

## United States Department of Agriculture Natural Resources Conservation Service

### Ecological Site Description

Site Type: Rangeland

Site Name: Clayey Terrace

Site ID: R063AY032SD

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



### Physiographic Features

This site occurs on nearly level areas that receive additional water from rare stream flooding events.

Landform: plains, stream terrace, flood plain

Aspect: N/A

	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	1600	2700
Slope (percent):	0	2
Water Table Depth (inches):	42	80
Flooding:		
Frequency:	None	Rare
Duration:	None	Very brief
Ponding:		
Depth (inches):	None	None
Frequency:	None	None
Duration:	None	None
Runoff Class:	Medium	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):**

	<b>Precip. Min.</b>	<b>Precip. Max</b>	<b>Temp. Min.</b>	<b>Temp. Max.</b>
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

<b>Climate Stations</b>		<b>Period</b>	
<b>Station ID</b>	<b>Location or Name</b>	<b>From</b>	<b>To</b>
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.usda.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 moderately well drained and formed in clayey alluvium. The silty clay or clay surface layer is five to eight inches thick. The soils have a slow infiltration rate. Subsoil textures range from silty clay loam to clay and are stratified. This site should show no evidence of rills, wind scoured areas, or pedestalled plants. If present, water flow paths are broken, irregular in appearance, or discontinuous. The soil surface is stable and intact.

These soils are mainly susceptible to water erosion if vegetative cover is inadequate or highly disturbed. A drastic loss of the soil surface layer on this site can result in a shift in species composition and/or production.

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

**Parent Material Kind:** alluvium  
**Parent Material Origin:** shale, calcareous  
**Surface Texture:** silty clay, clay  
**Surface Texture Modifier:** none  
**Subsurface Texture Group:** clayey  
**Surface Fragments ≤3” (% Cover):** 0  
**Surface Fragments >3” (%Cover):** 0  
**Subsurface Fragments ≤3” (% Volume):** 0  
**Subsurface Fragments >3” (% Volume):** 0

	<u>Minimum</u>	<u>Maximum</u>
<b>Drainage Class:</b>	moderately well	moderately well
<b>Permeability Class:</b>	slow	slow
<b>Depth (inches):</b>	80	80
<b>Electrical Conductivity (mmhos/cm)*:</b>	0	2
<b>Sodium Absorption Ratio*:</b>	0	1
<b>Soil Reaction (1:1 Water)*:</b>	7.4	8.4
<b>Soil Reaction (0.1M CaCl<sub>2</sub>)*:</b>	NA	NA
<b>Available Water Capacity (inches)*:</b>	5	6
<b>Calcium Carbonate Equivalent (percent)*:</b>	0	15

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

## Plant Communities

### Ecological Dynamics of the Site:

This site developed under Northern Great Plains climatic conditions, natural influences of large herbivores, occasional fire, 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 between communities that will occur, severe disturbances, such as periods of well below average precipitation, can cause significant shifts in plant communities and/or species composition.

