

## United States Department of Agriculture Natural Resources Conservation Service

### Ecological Site Description

**Site Type:** Rangeland

**Site Name:** Shallow Clay

**Site ID:** R063AY017SD

**Major Land Resource Area (MLRA):** 63A –  
Northern Rolling Pierre Shale Plains



### Physiographic Features

This site typically occurs on gently to steeply sloping uplands.

**Landform:** plain, hill, ridge, knoll

**Aspect:** N/A

	<u>Minimum</u>	<u>Maximum</u>
<b>Elevation (feet):</b>	1600	2700
<b>Slope (percent):</b>	6	60
<b>Water Table Depth (inches):</b>	None	None
<b>Flooding:</b>		
<b>Frequency:</b>	None	None
<b>Duration:</b>	None	None
<b>Ponding:</b>		
<b>Depth (inches):</b>	None	None
<b>Frequency:</b>	None	None
<b>Duration:</b>	None	None
<b>Runoff Class:</b>	Medium	Very high

### Climatic Features

MLRA 63A is considered to have a continental climate – cold winters and hot summers, low humidity, light rainfall, and much sunshine. Extremes in temperature may also abound. The climate is the result of this MLRA's location near the geographic center of North America. There are few natural barriers on the Northern Great Plains and air masses move freely across the plains and account for rapid changes in temperature.

Annual precipitation ranges from 16 to 20 inches per year. The average annual temperature is about 47°F. January is the coldest month with average temperatures ranging from about 11°F (Pollock, South Dakota (SD)), to about 22°F (Cedar Butte, SD). July is the warmest month with temperatures averaging from about 72°F (Pollock, SD), to about 76°F (Cedar Butte, SD). The range of normal average monthly temperatures between the coldest and warmest months is about 58°F. This large annual range attests to the continental nature of this area's climate. Hourly winds are estimated to average about 11 miles per hour annually, ranging from about 13 miles per hour during the spring to

about 10 miles per hour during the summer. Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 50 miles per hour.

Growth of cool-season plants begins in early to mid-March, slowing or ceasing in late June. Warm-season plants begin growth about mid-May and continue to early or mid-September. Green up of cool-season plants may occur in September and October when adequate soil moisture is present.

	<u>Minimum</u>	<u>Maximum</u>
<b>Frost-free period (days):</b>	126	149
<b>Freeze-free period (days):</b>	149	165
<b>Mean Annual Precipitation (inches):</b>	16	20

**Average Monthly Precipitation (inches) and Temperature (°F):**

	Precip. Min.	Precip. Max	Temp. Min.	Temp. Max.
January	0.40	0.41	-0.9	34.0
February	0.44	0.49	5.8	39.2
March	0.87	1.36	17.3	49.0
April	1.77	2.18	31.3	61.2
May	2.82	3.29	43.3	72.2
June	2.96	3.45	53.2	82.5
July	2.04	2.84	58.5	90.8
August	1.57	2.38	56.5	90.3
September	1.13	1.53	45.4	79.2
October	1.02	1.38	33.4	65.7
November	0.48	0.63	19.3	48.2
December	0.23	0.35	5.7	37.2

Climate Stations		Period	
Station ID	Location or Name	From	To
SD1539	Cedar Butte	1951	2004
SD1972	Cottonwood 3 E	1909	2004
SD6712	Pollock	1948	2004
SD6790	Presho 7 NW	1975	2004

For local climate stations that may be more representative, refer to <http://www.wcc.nrcs.uds.gov>.

## Riparian and Wetland Features

No riparian areas or wetland features are directly associated with this site.

## Representative Soil Features

The soils in this site are well drained and formed in shale. The clay to silty clay loam surface layer is two to eight inches thick. The bedrock which occurs at 10 to 20 inches is impervious shale which is virtually impenetrable to plant roots. The soils have a slow to very slow infiltration rate. This site should show slight to no evidence of rills, wind scoured areas, or pedestalled plants. Water flow paths are broken, irregular in appearance, or discontinuous with numerous debris dams or vegetative barriers.

These soils are mainly susceptible to water erosion. The hazard of water erosion increases on slopes greater than about 10 percent. Low available water capacity and very slow permeability strongly influences the soil-water-plant relationship.

Access Web Soil Survey (<http://websoilsurvey.nrcs.usda.gov/app/>) for specific local soils information.

**Parent Material Kind:** residuum, alluvium, shale  
**Parent Material Origin:** shale, unspecified  
**Surface Texture:** clay, silty clay loam, silty clay  
**Surface Texture Modifier:** none  
**Subsurface Texture Group:** clayey  
**Surface Fragments ≤3” (% Cover):** 0-25  
**Surface Fragments >3” (%Cover):** 0  
**Subsurface Fragments ≤3” (% Volume):** 5-15  
**Subsurface Fragments >3” (% Volume):** 0

	<u>Minimum</u>	<u>Maximum</u>
<b>Drainage Class</b>	well	well
<b>Permeability Class:</b>	very slow	moderate
<b>Depth to Bedrock (inches):</b>	10	20
<b>Electrical Conductivity (mmhos/cm)*:</b>	0	8
<b>Sodium Absorption Ratio*:</b>	0	15
<b>Soil Reaction (1:1 Water)*:</b>	6.6	9.0
<b>Soil Reaction (0.1M CaCl2)*:</b>	NA	NA
<b>Available Water Capacity (inches)*:</b>	1	2
<b>Calcium Carbonate Equivalent (percent)*:</b>	0	15

\*These attributes represent 0-40 inches in depth or to the first restrictive layer.

