on faces of peds; strongly acid; clear wavy boundary.

Bt2 41-55cm; light yellowish brown (10YR6/4) silty clay loam, dark yellowish brown (10YR4/4) moist; moderate fine subangular blocky structure; slightly hard, friable; few fine roots; thin clay films on faces of some peds; strongly acid; clear wavy boundary.

C 55-75$^{+}$cm; grayish brown (2.5YR5/2) channery loam, dark grayish brown (10YR4/2) moist; massive; soft, friable; 20% by volume coarse fragments of slate; moderately acid.

Remarks: The A horizon thickness varies from 0.5 to 3 cm across face of pedon.

| SOIL | HORIZON | DEPTH (cm) | PARTICLE SIZE (% of TOTAL) — TOTAL Sand | TOTAL Silt | TOTAL Clay | SAND FRACTION VC | SAND FRACTION C | SAND FRACTION M | SAND FRACTION F | SAND FRACTION VF | SILT FRACTION C | SILT FRACTION M | SILT FRACTION F | C. FRAG. % by Vol. | CLAY RATIO Bt/E | RATIO Sa to Si+Cl |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | 0-3 | 18.1 | 66.8 | 15.1 | 0.7 | 1.5 | 4.1 | 6.2 | 5.7 | 31.5 | 28.0 | 7.3 | - | | 0.22 |
| | E | 3-22 | 28.6 | 59.7 | 11.7 | 0.4 | 1.6 | 6.4 | 9.7 | 10.4 | 38.0 | 18.0 | 3.7 | - | | 0.40 |
| Virkula | Bt1 | 22-64 | 10.7 | 53.1 | 36.2 | 0.1 | 0.4 | 1.6 | 2.5 | 6.2 | 33.5 | 15.1 | 4.5 | - | 3.0 | 0.12 |
| | Bt2 | 64-78 | 14.4 | 54.6 | 31.0 | 0.3 | 0.3 | 1.8 | 2.8 | 9.3 | 32.5 | 16.2 | 6.0 | - | | 0.17 |
| #75 | C | 78-100+ | 26.1 | 47.5 | 26.3 | 0.3 | 1.6 | 5.5 | 7.3 | 11.6 | 26.5 | 15.3 | 5.7 | 10 | | 0.35 |
| | A | 0-2 | 11.3 | 71.1 | 17.7 | 0.3 | 0.7 | 1.6 | 2.7 | 6.0 | 37.0 | 25.7 | 8.4 | - | | 0.13 |
| Virkula | E | 2-15 | 14.2 | 64.4 | 21.3 | 0.7 | 0.9 | 2.0 | 3.7 | 6.9 | 44.6 | 15.8 | 4.0 | - | | 0.17 |
| | Bt1 | 15-41 | 7.6 | 54.7 | 37.8 | 0.4 | 0.4 | 0.7 | 1.5 | 4.5 | 37.1 | 11.0 | 6.5 | - | 1.7 | 0.08 |
| | Bt2 | 41-55 | 6.3 | 58.2 | 35.5 | 0.2 | 0.4 | 0.6 | 1.4 | 3.7 | 41.4 | 12.4 | 4.4 | - | | 0.07 |
| #71 | C | 55-75 | 27.1 | 48.6 | 24.2 | 1.7 | 3.1 | 6.7 | 8.3 | 7.3 | 28.9 | 15.3 | 4.4 | 20 | | 0.37 |

| SOIL | HORIZON | EXTRACTABLE BASES Ca | Mg | Na | K | CEC (NaOAc) | pH (1:1) | OM % | $CaCO_3$ % | RATIO CEC/Clay | WATER CONTENT .03 MPa | 1.5 MPa | RATIO 1.5 MPa to Clay |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | cmol | $(p^+)kg^{-1}$ | | | | | | | | % | | |
| | A | 19.2 | 3.6 | 0.0 | 0.6 | 39.4 | 4.8 | 9.1 | | 2.59 | 44.0 | 35.3 | 2.34 |
| Virkula | E | 2.0 | 1.2 | 0.0 | 0.3 | 8.3 | 5.3 | 1.4 | | 0.71 | 20.8 | 5.4 | 0.46 |
| | Bt1 | 14.1 | 5.1 | 0.0 | 0.5 | 19.0 | 5.4 | 0.6 | | 0.52 | 26.3 | 14.3 | 0.40 |
| | Bt2 | 12.1 | 4.8 | tr | 0.5 | 19.0 | 5.6 | 0.5 | | 0.61 | 26.1 | 13.3 | 0.37 |
| #75 | C | 11.1 | 4.0 | tr | 0.4 | 16.4 | 5.6 | 0.5 | | 0.62 | 22.9 | 11.5 | 0.44 |
| Virkula | A | 29.0 | 6.3 | 0.0 | 0.6 | 63.5 | 5.1 | 8.0 | | 3.59 | 57.6 | 44.2 | 2.50 |
| | E | 10.1 | 1.6 | 0.0 | 0.3 | 11.8 | 5.4 | 1.6 | | 0.55 | 21.1 | 8.6 | 0.40 |
| | Bt1 | 19.2 | 3.0 | 0.0 | 0.5 | 20.6 | 5.4 | 0.9 | | 0.57 | 26.3 | 16.2 | 0.43 |
| #71 | Bt2 | 19.2 | 2.5 | 0.0 | 0.5 | 19.5 | 5.5 | 0.7 | | 0.55 | 26.6 | 14.7 | 0.41 |
| | C | 16.2 | 1.3 | 0.0 | 0.4 | 15.4 | 5.8 | 0.5 | | 0.64 | 22.5 | 10.7 | 0.44 |