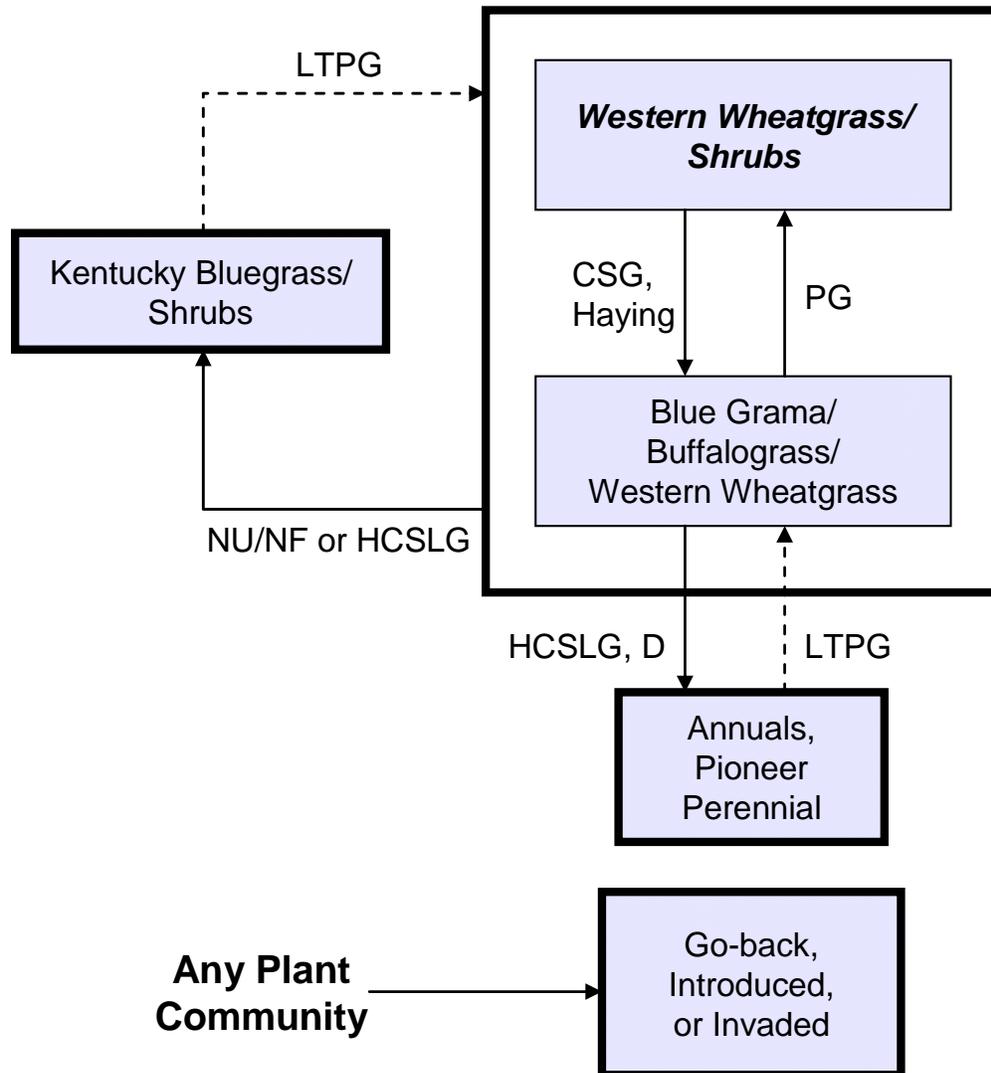
A high percentage of these areas have been tilled in the past, and have been planted to alfalfa for haying or are in a winter wheat/fallow rotation. Also, many of these areas are located in good winter livestock areas and are used as calving/feeding areas. Very few areas exist that have not had severe soil disturbance. Many areas that have not been tilled have been continuously hayed resulting in a mono-culture of western wheatgrass. Continuous seasonal grazing without adequate recovery periods following each grazing occurrence over several years causes this site to depart from the climax species. Species such as blue grama will initially increase. Western wheatgrass, green needlegrass, and sideoats grama will decrease in frequency and production. Extended periods of non-use and/or lack of fire or heavy, continuous season-long grazing will result in a plant community having high litter levels, which favors an increase in Kentucky bluegrass, smooth brome grass, and/or annual brome grass and in time, shrubs and trees such as western snowberry and green ash.

Interpretations are primarily based on the Western Wheatgrass/Shrubs 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 is a diagram that illustrates the common plant communities that can occur on the site and the transition pathways between communities. The ecological processes will be discussed in more detail in the plant community descriptions following the diagram.