## Plant Communities

### Ecological Dynamics of the Site:

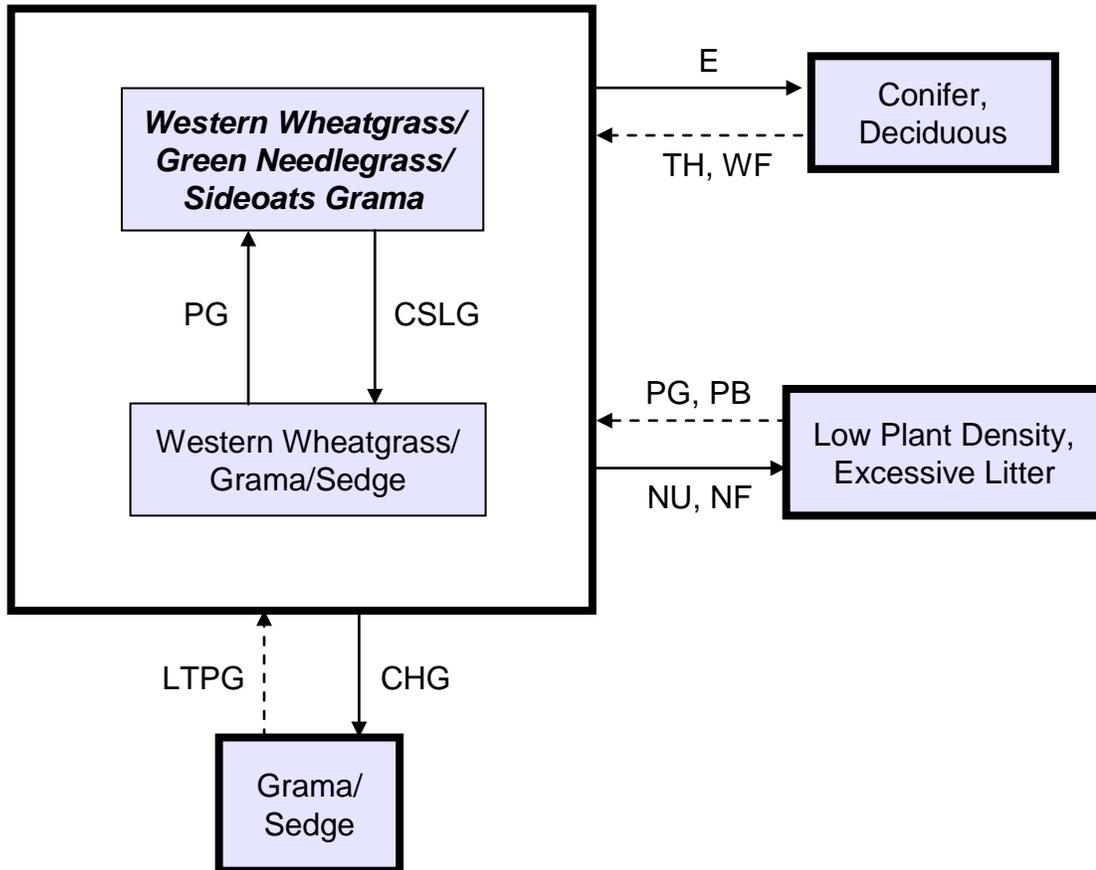
This site developed under Northern Great Plains climatic conditions, light to severe grazing by bison and other large herbivores, sporadic natural or man-caused wildfire (often of light intensities), and other biotic and abiotic factors that typically influence soil/site development. Changes will occur in the plant communities due to short-term weather variations, impacts of native and/or exotic plant and animal species, and management actions. While the following plant community descriptions describe more typical transitions that will occur, severe disturbances, such as periods of well below average precipitation, can cause significant shifts in plant communities and/or species composition.

Continuous season-long grazing (during the typical growing season of May through October) and/or repeated seasonal grazing (e.g., every spring, every summer) without adequate recovery periods following each grazing occurrence, causes this site to depart from the Western Wheatgrass/Green Needlegrass/Sideoats Grama Plant Community. Species such as blue grama will increase. Grasses such as green needlegrass, little bluestem, and western wheatgrass will decrease in frequency and production.

Interpretations are primarily based on the Western Wheatgrass/Green Needlegrass/Sideoats Grama Plant Community. It has been determined by study of rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily grazed to lightly grazed areas, seasonal use pastures, and historical accounts also have been used. Plant communities, states, transitional pathways, and thresholds have been determined through similar studies and experience.

The following diagram illustrates the common plant communities and vegetation states commonly occurring on the site and the transition pathways between communities and states. The ecological processes will be discussed in more detail in the plant community descriptions following the diagram.

### Plant Communities and Transitional Pathways



**CSLG** – Continuous season-long grazing (grazing a unit for an entire growing season); **CHG** – Continuous heavy grazing (heavy levels of grazing of a unit during most or all of the growing season); **E** – Encroachment; **LTPG** – Long-term prescribed grazing; **NU, NF** – Extended period of non-use & no fire; **PB** – Prescribed burning; **PG** – Prescribed grazing (planned, controlled harvest of vegetation with grazing or browsing animals – see FOTG, Section IV, 528).

Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SCIENTIFIC NAME	SYMBOL	Western Wheatgrass/Green Needlegrass/Sideoats Grama		
			Group	lbs./acre	% Comp
<b>GRASSES &amp; GRASS-LIKES</b>				1425 - 1710	75 - 90
<b>WHEATGRASS</b>			1	380 - 665	20 - 35
western wheatgrass	Pascopyrum smithii	PASM	1	380 - 665	20 - 35
slender wheatgrass	Elymus trachycaulus	ELTR7	1	0 - 190	0 - 10
<b>NEEDLEGRASS</b>			2	190 - 475	10 - 25
green needlegrass	Nassella viridula	NAV14	2	190 - 475	10 - 25
porcupine grass	Hesperostipa spartea	HESP11	2	0 - 190	0 - 10
needleandthread	Hesperostipa comata ssp. comata	HECOC8	2	0 - 95	0 - 5
<b>TALL/MID WARM-SEASON</b>			3	190 - 475	10 - 25
sideoats grama	Bouteloua curtipendula	BOCU	3	95 - 475	5 - 25
big bluestem	Andropogon gerardii	ANGE	3	0 - 152	0 - 8
little bluestem	Schizachyrium scoparium	SCSC	3	0 - 95	0 - 5
<b>SHORT WARM-SEASON</b>			4	38 - 190	2 - 10
blue grama	Bouteloua gracilis	BOGR2	4	38 - 190	2 - 10
buffalograss	Bouteloua dactyloides	BODA2	4	38 - 190	2 - 10
threeawn	Aristida spp.	ARIST	4	0 - 57	0 - 3
<b>OTHER NATIVE GRASSES</b>			5	38 - 152	2 - 8
prairie junegrass	Koeleria macrantha	KOMA	5	19 - 57	1 - 3
prairie sandreed	Calamovilfa longifolia	CALO	5	0 - 57	0 - 3
plains muhly	Muhlenbergia cuspidata	MUCU3	5	0 - 95	0 - 5
dropseed	Sporobolus spp.	SPORO	5	0 - 95	0 - 5
other grasses		2GRAM	5	0 - 95	0 - 5
<b>GRASS-LIKES</b>			6	19 - 95	1 - 5
threadleaf sedge	Carex filifolia	CAFI	6	0 - 95	0 - 5
needleleaf sedge	Carex duriuscula	CADU6	6	0 - 95	0 - 5
sun sedge	Carex inops ssp. heliophila	CAINH2	6	0 - 95	0 - 5
<b>FORBS</b>			8	95 - 190	5 - 10
American vetch	Vicia americana	VIAM	8	0 - 38	0 - 2
biscuitroot	Lomatium spp.	LOMAT	8	0 - 38	0 - 2
catclaw sensitive briar	Mimosa nuttallii	MINU6	8	0 - 57	0 - 3
cudweed sagewort	Artemisia ludoviciana	ARLU	8	0 - 57	0 - 3
dotted gayfeather	Liatris punctata	LIPU	8	0 - 19	0 - 1
false boneset	Brickellia eupatorioides	BREU	8	0 - 38	0 - 2
goldenrod	Solidago spp.	SOLID	8	0 - 57	0 - 3
Indian breadroot	Pediemelum esculentum	PEES	8	0 - 38	0 - 2
milkvetch	Astragalus spp.	ASTRA	8	0 - 38	0 - 2
prairie coneflower	Ratibida columnifera	RACO3	8	0 - 38	0 - 2
purple coneflower	Echinacea angustifolia	ECAN2	8	0 - 57	0 - 3
purple prairie clover	Dalea purpurea	DAPU5	8	0 - 19	0 - 1
scarlet gaura	Gaura coccinea	GACO5	8	0 - 38	0 - 2
scarlet globemallow	Sphaeralcea coccinea	SPCO	8	0 - 38	0 - 2
scurfpea	Psoralegium spp.	PSORA2	8	0 - 57	0 - 3
textile onion	Allium textile	ALTE	8	0 - 19	0 - 1
wavyleaf thistle	Cirsium undulatum	CIUN	8	0 - 38	0 - 2
western yarrow	Achillea millefolium var. occidentalis	ACMIO	8	0 - 38	0 - 2
white prairie aster	Symphyotrichum falcatum	SYFA	8	0 - 38	0 - 2
wild parsley	Musineon divaricatum	MUDI	8	0 - 38	0 - 2
yellow wild buckwheat	Eriogonum flavum var. flavum	ERFLF	8	0 - 19	0 - 1
native forbs		2FN	8	0 - 57	0 - 3
<b>SHRUBS</b>			9	38 - 190	2 - 10
broom snakeweed	Gutierrezia sarothrae	GUSA2	9	0 - 19	0 - 1
fringed sagewort	Artemisia frigida	ARFR4	9	0 - 57	0 - 3
leadplant	Amorpha canescens	AMCA6	9	19 - 76	1 - 4
rose	Rosa spp.	ROSA5	9	19 - 57	1 - 3
skunkbush sumac	Rhus trilobata	RHTR	9	0 - 38	0 - 2
yucca	Yucca glauca	YUGL	9	0 - 57	0 - 3
other shrubs		2SHRUB	9	0 - 38	0 - 2
<b>TREES</b>			10	0 - 38	0 - 2
juniper	Juniperus spp.	JUNIP	10	0 - 38	0 - 2
other trees		2TREE	10	0 - 38	0 - 2

Annual Production lbs./acre		LOW	RV	HIGH
<b>GRASSES &amp; GRASS-LIKES</b>		1075	1625	-2030
<b>FORBS</b>		90	143	-215
<b>SHRUBS</b>		35	114	-215
<b>TREES</b>		0	19	-40
<b>TOTAL</b>		1200	1900	-2500

This list of plants and their relative proportions are based on near normal years. Fluctuations in species composition and relative production may change from year to year dependent upon precipitation or other climatic factors. RV = Representative value.

Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SYMBOL	Western Wheatgrass/Green Needlegrass/Sideoats Grama			Western Wheatgrass/ Grama/Sedge			Low Plant Density, Excessive Litter			Grama/Sedge		
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp
<b>GRASSES &amp; GRASS-LIKES</b>													
<b>WHEATGRASS</b>													
western wheatgrass	PASM	1	380 - 665	20 - 35	1	65 - 260	5 - 20	1	210 - 420	15 - 30	1	9 - 90	1 - 10
slender wheatgrass	ELTR7	1	0 - 190	0 - 10	1	0 - 65	0 - 5	1	0 - 70	0 - 5			
<b>NEEDLEGRASS</b>													
green needlegrass	NAV4	2	190 - 475	10 - 25	2	0 - 130	0 - 10	2	70 - 280	5 - 20	2	0 - 45	0 - 5
porcupine grass	HESP11	2	0 - 190	0 - 10	2	0 - 65	0 - 5	2	0 - 70	0 - 5			
needleandthread	HECOC8	2	0 - 95	0 - 5	2	0 - 65	0 - 5	2	0 - 140	0 - 10	2	0 - 45	0 - 5
<b>TALL/MID WARM-SEASON</b>													
sideoats grama	BOCU	3	95 - 475	5 - 25	3	13 - 130	1 - 10	3	28 - 140	2 - 10	3	0 - 45	0 - 5
big bluestem	ANGE	3	0 - 152	0 - 8				3	0 - 42	0 - 3			
little bluestem	SCSC	3	0 - 95	0 - 5	3	26 - 195	2 - 15	3	0 - 70	0 - 5	3	0 - 27	0 - 3
<b>SHORT WARM-SEASON</b>													
blue grama	BOGR2	4	38 - 190	2 - 10	4	130 - 390	10 - 30	4	14 - 112	1 - 8	4	225 - 450	25 - 50
buffalograss	BODA2	4	38 - 190	2 - 10	4	0 - 130	0 - 10	4	0 - 42	0 - 3	4	0 - 135	0 - 15
threeawn	ARIST	4	0 - 57	0 - 3	4	0 - 104	0 - 8	4	14 - 140	1 - 10	4	9 - 90	1 - 10
<b>OTHER NATIVE GRASSES</b>													
prairie junegrass	KOMA	5	19 - 57	1 - 3	5	13 - 65	1 - 5	5	14 - 42	1 - 3	5	9 - 18	1 - 2
prairie sandreed	CALO	5	0 - 57	0 - 3	5	0 - 26	0 - 2						
plains muhly	MUCU3	5	0 - 95	0 - 5	5	0 - 26	0 - 2	5	0 - 14	0 - 1			
dropseed	SPORO	5	0 - 95	0 - 5	5	0 - 65	0 - 5	5	0 - 56	0 - 4	5	0 - 27	0 - 3
other grasses	2GRAM	5	0 - 95	0 - 5	5	0 - 65	0 - 5	5	0 - 70	0 - 5	5	0 - 27	0 - 3
<b>GRASS-LIKES</b>													
threadleaf sedge	CAFI	6	0 - 95	0 - 5	6	26 - 130	2 - 10	6	14 - 112	1 - 8	6	45 - 135	5 - 15
needleleaf sedge	CADU6	6	0 - 95	0 - 5	6	26 - 130	2 - 10	6	14 - 112	1 - 8	6	45 - 135	5 - 15
sun sedge	CAINH2	6	0 - 95	0 - 5	6	0 - 104	0 - 8	6	0 - 70	0 - 5	6	0 - 27	0 - 3
<b>NON-NATIVE GRASSES</b>													
bluegrass	POA	7			7	0 - 65	0 - 5	7	28 - 210	2 - 15	7	9 - 45	1 - 5
smooth brome	BRIN2	7			7	0 - 65	0 - 5	7	0 - 140	0 - 10	7	0 - 45	0 - 5
cheatgrass	BRTE	7			7	0 - 65	0 - 5	7	28 - 140	2 - 10	7	9 - 45	1 - 5
<b>FORBS</b>													
American vetch	VIAM	8	0 - 38	0 - 2	8	0 - 26	0 - 2	8	0 - 14	0 - 1			
biscuitroot	LOMAT	8	0 - 38	0 - 2	8	0 - 39	0 - 3	8	0 - 28	0 - 2	8	0 - 9	0 - 1
catclaw sensitive briar	MINU6	8	0 - 57	0 - 3	8	0 - 13	0 - 1						
cutweed sawwort	ARLU	8	0 - 57	0 - 3	8	13 - 65	1 - 5	8	14 - 112	1 - 8	8	9 - 45	1 - 5
dotted gayfeather	LIPU	8	0 - 19	0 - 1	8	0 - 26	0 - 2	8	0 - 28	0 - 2	8	0 - 18	0 - 2
false boneset	BREU	8	0 - 38	0 - 2	8	0 - 13	0 - 1						
goldenrod	SOLID	8	0 - 57	0 - 3	8	13 - 52	1 - 4	8	14 - 70	1 - 5	8	9 - 45	1 - 5
Indian breadroot	PEES	8	0 - 38	0 - 2				8	0 - 14	0 - 1			
milkvetch	ASTRA	8	0 - 38	0 - 2	8	0 - 26	0 - 2	8	0 - 14	0 - 1	8	0 - 18	0 - 2
prairie coneflower	RACO3	8	0 - 38	0 - 2	8	0 - 26	0 - 2	8	0 - 28	0 - 2	8	0 - 18	0 - 2
purple coneflower	ECAN2	8	0 - 57	0 - 3	8	0 - 39	0 - 3	8	0 - 28	0 - 2	8	0 - 9	0 - 1
purple prairie clover	DAPU5	8	0 - 19	0 - 1	8	0 - 13	0 - 1	8	0 - 14	0 - 1	8	0 - 9	0 - 1
scarlet gaura	GACO5	8	0 - 38	0 - 2	8	0 - 13	0 - 1	8	0 - 14	0 - 1			
scarlet globemallow	SPCO	8	0 - 38	0 - 2	8	0 - 26	0 - 2	8	0 - 28	0 - 2	8	0 - 18	0 - 2
scurfpea	PSORA2	8	0 - 57	0 - 3	8	13 - 39	1 - 3	8	14 - 56	1 - 4	8	9 - 27	1 - 3
textile onion	ALTE	8	0 - 19	0 - 1	8	0 - 13	0 - 1	8	0 - 14	0 - 1	8	0 - 9	0 - 1
wayleaf thistle	CIJN	8	0 - 38	0 - 2	8	0 - 26	0 - 2	8	0 - 28	0 - 2	8	0 - 27	0 - 3
western yarrow	ACMIO	8	0 - 38	0 - 2	8	0 - 39	0 - 3	8	14 - 42	1 - 3	8	9 - 27	1 - 3
white prairie aster	SYFA	8	0 - 38	0 - 2	8	13 - 39	1 - 3	8	14 - 56	1 - 4	8	9 - 18	1 - 2
wild parsley	MUDI	8	0 - 38	0 - 2	8	0 - 39	0 - 3	8	0 - 28	0 - 2	8	0 - 9	0 - 1
yellow wild buckwheat	ERFLF	8	0 - 19	0 - 1	8	0 - 13	0 - 1				8	0 - 9	0 - 1
native forbs	2FN	8	0 - 57	0 - 3	8	0 - 65	0 - 5	8	0 - 70	0 - 5	8	0 - 36	0 - 4
introduced forbs	2FI				8	0 - 65	0 - 5	8	0 - 112	0 - 8	8	0 - 72	0 - 8
<b>SHRUBS</b>													
broom snakeweed	GUSA2	9	0 - 19	0 - 1	9	13 - 39	1 - 3	9	0 - 42	0 - 3	9	9 - 63	1 - 7
fringed sawwort	ARFR4	9	0 - 57	0 - 3	9	13 - 65	1 - 5	9	14 - 98	1 - 7	9	18 - 90	2 - 10
leadplant	AMCA6	9	19 - 76	1 - 4	9	0 - 13	0 - 1	9	0 - 28	0 - 2			
rose	ROSA5	9	19 - 57	1 - 3	9	13 - 39	1 - 3	9	14 - 42	1 - 3	9	9 - 27	1 - 3
skunkbush sumac	RHTR	9	0 - 38	0 - 2	9	0 - 13	0 - 1	9	0 - 28	0 - 2	9	0 - 9	0 - 1
yucca	YUGL	9	0 - 57	0 - 3	9	0 - 65	0 - 5	9	0 - 42	0 - 3	9	0 - 45	0 - 5
other shrubs	2SHRUB	9	0 - 38	0 - 2	9	0 - 39	0 - 3	9	0 - 42	0 - 3	9	0 - 18	0 - 2
<b>TREES</b>													
juniper	JUNIP	10	0 - 38	0 - 2	10	0 - 26	0 - 2	10	0 - 28	0 - 2	10	0 - 18	0 - 2
other trees	2TREE	10	0 - 38	0 - 2	10	0 - 26	0 - 2	10	0 - 28	0 - 2	10	0 - 18	0 - 2
<b>Annual Production lbs./acre</b>													
		LOW	RV	HIGH	LOW	RV	HIGH	LOW	RV	HIGH	LOW	RV	HIGH
<b>GRASSES &amp; GRASS-LIKES</b>		1075	1625	2070	815	1079	1435	870	1141	1410	520	711	900
<b>FORBS</b>		90	143	195	60	130	200	65	140	215	40	90	140
<b>SHRUBS</b>		35	114	195	25	78	135	65	105	145	40	90	140
<b>TREES</b>		0	19	40	0	13	30	0	14	30	0	9	20
<b>TOTAL</b>		1200	1900	2500	900	1300	1800	1000	1400	1800	600	900	1200