Stovho (taxajunct) - Site #46

Taxonomic Class: Fine, montmorillonitic, Typic Cryoboralfs

Pedon Description: Stovho silt loam, 11% slightly concave slope, aspect 238°N azimuth, under a moderately dense forest canopy of ponderosa pine at 2,018 meters elevation, NW¼ of Sec. 33, T2S, R3E, Custer County. (Colors are for day soil unless otherwise stated).

Oe 2-0cm; partially decomposed and decomposed forest litter.

E 0-12cm; brown (10YR5/3) silt loam, dark brown (10YR4/3) moist; weak medium platy parting to weak fine subangular blocky structure; slightly hard, friable; common fine and medium roots; moderately acid; clear wavy boundary.

Bt1 12-20cm; brown (7.5YR5/4) silty clay, dark brown (7.5YR4/4) moist, and dark brown (7.5YR4/2) coatings on faces of peds; strong very fine blocky structure, hard, firm; few fine and medium roots; moderately acid; clear wavy boundary.

Bt2 20-37cm; brown and light brown (7.5YR5/4 and 6/4) silty clay, dark yellowish brown (10YR4/4) moist, and dark brown (7.5YR4/2) coatings on faces of peds; strong fine blocky structure; hard, firm; 5% by volume fragments of limestone; few medium roots; slightly acid; clear wavy boundary.

C 37-45$^{+}$cm; brown (10YR5/3) very stony silty clay loam, brown (10YR5/3) moist; massive; slightly hard, friable; 60% by volume limestone fragments; violent effervescence; mildly alkaline.

## Stovho (Taxajunct) - Site #1

Taxonomic Class: Fine, montmorillonitic, Typic Cryoboralfs

Pedon Description: Stovho silt loam, 10% slightly concave slope, aspect 218°N azimuth, within a grassed clearing of a ponderosa pine forest at 2073 meters elevation, SW¼, Sec. 30, T1S, R3E, Pennington County. (Colors are for dry soil unless otherwise stated).

E 0-15cm; light brownish gray (10YR6/2) silt loam, dark brown (10YR4/2) moist; weak fine granular and subangular blocky structure; soft, friable; 5% by volume coarse fragments of limestone; many very fine to fine roots; strongly acid; clear wavy boundary.

Bt 15-38cm; brown (7.5YR5/4 and 5/2) silty clay, dark brown (7.5YR4/2) moist, and dark brown (7.5YR3/2) coatings on faces of peds; strong medium blocky structure; hard, firm; 5% by volume coarse fragments of limestone; common very fine to fine roots; moderately acid; clear wavy boundary.

BC1 38-48cm; brown (10YR5/3) silty clay loam, dark yellowish brown (10YR4/4) moist, and dark grayish brown (10YR4/2) coatings on faces of some peds; slightly hard, friable; 10% by volume coarse fragments of limestone; common fine roots; strong effervescence; mildly alkaline; clear wavy boundary.

BC2 48-66cm; pale brown (10YR6/3) gravelly silty clay loam, brown (10YR5/3) moist; weak very fine subangular blocky structure; slightly hard, friable; 15% by volume coarse fragments of limestone; few fine roots; violent effervescence; mildly alkaline; abrupt wavy boundary.

C 66-80$^{+}$cm; very pale brown and reddish yellow (10YR7/3 and 7.5YR6/6) very gravelly silty clay loam, light yellowish brown and brown (10YR6/4 and 7.5YR5/4) moist; massive; 45% by volume coarse fragments of limestone; violent effervescense; mildly alkaline.

Remarks: Thin lenses of A horizon present but too intermittent to sample.