### Plant Communities and Transitional Pathways



**CSG** – Continuous seasonal grazing (grazing a unit for an entire portion of a growing season, and the same season every year); **D** – Defoliation; **HCSLG** – Heavy, continuous season-long grazing; **LTPG** – Long-term prescribed grazing; **NU/NF** – Extended period of non-use & no fire; **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/Shrubs		
			Group	lbs./acre	% Comp
<b>GRASSES &amp; GRASS-LIKES</b>				1820 - 2340	70 - 90
<b>WHEATGRASS</b>			1	910 - 1560	35 - 60
western wheatgrass	Pascopyrum smithii	PASM	1	910 - 1560	35 - 60
slender wheatgrass	Elymus trachycaulus	ELTR7	1	52 - 260	2 - 10
thickspike wheatgrass	Elymus lanceolatus ssp. lanceolatus	ELLAL	1	0 - 260	0 - 10
<b>COOL-SEASON BUNCHGRASSES</b>			2	130 - 390	5 - 15
green needlegrass	Nassella viridula	NAV14	2	78 - 390	3 - 15
Canada wildrye	Elymus canadensis	ELCA4	2	52 - 208	2 - 8
needleandthread	Hesperostipa comata ssp. comata	HECOC8	2	0 - 78	0 - 3
<b>WARM-SEASON GRASSES</b>			3	26 - 130	1 - 5
tall dropseed	Sporobolus compositus var. compositus	SPCOC2	3	26 - 130	1 - 5
big bluestem	Andropogon gerardii	ANGE	3	26 - 130	1 - 5
sideoats grama	Bouteloua curtipendula	BOCU	3	0 - 130	0 - 5
<b>SHORT WARM-SEASON GRASSES</b>			4	52 - 260	2 - 10
blue grama	Bouteloua gracilis	BOGR2	4	26 - 208	1 - 8
buffalograss	Bouteloua dactyloides	BODA2	4	26 - 208	1 - 8
inland saltgrass	Distichlis spicata	DISP	4	0 - 52	0 - 2
<b>OTHER NATIVE GRASSES</b>			5	52 - 130	2 - 5
foxtail barley	Hordeum jubatum	HOJU	5	26 - 78	1 - 3
prairie junegrass	Koeleria macrantha	KOMA	5	26 - 52	1 - 2
Scribner panicum	Dichanthelium oligosanthes var. scribnerianum	DIOLS	5	0 - 26	0 - 1
other grasses		2GRAM	5	0 - 130	0 - 5
<b>GRASS-LIKES</b>			6	26 - 130	1 - 5
needleleaf sedge	Carex duriuscula	CADU6	6	26 - 130	1 - 5
other grass-likes		2GL	6	0 - 130	0 - 5
<b>FORBS</b>			8	52 - 208	2 - 8
American vetch	Vicia americana	VIAM	8	26 - 52	1 - 2
cudweed sagewort	Artemisia ludoviciana	ARLU	8	26 - 78	1 - 3
dotted gayfeather	Liatriis punctata	LIPU	8	26 - 52	1 - 2
false boneset	Brickellia eupatorioides	BREU	8	0 - 52	0 - 2
goldenrod	Solidago spp.	SOLID	8	26 - 78	1 - 3
groundsel	Senecio spp.	SENEC	8	0 - 26	0 - 1
Maximilian sunflower	Helianthus maximiliani	HEMA2	8	0 - 52	0 - 2
prairie coneflower	Ratibida columnifera	RACO3	8	26 - 52	1 - 2
purple prairie clover	Dalea purpurea	DAPU5	8	26 - 52	1 - 2
scarlet gaura	Gaura coccinea	GACO5	8	0 - 26	0 - 1
silverleaf scurfpea	Pediomelum argophyllum	PEAR6	8	26 - 52	1 - 2
wavyleaf thistle	Cirsium undulatum	CIUN	8	0 - 26	0 - 1
western ragweed	Ambrosia psilostachya	AMPS	8	0 - 26	0 - 1
western yarrow	Achillea millefolium var. occidentalis	ACMIO	8	0 - 52	0 - 2
white prairie aster	Symphotrichum falcatum	SYFA	8	26 - 52	1 - 2
native forbs		2FN	8	0 - 78	0 - 3
<b>SHRUBS</b>			9	260 - 520	10 - 20
chokecherry	Prunus virginiana	PRVI	9	0 - 130	0 - 5
currant	Ribes spp.	RIBES	9	0 - 78	0 - 3
fourwing saltbush	Atriplex canescens	ATCA2	9	0 - 78	0 - 3
juneberry	Amelanchier alnifolia	AMAL2	9	0 - 78	0 - 3
leadplant	Amorpha canescens	AMCA6	9	26 - 104	1 - 4
rose	Rosa spp.	ROSA5	9	26 - 78	1 - 3
silver buffaloberry	Shepherdia argentea	SHAR	9	0 - 130	0 - 5
silver sagebrush	Artemisia cana	ARCA13	9	0 - 78	0 - 3
snowberry	Symphoricarpos spp.	SYMPH	9	26 - 260	1 - 10
wild plum	Prunus americana	PRAM	9	26 - 208	1 - 8
other shrubs		2SHRUB	9	0 - 208	0 - 8
<b>TREES</b>			10	0 - 52	0 - 2
American elm	Ulmus americana	ULAM	10	0 - 52	0 - 2
boxelder	Acer negundo	ACNE2	10	0 - 52	0 - 2
bur oak	Quercus macrocarpa	QUMA2	10	0 - 52	0 - 2
green ash	Fraxinus pennsylvanica	FRPE	10	0 - 52	0 - 2
hackberry	Celtis occidentalis	CEOC	10	0 - 52	0 - 2
plains cottonwood	Populus deltoides ssp. monilifera	PODEM	10	0 - 52	0 - 2
other trees		2TREE	10	0 - 52	0 - 2