This list of plants and their relative proportions are based on near normal years. Fluctuations in species composition and relative production may change from year to year dependent upon precipitation or other climatic factors. RV = Representative value. Refer to PLANTS database for scientific names and codes: <http://plants.usda.gov>

### Plant Community and Vegetation State Narratives

Following are the narratives for each of the described plant communities. These plant communities may not represent every possibility, but they are the most prevalent and recurring plant communities. The plant composition tables shown above have been developed from the best available knowledge at the time of this revision. As more data is collected, some of these plant communities may be revised or removed, and new ones may be added. None of these plant communities should necessarily be thought of as “Desired Plant Communities (DPC).” According to the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) National Range and Pasture Handbook, DPCs will be determined by the decision-makers and will meet minimum quality criteria established by the NRCS. The main purpose for including any description of a plant community here is to capture the current knowledge and experience at the time of this revision.

### Western Wheatgrass/Green Needlegrass/Sideoats Grama Plant Community

Interpretations are primarily based on the Western Wheatgrass/Green Needlegrass/Sideoats Grama Plant Community (this is also considered to be climax). Potential vegetation is about 80 percent grasses or grass-like plants, 10 percent forbs, and 10 percent shrubs. The major grasses include western wheatgrass, green needlegrass, and sideoats grama. Other grasses and grass-likes occurring on this plant community include needleandthread, little bluestem, blue grama, sedge, and big bluestem. Forbs commonly occurring include goldenrod, purple coneflower, cudweed sagewort, and scurfpea. Shrubs commonly occurring include leadplant, fringed sagewort, yucca, and rose.

This plant community is well adapted to the Northern Great Plains climatic conditions. Individual species can vary greatly in production depending on growing conditions (timing and amount of precipitation and temperature). Community dynamics, nutrient cycle, water cycle, and energy flow are functioning properly. Plant litter is properly distributed with very little movement offsite and natural plant mortality is very low. The diversity in plant species allows for high drought tolerance. Runoff from adjacent sites and moderate or high available water capacity provides a favorable soil-water-plant relationship.