Evidence of Bt horizon material transported into C horizon via pedogenic cracks.

| SOIL | HORIZON | DEPTH (cm) | PARTICLE SIZE (% of TOTAL) — TOTAL — Sand | Silt | Clay | SAND FRACTION VC | C | M | F | VF | SILT FRACTION C | M | F | C. FRAG. % by Vol. | CLAY RATIO Bt/E | RATIO Sa to Si+Cl |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Stovho | E | 0-12 | 7.5 | 68.1 | 24.4 | 0.1 | 0.1 | 0.4 | 0.8 | 6.1 | 41.6 | 20.3 | 6.1 | - | | 0.08 |
| | Bt1 | 12-20 | 9.0 | 45.5 | 45.5 | 0.1 | 0.1 | 0.2 | 0.7 | 7.8 | 26.1 | 13.9 | 5.6 | - | 1.8 | 0.10 |
| | Bt2 | 20-37 | 6.9 | 49.1 | 44.0 | 0.1 | 0.1 | 0.2 | 0.4 | 6.1 | 28.5 | 15.4 | 5.2 | 5 | | 0.07 |
| #46 | C | 37-45+ | 12.0 | 49.0 | 39.0 | 3.7 | 2.4 | 1.5 | 0.8 | 3.6 | 24.9 | 17.9 | 6.2 | 60 | | 0.14 |
| Stovho | E | 0-15 | 7.7 | 72.2 | 19.6 | 0.4 | 0.4 | 0.6 | 1.5 | 4.7 | 43.9 | 23.0 | 5.7 | 5 | | 0.08 |
| | Bt | 15-38 | 5.6 | 40.0 | 54.4 | 0.3 | 0.3 | 0.4 | 1.4 | 3.3 | 21.8 | 12.7 | 5.5 | 5 | 2.8 | 0.06 |
| | BC1 | 38-48 | 9.1 | 44.9 | 46.0 | 0.7 | 0.5 | 0.6 | 3.1 | 4.2 | 21.2 | 16.9 | 6.8 | 10 | | 0.10 |
| | BC2 | 48-66 | 17.4 | 40.9 | 41.7 | 1.2 | 0.9 | 1.0 | 5.5 | 8.8 | 20.7 | 13.2 | 7.0 | 15 | | 0.21 |
| #1 | C | 66-80+ | 19.0 | 36.1 | 44.9 | 1.6 | 1.3 | 1.3 | 7.2 | 7.7 | 21.8 | 10.5 | 3.8 | 45 | | 0.23 |

| SOIL | HORIZON | EXTRACTABLE BASES Ca | Mg | Na | K | CEC (NaOAc) | pH | OM | $CaCO_3$ | RATIO | WATER CONTENT .03 MPa | 1.5 MPa | RATIO 1.5 MPa |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | cmol $(p^+)kg^{-1}$ | | | | | (1:1) | % | % | CEC/Clay | % | | to Clay |
| Stovho | E | 11.0 | 4.2 | 0.0 | 0.4 | 17.0 | 5.6 | 1.9 | 0.1 | 0.70 | 28.7 | 12.4 | 0.51 |
| | Bt1 | 19.0 | 8.2 | 0.0 | 0.6 | 28.9 | 5.8 | 2.0 | 0.1 | 0.64 | 33.1 | 20.1 | 0.44 |
| | Bt2 | 20.0 | 8.6 | tr | 0.5 | 28.1 | 6.5 | 1.3 | 0.3 | 0.64 | 34.1 | 20.0 | 0.45 |
| #46 | C | | | tr | 0.4 | 22.6 | 7.4 | 1.4 | 21.5 | 0.58 | 30.7 | 16.6 | 0.43 |
| Stovho | E | 10.0 | 2.5 | 0.0 | 0.4 | 14.2 | 5.2 | 2.0 | | 0.72 | 24.7 | 9.3 | 0.47 |
| | Bt | 22.0 | 10.0 | tr | 0.8 | 31.7 | 5.7 | 1.2 | 0.2 | 0.58 | 36.3 | 23.6 | 0.43 |
| | BC1 | | | 0.0 | 0.4 | 21.9 | 7.4 | 1.6 | 28.8 | 0.48 | 29.8 | 16.8 | 0.37 |
| #1 | BC2 | | | 0.0 | 0.3 | 17.0 | 7.5 | 1.1 | 47.6 | 0.41 | 24.3 | 14.0 | 0.34 |
| | C | | | tr | 0.3 | 17.8 | 7.5 | 0.9 | 56.4 | 0.40 | 25.2 | 14.8 | 0.33 |

Trebor (taxajunct) - Site #5

Taxonomic Class: Clayey-skeletal, mixed, Typic Cryoboralfs

Pedon Description: Trebor very flaggy silt loam, 7% convex slope, aspect 207°N azimuth, under a sparse forest canopy of ponderosa pine at 2,073 meters elevation, SW¼ of Sec. 30, T1S, R3E, Pennington County. (Colors are for dry soil unless otherwise stated).

Oa 3-0cm; decomposed and partially decomposed forest litter.