Annual Production lbs./acre	LOW	RV	HIGH
<b>GRASSES &amp; GRASS-LIKES</b>	1725	2054	2285
<b>FORBS</b>	50	130	235
<b>SHRUBS</b>	225	390	625
<b>TREES</b>	0	26	55
<b>TOTAL</b>	2000	2600	3200

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/Shrub			Blue Grama/Western Wheatgrass			Kentucky Bluegrass/Shrub		
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp
<b>GRASSES &amp; GRASS-LIKES</b>		1	2100 - 2520	75 - 90	1	1170 - 1530	65 - 85	1	910 - 1190	65 - 85
<b>WHEATGRASSES</b>		1	560 - 980	20 - 35	1	180 - 450	10 - 25	1	28 - 140	2 - 10
western wheatgrass	PASM	1	560 - 980	20 - 35	1	180 - 450	10 - 25	1	28 - 140	2 - 10
slender wheatgrass	ELTR7	1	0 - 140	0 - 5	1	0 - 36	0 - 2	1	0 - 14	0 - 1
<b>COOL-SEASON BUNCHGRASSES</b>		2	420 - 700	15 - 25	2	90 - 180	5 - 10	2	0 - 70	0 - 5
green needlegrass	NAVI4	2	280 - 560	10 - 20	2	36 - 144	2 - 8	2	0 - 70	0 - 5
needleandthread	HECOC8	2	56 - 280	2 - 10	2	18 - 90	1 - 5	2	0 - 28	0 - 2
porcupine grass	HESP11	2	0 - 140	0 - 5						
Canada wildrye	ELCA4	2	0 - 140	0 - 5						
<b>MID &amp; TALL WARM-SEASON</b>		3	140 - 560	5 - 20	3	36 - 144	2 - 8	3	0 - 42	0 - 3
big bluestem	ANGE	3	56 - 280	2 - 10	3	0 - 54	0 - 3			
prairie sandreed	CALO	3	28 - 140	1 - 5	3	0 - 36	0 - 2			
sidecats grama	BOCU	3	28 - 140	1 - 5	3	0 - 36	0 - 2			
little bluestem	SCSC	3	0 - 140	0 - 5	3	0 - 54	0 - 3			
tall dropseed	SPCOC2	3	0 - 84	0 - 3	3	0 - 90	0 - 5	3	0 - 42	0 - 3
<b>SHORT WARM-SEASON GRASSES</b>		4	28 - 140	1 - 5	4	270 - 540	15 - 30	4	210 - 420	15 - 30
blue grama	BOGR2	4	28 - 140	1 - 5	4	180 - 450	10 - 25	4	210 - 420	15 - 30
buffalograss	BODA2	4	0 - 84	0 - 3	4	18 - 180	1 - 10	4	0 - 98	0 - 7
sand dropseed	SPCR	4	0 - 56	0 - 2	4	18 - 90	1 - 5	4	0 - 112	0 - 8
<b>OTHER NATIVE GRASSES</b>		5	28 - 140	1 - 5	5	18 - 90	1 - 5	5	0 - 70	0 - 5
prairie junegrass	KOMA	5	28 - 84	1 - 3	5	18 - 36	1 - 2	5	0 - 14	0 - 1
inland saltgrass	DISP	5	0 - 56	0 - 2	5	0 - 90	0 - 5	5	0 - 56	0 - 4
other grasses	2GRAM	5	0 - 140	0 - 5	5	0 - 90	0 - 5	5	0 - 70	0 - 5
<b>GRASS-LIKES</b>		6	28 - 196	1 - 7	6	36 - 180	2 - 10	6	14 - 70	1 - 5
sedge	CAREX	6	28 - 196	1 - 7	6	36 - 180	2 - 10	6	14 - 70	1 - 5
other grass-like	ZGL	6	0 - 84	0 - 3	6	0 - 90	0 - 5	6	0 - 70	0 - 5
<b>NON-NATIVE GRASSES</b>		7			7	0 - 180	0 - 10	7	280 - 560	20 - 40
bluegrass	POA				7	0 - 144	0 - 8	7	210 - 490	15 - 35
cheatgrass	BRTE				7	0 - 90	0 - 5	7	14 - 140	1 - 10
smooth bromegrass	BRIN2				7	0 - 90	0 - 5	7	0 - 210	0 - 15
<b>FORBS</b>		8	140 - 280	5 - 10	8	90 - 270	5 - 15	8	70 - 140	5 - 10
American licorice	GLLE3	8	28 - 84	1 - 3	8	0 - 18	0 - 1			
American vetch	VIAM	8	28 - 56	1 - 2						
common mullein	VETH				8	0 - 36	0 - 2	8	0 - 56	0 - 4
cudweed sagewort	ARLU	8	28 - 84	1 - 3	8	18 - 90	1 - 5	8	14 - 70	1 - 5
curlycup gumweed	GRSQ				8	0 - 36	0 - 2	8	0 - 42	0 - 3