The following growth curve is an estimate of the monthly percentages of the annual growth of the dormant species expected during the normal year.

Growth curve number: SD6302

Growth curve name: Pierre Shale Plains, cool-season dominant, warm-season subdominant.

Growth curve description: Cool-season dominant, warm-season subdominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	10	23	34	15	6	5	4	0	0

Transitions or pathways leading to other plant communities are as follows:

- Encroachment will shift this community to a *Conifer, Deciduous Plant Community*.
- Continuous season-long grazing will convert the plant community to the *Western Wheatgrass/Grama/Sedge Plant Community*. Cool-season green needlegrass and western wheatgrass will decrease in frequency and production, while species such as blue grama, buffalograss, and sedges increase.

### Western Wheatgrass/Grama/Sedge Plant Community

This plant community develops under continuous season-long grazing (grazing the same area for the entire growing season year after year) by large herbivores. The potential vegetation is about 75 percent grasses and grass-likes, 15 percent forbs, and 10 percent shrubs. The major grasses and

grass-likes include western wheatgrass, blue grama, and sedge. Other grasses occurring on this plant community include sideoats grama, little bluestem, threeawn, and needleandthread.

Forbs commonly occurring on this site include goldenrod, cudweed sagewort, prairie coneflower, white prairie aster, and scurfpea. Shrubs commonly found include fringed sagewort, rose, yucca, and broom snakeweed.

When compared to the Western Wheatgrass/Green Needlegrass/Sideoats Grama Plant Community, blue grama and sedges have increased. Green needlegrass, little bluestem, and sideoats grama have decreased. Production of cool-season grasses has also been reduced. Nonnative species such as cheatgrass, salsify, thistle, and sweetclover will likely invade this plant community.

This plant community is stable and protected from excessive erosion. The dominant herbaceous species are very adapted to grazing; however, the mid-grass species and the more palatable forbs will decrease in the community through continuous seasonal grazing. This plant community tends to be resilient if disturbance is not long-term.

The following growth curve is an estimate of the monthly percentages of the annual growth of the dormant species expected during the normal year.

Growth curve number: SD6302

Growth curve name: Pierre Shale Plains, cool-season dominant, warm-season subdominant.

Growth curve description: Cool-season dominant, warm-season subdominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	10	23	34	15	6	5	4	0	0

Transitional pathways leading to other plant communities are as follows:

- Continuous heavy grazing will shift this plant community to the *Grass/Sedge Plant Community*.
- Nonuse and no fire will convert this plant community to the *Low Plant Density, Excessive Litter Plant Community*.
- Prescribed grazing will move this plant community to the *Western Wheatgrass/Green Needlegrass/Sideoats Grama Plant Community*.

### Low Plant Density, Excessive Litter Plant Community

This plant community develops after extended periods of nonuse by herbivores and exclusion of fire. This plant community can sometimes be found in small patches dispersed throughout the pasture, encircling spot grazed areas, and areas distant from water sources. This is a typical pattern found in properly stocked pastures grazed season-long. Plant litter may accumulate as this plant community first develops. Due to a lack of tiller stimulation and sunlight, native bunchgrasses typically develop dead centers and native rhizomatous grasses are limited to colonies. Standing decadent plants and moderate litter covers shorter understory species (i.e., shortgrasses and sedges), restricting their ability to capture adequate sunlight for photosynthesis. Vigor and diversity of native plants are reduced. Annual and/or biennial forbs, annual grasses, and cryptogams commonly fill interspaces once occupied by desirable species.

Bluegrass, cheatgrass, and sweetclover tend to invade and can sometimes dominate this plant community. Other grasses present include western wheatgrass, green needlegrass, needleandthread, sideoats grama, and sedges with lesser amounts of little bluestem, blue grama, big bluestem, and buffalograss. The common forbs include cudweed sagewort, goldenrod, scurfpea,

yarrow, and white prairie aster. Shrubs occurring on this plant community include fringed sagewort, broom snakeweed, and rose. The combination of both grazing and fire is most effective in moving this plant community towards the Western Wheatgrass/Green Needlegrass/Sideoats Grama Plant Community. Soil erosion is low.

Compared to the Western Wheatgrass/Green Needlegrass/Sideoats Grama Plant Community, infiltration is reduced to the lower root zone. This plant community tends to favor early cool-season plant species. Once this plant community is reached, any of the preferred treatments can readily return the diversity and production of the site.

The following growth curve is an estimate of the monthly percentages of total annual growth of the dominant species expected during an average year:

Growth curve number: SD6301

Growth curve name: Pierre Shale Plains, cool-season dominant.

Growth curve description: Cool-season dominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	4	12	25	36	10	5	4	4	0	0

Transitions or pathways leading to other plant communities are as follows:

- With prescribed grazing, prescribed burning that includes changing season of use and allowing adequate recovery periods and/or prescribed burning will shift this plant community toward the *Western Wheatgrass/Green Needlegrass/Sideoats Grama Plant Community*.

### **Grama/Sedge Plant Community**

This plant community develops under continuous heavy grazing. It is made up of approximately 65-80 percent grasses (primarily shortgrasses and grass-likes), 5-15 percent forbs, and 5-15 percent shrubs. The dominant grasses or grass-likes include blue grama, buffalograss, and sedge. Other grasses may include western wheatgrass, needleandthread, little bluestem, sideoats grama, threeawn, and nonnative bluegrass and cheatgrass. The dominant forbs include scurfpea, goldenrod, cudweed sagewort, and yarrow. The dominant shrubs are fringed sagewort and broom snakeweed.