E 0-3cm; dark grayish brown (10YR4/2) very flaggy silt loam, very dark grayish brown (10YR3/2) moist; weak medium platy structure parting to weak very fine subangular blocky; slightly hard; friable; 35% by volume fragments of limestone; many very fine and fine roots; moderately acid wavy boundary.

Bt 3-30cm; dark brown (7.5YR4/4) extremely flaggy silty clay, dark brown (7.5YR3/2) moist; and dark brown (10YR3/2) coatings on faces of some peds; strong very fine blocky structure; hard, firm; 65% by volume fragments of limestone; common very fine and medium roots; neutral; abrupt wavy boundary.

BC 30-37cm; grayish brown (10YR5/2) extremely flaggy silty clay loam, dark grayish brown (10YR4/2) moist; weak very fine subangular blocky structure; slightly hard, friable; 80% by volume coarse fragments of limestone; common very fine to few medium roots; strong effervescence; neutral; abrupt wavy boundary.

C $37\text{-}45^{+}$cm; pale brown and very pale brown (10YR6/3 and 7/4) extremely flaggy silty loam, brown and light yellowish brown (10YR5/3 and 6/4) moist; massive; slightly hard, friable; 80% by volume coarse fragments of limestone; few medium roots; violent effervescence; mildly alkaline.

Remarks: Dark grayish brown (10YR4/2) coatings (organs) surrounding some roots in BC and C horizons.

Trebor (taxajunct) - Site #8

Taxonomic Class: Clayey-skeletal, mixed, Typic Cryoboralfs.

Pedon Description: Trebor extremely stony silt loam, 11% slightly convex slope, aspect 253°N azimuth, under a dense forest canopy of ponderosa pine at 2073 meters elevation, SW¼, Sect. 30, T1S, R3E, Pennington County. (Colors are for dry soil unless otherwise stated).

Oe 2-0cm; partially decomposed and decomposed pine needles and litter.

E 0-7cm; brown (7.5Yr5/2) extremely stony silt loam, dark brown (7.5YR4/2) moist; weak medium platy structure; soft, very friable; 70% by volume coarse fragments of limestone; common fine to medium roots; very strongly acid; clear wavy boundary.

Bt 7-28cm; dark brown (7.5YR4/4) extremely stony silty clay, dark brown (7.5YR4/4) moist, and dark brown (7.5YR4/2) coatings on faces of some peds; strong fine blocky structure; slightly hard, friable; 80% by volume coarse fragments of limestone; common fine to medium roots; neutral; abrupt irregular boundary.

C 28-40$^{+}$cm; grayish brown (10YR5/2) extremely stony silty clay loam, dark yellowish brown (10YR4/4) moist; massive; soft, very friable; 90% by volume coarse fragments of limestone; few fine roots; violent effervescence; neutral.

Remarks: Raw organic matter has been transported into the C horizon via cracks between coarse fragments. Dark brown humus and Bt material also transported into C horizon via cracks. Therfore 7.5YR4/4 colors also present in C.

Intermittent BE horizon with color of 10YR5/4 observed but too thin to sample.

| SOIL | HORIZON | DEPTH (cm) | PARTICLE SIZE (% of TOTAL) — TOTAL — Sand | Silt | Clay | SAND FRACTION VC | C | M | F | VF | SILT FRACTION C | M | F | C. FRAG. % by Vol. | CLAY RATIO Bt/E | RATIO Sa to Si+Cl |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Trebor #5 | E | 0-3 | 5.2 | 68.6 | 26.2 | 0.2 | 0.2 | 0.2 | 0.6 | 4.0 | 35.1 | 23.7 | 9.8 | 35 | | 0.05 |
| | Bt | 3-30 | 5.2 | 46.2 | 48.6 | 0.3 | 0.2 | 0.2 | 0.4 | 4.1 | 4.0 | 31.2 | 11.0 | 65 | 1.9 | 0.05 |
| | BC | 30-37 | 6.4 | 57.9 | 35.7 | 0.1 | 0.3 | 0.3 | 0.5 | 5.1 | 29.4 | 17.7 | 10.8 | 80 | | 0.07 |
| | C | 37-45+ | 13.5 | 69.1 | 17.4 | 1.8 | 1.6 | 0.2 | 0.5 | 9.4 | 50.9 | 16.3 | 2.0 | 80 | | 0.16 |
| Trebor #8 | E | 0-7 | 7.1 | 75.5 | 17.4 | 0.4 | 0.4 | 0.3 | 0.8 | 5.1 | 43.5 | 24.4 | 7.6 | 70 | | 0.08 |
| | Bt | 7-28 | 4.3 | 44.5 | 51.2 | 0.3 | 0.4 | 0.4 | 0.7 | 2.4 | 18.7 | 16.8 | 9.0 | 80 | 2.9 | 0.04 |
| | C | 28-40+ | 16.8 | 52.3 | 30.9 | 3.1 | 4.6 | 5.2 | 1.3 | 2.6 | 22.4 | 15.2 | 14.7 | 90 | | 0.20 |