dotted gayfeather	LIPU	8	0 - 28	0 - 1	8	0 - 18	0 - 1			
false boneset	BREU	8	0 - 28	0 - 1						
goldenrod	SOLID	8	28 - 84	1 - 3	8	18 - 72	1 - 4	8	14 - 42	1 - 3
green sagewort	ARDR4	8	0 - 56	0 - 2	8	0 - 54	0 - 3	8	0 - 56	0 - 4
heath aster	SYER	8	28 - 56	1 - 2	8	18 - 36	1 - 2	8	14 - 42	1 - 3
maiestail	COCA5				8	0 - 36	0 - 2	8	0 - 56	0 - 4
Maximilian sunflower	HEMA2	8	28 - 84	1 - 3	8	0 - 18	0 - 1			
mint	MENTH	8	0 - 56	0 - 2						
nettle	URTIC	8	0 - 28	0 - 1	8	0 - 36	0 - 2	8	0 - 28	0 - 2
prairie clover	DALEA	8	28 - 56	1 - 2	8	0 - 18	0 - 1			
prairie coneflower	RACO3	8	28 - 56	1 - 2	8	0 - 18	0 - 1			
rockcress	ARABI2	8	0 - 28	0 - 1						
scarlet gaura	GACO5	8	0 - 28	0 - 1						
scurpea	PSORA2	8	28 - 56	1 - 2	8	18 - 54	1 - 3	8	14 - 28	1 - 2
stiff sunflower	HEPA19	8	0 - 28	0 - 1						
wavyleaf thistle	CIUN	8	28 - 56	1 - 2	8	0 - 36	0 - 2			
western ragweed	AMPS	8	0 - 28	0 - 1	8	18 - 36	1 - 2	8	14 - 28	1 - 2
western salsify	TRDU				8	0 - 18	0 - 1	8	14 - 42	1 - 3
western yarrow	ACMIO	8	28 - 56	1 - 2	8	18 - 54	1 - 3	8	14 - 56	1 - 4
wood lily	LIPH	8	0 - 28	0 - 1						
woolly verbena	VEST	8	28 - 56	1 - 2	8	18 - 54	1 - 3	8	14 - 42	1 - 3
native forbs	2FN	8	28 - 140	1 - 5	8	18 - 90	1 - 5	8	14 - 56	1 - 4
introduced forbs	2FI				8	0 - 90	0 - 5	8	0 - 112	0 - 8
<b>SHRUBS</b>		9	280 - 560	10 - 20	9	90 - 270	5 - 15	9	140 - 280	10 - 20
American plum	PRAM	9	0 - 224	0 - 8	9	0 - 36	0 - 2	9	0 - 42	0 - 3
chokecherry	PRVI	9	0 - 140	0 - 5	9	0 - 18	0 - 1			
false indigo	AMFR	9	0 - 28	0 - 1						
leadplant	AMCA6	9	28 - 140	1 - 5	9	0 - 36	0 - 2			
rose	ROSA5	9	28 - 84	1 - 3	9	18 - 54	1 - 3	9	14 - 28	1 - 2
silver buffaloberry	SHAR	9	0 - 224	0 - 8	9	0 - 36	0 - 2	9	0 - 14	0 - 1
silver sagebrush	ARCA13	9	0 - 140	0 - 5	9	0 - 90	0 - 5	9	0 - 140	0 - 10
skunkbush sumac	RHTR	9	0 - 56	0 - 2	9	0 - 18	0 - 1	9	0 - 14	0 - 1
western snowberry	SYOC	9	28 - 280	1 - 10	9	36 - 180	2 - 10	9	70 - 210	5 - 15
other shrubs	2SHRUB	9	0 - 224	0 - 8	9	0 - 90	0 - 5	9	0 - 70	0 - 5
<b>TREES</b>		10	0 - 84	0 - 3	10	0 - 54	0 - 3	10	0 - 42	0 - 3
American elm	ULAM	10	0 - 84	0 - 3	10	0 - 54	0 - 3	10	0 - 42	0 - 3
boxelder	ACNE2	10	0 - 84	0 - 3	10	0 - 54	0 - 3	10	0 - 42	0 - 3
green ash	FRPE	10	0 - 84	0 - 3	10	0 - 54	0 - 3	10	0 - 42	0 - 3
plains cottonwood	PODEM	10	0 - 84	0 - 3	10	0 - 54	0 - 3	10	0 - 42	0 - 3
other trees	2TREE	10	0 - 84	0 - 3	10	0 - 54	0 - 3	10	0 - 42	0 - 3
<b>Annual Production lbs./acre</b>			LOW RV HIGH		LOW RV HIGH		LOW RV HIGH		LOW RV HIGH	
<b>GRASSES &amp; GRASS-LIKES</b>			1635 - 2128 - 2525		1030 - 1413 - 1725		710 - 1064 - 1280			
<b>FORBS</b>			125 - 210 - 320		85 - 180 - 310		65 - 105 - 155			
<b>SHRUBS</b>			240 - 420 - 670		85 - 180 - 310		125 - 210 - 320			
<b>TREES</b>			0 - 42 - 85		0 - 27 - 55		0 - 21 - 45			
<b>TOTAL</b>			2000 - 2800 - 3600		1200 - 1800 - 2400		900 - 1400 - 1800			