Compared to the Western Wheatgrass/Green Needlegrass/Sideoats Grama Plant Community, shortgrasses have increased and the cool-season mid-grasses have diminished greatly. Some forbs and cactus have either increased and/or invaded the site. Plant diversity is low. This plant community is very stable. Generally, this plant community will require significant management inputs and time to move it away from this plant community. Onsite soil erosion is low. Infiltration is low and runoff is high. Typically, the runoff is very clean, but offsite areas can be significantly impacted due to the increased runoff.

The following growth curve is an estimate of the monthly percentages of total annual growth of the dominant species expected during an average year:

Growth curve number: SD6304

Growth curve name: Pierre Shale Plains, warm-season dominant, cool-season subdominant.

Growth curve description: Warm-season dominant, cool-season subdominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	7	18	25	25	15	7	1	0	0

Transitions or pathways leading to other plant communities are as follows:

- Long-term prescribed grazing and favorable climatic conditions, which allows for adequate plant recovery periods, will move this plant community towards the *Western Wheatgrass/Grama/Sedge Plant Community*.

## **Ecological Site Interpretations**

### **Animal Community – Wildlife Interpretations**

-- Under development --

**Western Wheatgrass/Green Needlegrass/Sideoats Grama Plant Community:**

**Western Wheatgrass/Grama/Sedge Plant Community:**

**Low Plant Density, Excessive Litter Plant Community:**

**Grama/Sedge Plant Community:**

### Animal Preferences (Quarterly – 1,2,3,4<sup>†</sup>)

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
<b>Grasses &amp; Grass-likes</b>							
big bluestem	U D P D	U D U U	U D P D	U D U U	U D U U	U D P D	U D P D
blue grama	U D P U	D P P D	U D P U	D P P D	D P P D	U D P U	U D P U
buffalograss	U U D U	N U D U	U U D U	N U D U	N U D U	U U D U	U U D U
green needlegrass	U P U D	N P N P	U P U D	N P N P	N P N P	U P U D	U P U D
little bluestem	U D D U	N D N N	U D D U	N D N N	N D N N	U D D U	U D D U
needleandthread	U D U D	N D N U	U D U D	N D N U	N D N U	U D U D	U D U D
needleleaf sedge	U D U D	U P N D	U D U D	U D U D	U D U D	U D U D	U D U D
plains muhly	U U D U	U U D U	U U D U	N N N N	N N N N	U U D U	U U D U
porcupine grass	U P U D	N D N U	U P U D	N D N U	N D N U	U P U D	U P U D
prairie junegrass	U D U D	N D N U	U D U D	N D N U	N D N U	U D U D	U D U D
prairie sandreed	U D D U	U D U U	U D D U	U D U U	U D U U	U D D U	U D D U
sideoats grama	U D P U	U P D U	U D P U	U P D U	U P D U	U D P U	U D P U
slender wheatgrass	U P U U	N D U N	U P U U	N D U N	N D U N	U P U U	U P U U
sun sedge	U D U D	U P N D	U D U D	U D U D	U D U D	U D U D	U D U D
threadleaf sedge	U D U D	U P N D	U D U D	U D U D	U D U D	U D U D	U D U D
threeawn	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
western wheatgrass	U P D U	N D N N	U P D U	N D N N	N D N N	U P D U	U P D U
<b>Forbs</b>							
biscuitroot	U D U U	U D D U	U D U U	U D D U	U D D U	U D U U	U D D U
cudweed sagewort	U U U U	U U D U	U U U U	U U D U	U U D U	U U U U	U U D U
dotted gayfeather	U U D U	U P P U	U U D U	U P P U	U P P U	U U D U	U P P U
false boneset	U U D U	N D U N	U U D U	N D U N	N D U N	U U D U	N D U N
goldenrod	U U D U	N U U N	U U D U	N U U N	N U U N	U U D U	N U U N
hairy goldaster	U U D U	N N N N	U U D U	N N N N	N N N N	U U D U	N N N N
Indian breadroot	U U U U	U D U U	U U U U	U D U U	U D U U	U U U U	U D U U
milkvetch	U U U U	U D U U	U U U U	U D U U	U D U U	U U U U	U D U U
prairie coneflower	U U D U	U P P U	U U D U	U P P U	U P P U	U U D U	U P P U
purple coneflower	U U D U	U P P U	U U D U	U P P U	U P P U	U U D U	U P P U
purple prairie clover	U D P U	U P P U	U D P U	U P P U	U P P U	U D P U	U P P U
pussytoes	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U
scarlet gaura	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
scarlet globemallow	U U D U	U D D U	U U D U	U D D U	U D D U	U U D U	U D D U
scurfpea	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
wavyleaf thistle	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N
western yarrow	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
white prairie aster	U U D U	N N N N	U U D U	N N N N	N N N N	U U D U	N N N N
wild onion	U D U U	U D D U	U D U U	U D D U	U D D U	U D U U	U D D U
wild parsley	U D U U	U D D U	U D U U	U D D U	U D D U	U D U U	U D D U
yellow wild buckwheat	N N U N	N N U N	N N U N	N N U N	N N U N	N N U N	N N U N
<b>Shrubs</b>							
broom snakeweed	N N N N	U U U U	N N N N	U U U U	U U U U	N N N N	U U U U
dwarf false indigo	U P D U	U P D U	U P D U	U P D U	U P D U	U P D U	U P D U
fringed sagewort	U U U U	U U U U	U U U U	U D D U	U P P D	U U U U	U U U D
leadplant	U P D U	U P D U	U P D U	U P D U	U P D U	U P D U	U P D U
rose	U D D U	U D D U	U D D U	U D D U	U D D U	U D D U	U D D U
skunkbush sumac	D U U D	D U U D	D U U D	D U U D	D U U D	D U U D	D U U D
yucca	D N N D	D U U D	D N N D	D U U D	D U U D	D N N D	D U U D
<b>Trees</b>							
eastern redcedar	U N N U	U N N U	U N N U	D U U D	U N N U	U N N U	U N N U

N = not used; U = undesirable; D = desirable; P = preferred; T = toxic

<sup>†</sup> Quarters: 1 – Jan., Feb., Mar.; 2 – Apr., May, Jun.; 3 – Jul., Aug., Sep.; 4 – Oct., Nov., Dec.