| SOIL | HORIZON | EXTRACTABLE BASES Ca | Mg | Na | K | CEC (NaOAc) | pH | OM | $CaCO_3$ | RATIO | WATER CONTENT .03 MPa | 1.5 MPa | RATIO 1.5 MPa |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | cmol $(p^+)kg^{-1}$ | | | | | (1:1) | % | % | CEC/Clay | % | | to Clay |
| Trebor #5 | E | 16.0 | 8.6 | tr | 0.6 | 27.4 | 5.8 | 5.7 | 0.2 | 1.04 | 34.0 | 19.3 | 0.74 |
| | Bt | 21.0 | 13.7 | tr | 0.5 | 29.6 | 7.0 | 3.5 | 2.6 | 0.61 | 34.7 | 24.5 | 0.50 |
| | BC | | | tr | 0.3 | 26.1 | 7.2 | 4.3 | 46.4 | 0.73 | 33.6 | 21.7 | 0.61 |
| | C | | | tr | 0.2 | 17.8 | 7.4 | 4.2 | 74.2 | 1.02 | 28.5 | 15.0 | 0.86 |
| Trebor #8 | E | 13.8 | 3.6 | tr | 0.4 | 18.4 | 4.9 | 4.5 | 0.2 | 1.05 | 28.7 | 12.9 | 0.74 |
| | Bt | 40.7 | 4.0 | 0.0 | 0.6 | 49.4 | 6.9 | 4.2 | 0.5 | 0.96 | 37.7 | 26.5 | 0.52 |
| | C | | | 0.0 | 0.4 | 31.8 | 7.0 | 5.2 | 16.7 | 1.03 | 33.1 | 21.3 | 0.69 |

Vanocker-Site #19

Taxonomic Class: Loamy skeletal, mixed Typic Eutroboralfs

Pedon Description: Vanocker channery silt loam, 15% north-facing slope, aspect 330°N azimuth, under a moderate forest canopy of ponderosa pine at 1,618 meters elevation, NE¼ of Sec. 31, T3S, R2E, Custer County. (Colors are for dry soil unless otherwise stated).

Oe 3 to 0cm; partially decomposed pine needles, twigs and grass.

A 0 to 8cm; dark grayish brown (10YR4/2) channery silt loam, very dark grayish brown (10YR3/2) moist; moderate fine subangular blocky structure; slightly hard; friable; 20% by volume limestone fragments; common fine to medium roots; slightly acid; abrupt wavy boundary.

Bt 8 to 11cm; brown (7.5YR5/4) very channery clay loam, dark brown (7.5YR4/4) moist; moderate fine subangular blocky structure; hard, firm; 35% by volume limestone fragments; common fine to medium roots; very slight effervescence; neutral; abrupt wavy boundary.

BC1 11 to 17cm; brown (10YR5/2) very channery clay loam, dark brown (7.5YR4/2) moist; weak fine subangular blocky structure; hard, firm; 40% by volume limestone fragments; few fine to medium roots; strong effervescence; mildly alkaline; clear wavy boundary.

BC2 17 to 30cm; light gray (10YR7/2) very channery loam, brown (10YR5/3) moist; slightly hard, friable; 40% by volume limestone fragments; few fine to medium roots; violent effervescence; mildly alkaline; clear wavy boundary.

2C 30-50$^{+}$cm; pinkish gray (7.5YR7/2 and 5YR7/2) very channery loam, light reddish brown and reddish gray (5YR6/3 and 5/2) moist; weak very fine subangular blocky structure; slightly hard, friable; 50% by volume limestone fragments; few fine roots; violent effervescence; mildly alkaline.

## Vanocker - Site #41

Taxonomic Class: Loamy-skeletal, mixed, Typic Eutroboralfs.

Pedon Description: Vanocker loam, 22% south-facing slope, aspect 320°N azimuth, under a dense forest canopy of ponderosa pine at 1,585 meters elevation, NW¼, Sect. 31, T3S, R2E, Custer County. (Colors are for dry soil unless otherwise indicated).

Oe 3-0cm; partially decomposed and decomposed pine needles and twigs.

A 0-5cm; very dark grayish brown (10YR3/2), black (10YR2/1) moist; weak very fine subangular blocky and granular structure; soft, very friable; common very fine roots; moderately acid; abrupt wavy boundary.

E 5-7cm; brown (7.5YR5/2) loam; dark brown (7.5YR4/2) moist; weak very fine subangular blocky structure; soft, very friable; common very fine to fine roots; neutral; abrupt wavy boundary.