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/Shrubs Plant Community

Interpretations are based primarily on the Western Wheatgrass/Green Needlegrass/Shrub Plant Community, which is considered to be climax. The potential vegetation is between 70-90 percent grasses or grass-like plants, 2-8 percent forbs, 10-20 percent shrubs, and 0-2 percent trees. The community is dominated by cool-season grasses. The major grasses include western wheatgrass and green needlegrass. Other prominent grasses and grass-likes include Canada wildrye, blue grama, and buffalograss. Forbs consist of cudweed sagewort, goldenrod, purple prairie clover, silverleaf scurfspea, and white prairie aster. Shrub species found on this site are leadplant, rose, snowberry, and wild plum. Common trees include American elm, boxelder, green ash, and plains cottonwood. Regeneration of trees is not common due to the lack of flooding, lower water table, and high grass cover.

This plant community is productive and diverse. The diversity in plant species allows for high drought tolerance. This is a sustainable plant community in regards to site/soil stability, watershed function, and biologic integrity.

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:

- Continuous seasonal grazing and/or haying will convert the plant community to the *Blue Grama/Buffalograss/Western Wheatgrass Plant Community*.
- Nonuse and/or no fire or heavy, continuous season-long grazing will shift plant community to a *Kentucky Bluegrass/Shrubs Plant Community*.