## Animal Community – Grazing Interpretations

The following table lists annual, suggested initial stocking rates with average growing conditions. These are conservative estimates that should be used only as guidelines in the initial stages of conservation planning. Often, the current plant composition does not entirely match any particular plant community (as described in this ecological site description). Because of this, a resource inventory is necessary to document plant composition and production. More accurate carrying capacity estimates should eventually be calculated using the following stocking rate information along with animal preference data and actual stocking records, particularly when grazers other than cattle are involved. With consultation of the land manager, more intensive grazing management may result in improved harvest efficiencies and increased carrying capacity.

Plant Community	Average Annual Production (lbs./acre, air-dry)	Stocking Rate* (AUM/acre)
Western Wheatgrass/Green Needlegrass/Sideoats Grama	1900	0.52
Western Wheatgrass/Grama/Sedge	1300	0.36
Low Plant Density, Excessive Litter Grama/Sedge	1400	0.38
	900	0.25

\*Based on 912 lbs./acre (air-dry weight) per Animal Unit Month (AUM), and on 25 percent harvest efficiency (refer to USDA NRCS, National Range and Pasture Handbook).

Grazing by domestic livestock is one of the major income-producing industries in the area. Rangeland in this area may provide yearlong forage. During the dormant period, the forage for livestock will likely be lacking protein to meet livestock requirements, and added protein will allow ruminants to better utilize the energy stored in grazed plant materials. A forage quality test (either directly or through fecal sampling) should be used to determine the level of supplementation needed.

## Hydrology Functions

Water is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic group D. Infiltration and runoff potential for this site varies from very slow to moderate depending on soil hydrologic group, slope, and ground cover. In many cases, areas with greater than 75 percent ground cover have the greatest potential for high infiltration and lower runoff. An example of an exception would be where shortgrasses form a strong sod and dominate the site. Dominance by blue grama, buffalograss, bluegrass, and/or smooth brome grass will result in reduced infiltration and increased runoff. Areas where ground cover is less than 50 percent have the greatest potential to have reduced infiltration and higher runoff (refer to Section 4, NRCS National Engineering Handbook for runoff quantities and hydrologic curves).

## Recreational Uses

This site provides hunting, hiking, photography, bird watching, and other opportunities. The wide varieties of plants that bloom from spring until fall have an aesthetic value that appeals to visitors.

## Wood Products

Timber harvest of eastern redcedar may occur on localized areas of this site.

## Other Products

Seed harvest of native plant species can provide additional income on this site.

## Supporting Information

### Associated Sites

Clayey (R063AY011SD), Thin Upland (R063AY012SD), Loamy (R063AY010SD), Dense Clay (R063AY018SD)

### Similar Sites

(R063AY011SD) – Clayey [more sideoats; higher production]  
(R063AY024SD) – Shallow Loamy [more green needlegrass; higher production]

### Inventory Data References

Information presented here has been derived from NRCS clipping data and other inventory data. Field observations from range trained personnel were also used. Those involved in developing this site include: April Boltjes, Range Management Specialist (RMS), NRCS; Stan Boltz, RMS, NRCS; Kent Cooley, Soil Scientist, NRCS; Rick Peterson, RMS, NRCS; and L. Michael Stirling, RMS, NRCS.

<u>Data Source</u>	<u>Number of Records</u>	<u>Sample Period</u>	<u>State</u>	<u>County</u>
SCS-RANGE-417	5	1969 – 1986	SD	Dewey, Haakon, Lyman, Mellette

### State Correlation

MLRA 63A lies entirely within SD, so no cross-state correlation has occurred.

### Field Offices/Counties

Dupree, SD	Ziebach	McIntosh, SD	Corson	Pierre, SD	Hughes/Stanley
Faith, SD	Meade	Mound City, SD	Campbell	Selby, SD	Walworth
Gettysburg, SD	Potter	Murdo, SD	Jones	Timber Lake, SD	Dewey
Kadoka, SD	Jackson	Onida, SD	Sully	Wall, SD	East Pennington
Kennebec, SD	Lyman	Philip, SD	Haakon	White River, SD	Mellette

### Relationship to Other Established Classifications

Level IV Ecoregions of the Conterminous United States: 43c – River Breaks and 43f – Subhumid Pierre Shale Plains.

### Other References

High Plains Regional Climate Center, University of Nebraska, 830728 Chase Hall, Lincoln, NE 68583-0728. (<http://www.hprcc.unl.edu/>)

USDA, NRCS. National Water and Climate Center, 101 SW Main, Suite 1600, Portland, OR 97204-3224. (<http://www.wcc.nrcs.usda.gov/>)

USDA, NRCS. National Range and Pasture Handbook, September 1997

USDA, NRCS. National Soil Information System, Information Technology Center, 2150 Centre Avenue, Building A, Fort Collins, CO 80526. (<http://nasis.nrcs.usda.gov>)

USDA, NRCS. 2001. The PLANTS Database, Version 3.1 (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874-4490 USA

USDA, NRCS, Various Published Soil Surveys

### Site Description Approval

\_\_\_\_\_  
SD, State Range Management Specialist

\_\_\_\_\_  
Date