Bt 7-12cm; brown (7.5YR5/4) very flaggy loam, dark brown (7.5YR4/4) moist; very dark grayish brown (10YR3/2) coatings on faces of some peds; moderate fine subangular blocky structure; slightly hard, friable; 35% by volume coarse fragments of sandy limestone; common very fine to fine roots; very slight effervescence; neutral; abrupt wavy boundary.

BC1 12-17cm; grayish brown (10YR5/2) very flaggy loam, dark grayish brown (10YR4/2) moist; moderate very fine and fine subangular blocky structure; soft, very friable; 40% by volume coarse fragments of sandy limestone; common very fine to fine roots; violent effervescence, mildly alkaline; clear wavy boundary.

BC2 17-29cm; light brownish gray (10YR6/2) very flaggy loam, brown (10YR4/3) moist; weak very fine and fine subangular blocky structure; soft, very friable; 60% by volume coarse fragments of sandy limestone; common very fine to fine roots; violent effervescence; mildly alkaline; clear wavy boundary.

C1 29-46cm; light brownish gray (10YR6/2) very stony loam, brown (10YR4/3) moist; massive; slightly hard, friable; 75% by volume coarse fragments of sandy limestone; common fine to fine medium roots; violent effervescence; mildly alkaline; abrupt wavy boundary.

2C2 46-60$^{+}$cm; light gray and white (10YR7/2 and 8/1) extremely stony fine sandy loam, brown and very pale brown (10YR5/3 and 7/4) moist; massive; soft, very friable; 75% by volume coarse fragments of sandy limestone; violent effervescence; mildly alkaline.

Vanocker - Site #41 (continued)

Remarks: The A horizon varies in thickness from 1-4 cm across pedon face.

The E horizon varies in thickness from 0 to 3 cm across pedon face. Evidence of some E material transported through cracks into Bt horizon.

| SOIL | HORIZON | DEPTH (cm) | PARTICLE SIZE (% of TOTAL) — TOTAL — Sand | Silt | Clay | SAND FRACTION VC | C | M | F | VF | SILT FRACTION C | M | F | C. FRAG. % by Vol. | CLAY RATIO Bt/E | RATIO Sa to Si+Cl |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Vanocker | A | 0-8 | 34.3 | 39.3 | 26.4 | 0.3 | 0.3 | 0.8 | 11.7 | 21.1 | 19.5 | 15.1 | 4.7 | 20 | | 0.52 |
| | Bt | 8-11 | 34.5 | 30.2 | 35.3 | 0.9 | 0.6 | 1.4 | 15.1 | 16.4 | 13.7 | 10.9 | 5.5 | 35 | | 0.52 |
| | BC1 | 11-17 | 35.2 | 34.0 | 30.8 | 1.9 | 1.7 | 2.4 | 14.8 | 14.5 | 14.6 | 13.3 | 6.0 | 40 | | 0.54 |
| #19 | BC2 | 17-30 | 24.1 | 42.0 | 33.9 | 0.1 | 0.3 | 0.8 | 9.5 | 13.4 | 21.9 | 14.2 | 5.9 | 40 | | 0.32 |
| | 2C | 30-50+ | 11.0 | 56.0 | 33.0 | 0.0 | 0.2 | 0.4 | 4.1 | 6.2 | 22.6 | 26.7 | 6.7 | 50 | | 0.12 |
| Vanocker | A | 0-5 | 37.6 | 43.1 | 19.4 | 0.1 | 0.2 | 1.5 | 21.4 | 14.4 | 20.8 | 16.5 | 5.8 | - | | 0.60 |
| | E | 5-7 | 42.9 | 38.4 | 18.6 | 0.3 | 0.3 | 1.9 | 24.0 | 16.4 | 23.0 | 11.9 | 3.5 | - | | 0.75 |
| | Bt | 7-12 | 45.8 | 31.0 | 23.2 | 0.4 | 0.4 | 1.7 | 24.6 | 18.6 | 17.8 | 9.9 | 3.4 | 35 | 1.2 | 0.80 |
| #41 | BC1 | 12-17 | 47.7 | 32.8 | 19.5 | 0.3 | 0.4 | 1.4 | 29.6 | 15.9 | 18.3 | 10.3 | 4.3 | 40 | | 0.91 |
| | BC2 | 17-29 | 45.4 | 30.0 | 24.6 | 0.1 | 0.2 | 2.0 | 27.7 | 15.4 | 17.9 | 8.3 | 3.8 | 60 | | 0.83 |
| | C1 | 29-46 | 43.3 | 40.4 | 16.3 | 3.4 | 3.6 | 5.0 | 21.0 | 10.3 | 17.7 | 13.3 | 9.4 | 75 | | 0.76 |
| | 2C2 | 46-60+ | 60.0 | 22.2 | 17.9 | 0.3 | 0.6 | 2.7 | 41.4 | 15.1 | 10.1 | 10.4 | 1.7 | 75 | | 1.5 |