### Blue Grama/Buffalograss/Western Wheatgrass Plant Community

This plant community can slowly develop from the adverse effects of continuous seasonal grazing without adequate recovery periods between each grazing event during the growing season. Recognition of this plant community will enable the land user to implement key management decisions before a significant ecological threshold is crossed. Blue grama, buffalograss, and western

wheatgrass are the dominant species. Green needlegrass has been reduced, while sedges have increased slightly, along with nonnative grasses.

Forb species include cudweed sagewort, goldenrod, silverleaf scurfpea, and western yarrow. Leadplant has been reduced while western snowberry has increased. Common trees include American elm, boxelder, bur oak, green ash, hackberry, and plains cottonwood. Regeneration of trees is still lacking.

This plant community is relatively stable and less productive than the climax community. Reduction of litter and short plant heights result in higher soil temperatures, poor water infiltration rates, increased runoff and high evapotranspiration rates. This plant community can occur throughout the site, on spot grazed areas, and around water sources where season-long grazing patterns occur. Soil erosion will be minimal due to the sod forming habit of blue grama.

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: SD6303

Growth curve name: Pierre Shale Plains, cool-season/warm-season codominant.

Growth curve description: Cool-season, warm-season codominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	10	20	28	21	10	5	3	0	0

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

- Heavy continuous season-long grazing or defoliation will convert this plant community to the *Annuals, Pioneer Perennial Plant Community*.
- Nonuse and/or no fire or heavy, continuous season-long grazing for extended periods of time will shift this plant community to the *Kentucky Bluegrass/Shrubs Plant Community*.
- Prescribed grazing with proper stocking rates and adequate recovery periods following each grazing event and proper stocking will shift this plant community back to the *Western Wheatgrass/Shrubs Plant Community*.

### **Kentucky Bluegrass/Shrubs Plant Community**

This plant community develops after an extended period of non-use and exclusion of fire or from heavy continuous season-long grazing. Eventually litter levels become high enough to reduce native grass vigor, diversity and density. Kentucky bluegrass dominates this plant community. Other grass and grass-like species include blue grama, buffalograss, foxtail barley, cheatgrass, smooth bromegrass, and needleleaf sedge. Common forbs include cudweed sagewort, goldenrod, western ragweed, and western yarrow. Shrubs such as western snowberry and/or silver sagebrush will increase in density and cover and eventually tree species such as green ash, boxelder, bur oak, green ash, hackberry, plains cottonwood, and American elm will do the same. Tree regeneration is still lacking.

This plant community is resistant to change without prescribed grazing and/or fire. The combination of both grazing and fire is most effective in moving this plant community toward the Western Wheatgrass/Shrubs Plant Community. Soil erosion is low. Runoff is similar to the climax community. Once the advanced stage of this plant community is reached, time and external resources will be needed to see a recovery in the diversity 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:

- Long-term prescribed grazing may convert the plant community back to the climax *Western Wheatgrass/Shrubs Plant Community* or to the associated successional plant community stages assuming an adequate seed/vegetative source is available.

### Annuals, Pioneer Perennial Plant Community

This plant community develops under severe disturbance, heavy continuous season-long grazing, and/or defoliation. This can result from heavy livestock or wildlife concentration, and cropping abandonment (Go-back land). The dominant vegetation includes pioneer annual grasses, forbs, invaders, and early successional biennial and perennial species. Grasses may include sixweeks fescue, smooth brome, annual brome, crested wheatgrass, needleandthread, prairie Junegrass, and western wheatgrass. The dominant forbs may include curlycup gumweed, lambsquarter, salsify, kochia, field bindweed, thistles, western ragweed, and other early successional species. Shrubs that may be present include rose and fringed sagewort. Plant species from adjacent ecological sites may become minor components of this plant community. The community also is susceptible to invasion of other nonnative species due to severe soil disturbances and relatively high percent of bare ground.

This plant community is resistant to change, as long as soil disturbance or severe vegetation defoliation persists, thus holding back secondary plant succession. Soil erosion is potentially high in this vegetation state. Reduced surface cover, low plant density, low plant vigor, loss of root biomass, and soil compaction, all contribute to decreased water infiltration, increased runoff, and accelerated erosion rates.