| SOIL | HORIZON | EXTRACTABLE BASES Ca | Mg | Na | K | CEC (NaOAc) | pH | OM | $CaCO_3$ | RATIO | WATER CONTENT .03 MPa | 1.5 MPa | RATIO 1.5 MPa |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | cmol $(p^+)kg^{-1}$ | | | | | (1:1) | % | % | CEC/Clay | % | | to Clay |
| Vanocker | A | 22.2 | 6.1 | 0.0 | 0.6 | 19.5 | 6.4 | 6.0 | - | 0,74 | 30.5 | 18.3 | 0.69 |
| | Bt | 27.3 | 7.6 | 0.0 | 0.5 | 18.4 | 7.1 | 3.3 | 3.6 | 0.52 | 28.9 | 17.9 | 0.51 |
| #19 | BC1 | | | 0.0 | 0.4 | 17.8 | 7.4 | 3.9 | 16.3 | 0.58 | 31.9 | 19.2 | 0.62 |
| | BC2 | | | 0.0 | 0.2 | 15.4 | 7.6 | 3.0 | 32.4 | 0.45 | 34.5 | 20.7 | 0.61 |
| | 2C | | | 0.0 | 0.2 | 10.7 | 7.7 | 2.7 | 54.3 | 0.32 | 36.9 | 20.6 | 0.62 |
| Vanocker | A | 32.3 | 3.6 | 0.0 | 0.6 | 25.9 | 5.9 | 8.0 | - | 1.3 | 37.5 | 19.8 | 1.02 |
| | E | - | - | - | - | - | - | - | - | - | - | - | - |
| | Bt | 35.0 | 4.4 | 0.0 | 0.2 | 24.4 | 7.2 | 2.4 | 1.8 | 1.1 | 22.6 | 12.1 | 0.52 |
| #41 | BC1 | | | 0.0 | 0.3 | 15.0 | 7.5 | 2.7 | 12.8 | 0.77 | 27.2 | 15.8 | 0.81 |
| | BC2 | | | 0.0 | 0.3 | 14.2 | 7.5 | 2.5 | 28.9 | 0.58 | 28.5 | 17.4 | 0.71 |
| | C1 | | | 0.0 | 0.2 | 13.7 | 7.5 | 2.6 | 31.9 | 0.84 | 33.3 | 20.4 | 1.25 |
| | 2C2 | | | 0.0 | 0.2 | 10.0 | 7.6 | 1.8 | 35.7 | 0.56 | 30.5 | 16.5 | 0.92 |

## Sawdust - Site #29

Taxonomic Class: Loamy-skeletal, mixed, (calcareous), frigid Typic Ustorthents.

Pedon Description: Sawdust channery loam, 20% south-facing slope, aspect 153°N azimuth, under a very sparse forest canopy of ponderosa pine at 1,628 meters elevation, NW¼ of Sect. 31, T3S, R2E, Custer County. (Colors are for dry soil unless otherwise stated).

A 0-10cm; dark grayish brown (10YR4/2) channery loam, very dark brown (10YR2/2) moist; weak fine granular structure; soft, very friable; 25% by volume coarse fragments of limestone; common very fine roots; strong effervescence; mildly alkaline; clear wavy boundary.

AC 10-26cm; light brownish gray (10YR6/2) very channery clay loam, brown (10YR4/3) moist; moderate fine subangular blocky structure; soft very friable; 45% by volume fragments of limestone; common very fine roots; violent effervescence; mildly alkaline; clear wavy boundary.

C 26-35$^{+}$cm; pinkish grey (7.5YR6/2) extremely flaggy loam, brown (7.5YR5/2) moist; massive; slightly hard, friable; 70% by volume fragments of limestone; few very fine roots; violent effervescence; moderately alkaline.

## Sawdust - Site #30

Taxonomic Class: Loamy-skeletal, mixed (calcareous), frigid, Typic Ustorthents.

Pedon Description: Sawdust fine sandy loam, 21% south-facing slope aspect 168°N azimuth, under a moderate forest canopy of ponderosa pine at 1,640 meters elevation, NW¼ Sect. 31, T3S, R2E, Custer County. (Colors are for dry soil unless otherwise stated).

Oe 3-0cm; partially decomposed and decomposed pine needles and grass litter.

A 0-4cm; very dark grayish brown (10YR3/2) fine sandy loam, black (10YR2/1) moist; weak very fine granular structure; soft, very friable; 10% by volume coarse fragments of limestone; many very fine roots; strongly acid; abrupt smooth boundary.

BA 4-11cm; brown (7.5YR4/2) very flaggy fine sandy loam, dark brown (7.5YR3/2) moist; weak fine subangular blocky structure; soft, very friable; 40% by volume coarse fragments of limestone; many very fine to common medium roots; neutral; abrupt wavy boundary.

BW 11-20cm; light brown (7.5YR6/4) extremely stony sandy clay loam, brown (7.5YR4/4) moist; moderate very fine subangular blocky structure; slightly hard, friable; 80% by volume coarse fragments of limestone; few very fine to common medium roots; strong effervescence; mildly alkaline; abrupt wavy boundary.

BC 20-33cm; brown (10YR5/3) extremely stony fine sandy loam, dark brown (7.5YR4/4) moist; weak very fine granular structure; soft, very friable; 80% by volume coarse fragments of limestone; few very fine to common medium roots; violent effervescence; mildly alkaline; abrupt wavy boundary.

C 33-45$^{+}$cm; pale brown (10YR6/3) extremely stony loam, brown (10YR5/3) moist; massive; slightly hard, friable; 80% by volume coarse fragments of limestone; few very fine to medium roots; violent effervescence; moderately alkaline.

| SOIL | HORIZON | DEPTH (cm) | PARTICLE SIZE (% of TOTAL) — TOTAL — Sand | Silt | Clay | SAND FRACTION VC | C | M | F | VF | SILT FRACTION C | M | F | C. FRAG. % by Vol. | CLAY RATIO Bt/E | RATIO Sa to Si+Cl |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sawdust | A | 0-10 | 39.5 | 36.6 | 23.9 | 0.6 | 0.5 | 1.7 | 18.9 | 17.9 | 18.4 | 14.3 | 3.8 | 25 | | 0.65 |
| | AC | 10-26 | 30.4 | 41.2 | 28.4 | 0.6 | 1.2 | 1.8 | 13.3 | 13.6 | 14.4 | 20.3 | 6.6 | 45 | | 0.44 |
| #29 | C | 26-35+ | 20.6 | 53.5 | 25.6 | 1.6 | 1.8 | 2.6 | 6.8 | 8.1 | 19.7 | 26.4 | 7.4 | 70 | | 0.26 |
| Sawdust | A | 0-4 | 55.4 | 28.6 | 16.0 | 0.3 | 0.4 | 2.2 | 28.8 | 23.7 | 13.7 | 11.0 | 4.0 | 10 | | 1.3 |
| | BA | 4-11 | 59.4 | 22.6 | 17.5 | 0.3 | 0.5 | 2.4 | 31.4 | 25.3 | 12.2 | 8.3 | 2.2 | 40 | | 1.5 |
| #30 | Bw | 11-20 | 58.5 | 20.5 | 21.1 | 0.3 | 0.2 | 1.9 | 30.1 | 25.9 | 12.6 | 6.6 | 1.2 | 80 | | 1.4 |
| | BC | 20-32 | 55.4 | 26.8 | 17.8 | 0.1 | 0.3 | 1.8 | 33.4 | 19.8 | 14.0 | 7.7 | 5.1 | 80 | | 1.2 |
| | C | 33-45+ | 47.2 | 33.7 | 19.1 | 0.0 | 0.0 | 0.3 | 27.2 | 19.5 | 20.2 | 10.3 | 3.2 | 80 | | 0.89 |

| SOIL | HORIZON | EXTRACTABLE BASES Ca | Mg | Na | K | CEC (NaOAc) | pH (1:1) | OM % | $CaCO_3$ % | RATIO CEC/Clay | WATER CONTENT .03 MPa | 1.5 MPa | RATIO 1.5 MPa to Clay |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | cmol $(p^+)kg^{-1}$ | | | | | | | | | % | | |
| Sawdust | A | | | tr | 0.6 | 24.3 | 7.5 | 5.3 | 26.1 | 1.02 | 29.6 | 15.0 | 0.63 |
| | AC | | | 0.0 | 0.3 | 14.5 | 7.8 | 3.0 | 46.5 | 0.51 | 28.7 | 15.7 | 0.55 |
| #29 | C | | | tr | 0.3 | 12.6 | 8.0 | 2.0 | 41.0 | 0.49 | 30.7 | 13.8 | 0.54 |
| Sawdust | A | 26.3 | 4.9 | 0.0 | 0.9 | 34.5 | 5.5 | 4.7 | | 1.44 | 15.9 | 19.6 | 1.23 |
| | BA | 15.2 | 3.7 | 0.0 | 0.6 | 15.9 | 6.8 | 2.7 | 0.3 | 0.91 | 17.4 | 8.6 | 0.49 |
| #30 | Bw | | | 0.0 | 0.4 | 15.4 | 7.5 | 1.5 | 2.9 | 0.73 | 18.5 | 9.9 | 0.47 |
| | BC | | | 0.0 | 0.1 | 18.4 | 7.6 | 2.6 | 17.6 | 1.03 | 23.9 | 13.5 | 0.76 |
| | C | | | 0.0 | 0.2 | 11.4 | 8.0 | 1.3 | 28.5 | 0.60 | 23.6 | 11.8 | 0.62 |