Significant economic inputs, management, and time would be required to move this plant community toward a higher successional stage and a more productive plant community. Secondary succession is highly variable, depending upon availability and diversity of a viable seed bank of higher successional species within the existing plant community and neighboring plant communities. This plant community can be renovated to improve the production capability, but management changes would be needed to maintain the new plant community.

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:

- Under long-term prescribed grazing, including adequate rest periods, this plant community will move through the successional stages eventually leading to the *Western Wheatgrass/Shrubs Plant Community*. Depending on the slope, aspect, and size, and if adequate perennial plants exist, this change can occur more rapidly.

### **Go-back, Introduced, or Invaded**

This group includes three separate vegetation states that are highly variable in nature. They are derived through three distinct management scenarios and are not related successional. Infiltration, runoff, and soil erosion varies depending on the vegetation present on the site.

The **Go-back Land** state can be reached whenever severe mechanical disturbance occurs (e.g., tilled and abandoned land, either past or present). During the early successional stages, the species that mainly dominate are annual grasses and forbs, later being replaced by both native and introduced perennials. The vegetation on this site varies greatly, sometimes being dominated by threeawn, bluegrass, smooth brome, annual brome, crested wheatgrass, buffalograss, broom snakeweed, sweetclover, and nonnative thistles. Other plants that commonly occur on the site include western wheatgrass, deathcamas, prickly lettuce, maretail, kochia, foxtail, and sunflowers. Bare ground is prevalent due to the loss of organic matter and lower overall soil health.

The **Introduced** state is normally those areas seeded to crested wheatgrass, pubescent wheatgrass, intermediate wheatgrass, alfalfa, or other introduced species. Refer to the associated Forage Suitability Group description for adapted species.

The **Invaded** state includes areas that have been invaded by species such as smooth brome, bluegrass, nonnative thistles, field bindweed, knapweeds, leafy spurge, hoary cress, and other introduced species.

## **Ecological Site Interpretations**

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

-- Under Development --

**Western Wheatgrass/Shrubs Plant Community:**

**Blue Grama/Buffalograss/Western Wheatgrass Plant Community:**

**Kentucky Bluegrass/Shrubs Plant Community:**

**Annuals, Pioneer Perennial Plant Community:**

**Go-back, Introduced, or Invaded 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
Canada wildrye	U D U U	N U N N	U D U U	N U N N	N U N N	U D U U	U D U U
foxtail barley	U D N N	N P N N	U D N N	N P N N	N P N N	U D N N	U D N N
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
inland saltgrass	N U U N	N N N N	N U U N	N N N N	N N N N	N U U N	N U U N
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
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
Scribner panicum	U U D U	N U N N	U U D U	N U N N	N U N N	U U D U	U U 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
tall dropseed	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 N
thickspike wheatgrass	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
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>							
American vetch	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
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
groundsel	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
Maximilian sunflower	U D P U	U D P U	U D P U	U D P U	U D P U	U D P U	U D P 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 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
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
silverleaf 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 ragweed	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
<b>Shrubs</b>							
chokecherry	D T T D	D T T D	D T T D	P U D P	D U U D	D T T D	P U U P
currant	D U U D	D U U D	D U U D	D U U D	U U U U	D U U D	D U U D
fourwing saltbush	P D D P	P D D P	P D D P	P D D P	P D D P	P D D P	P D D P
juneberry	N D P U	N D P U	N D P U	N D P U	N D P U	N D P U	N D P U
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
silver buffaloberry	D U U U	D U U U	D U U U	P U D P	U U U U	D U U U	D U U U
silver sagebrush	D U U D	D U U D	D U U D	P D D P	P P P P	D U U D	D U U D
snowberry	U U U U	U U U U	U U U U	D U D D	U U U U	U U U U	D U U U
wild plum	D U U D	D U U D	D U U D	P U D D	D U U D	D U U D	D U U D
<b>Trees</b>							
American elm	N N N N	N N N N	N N N N	N U D N	N N N N	N N N N	N N N N
boxelder	N N N U	N N U U	N N N U	N N U U	N N U U	N N N U	N N U U
bur oak	T T T T	T T T T	N N N N	N U D U	N N N N	T T T T	N U D U
green ash	N U D U	N D D U	N U D U	N D D U	N U D U	N U D U	N D D U
hackberry	N U D U	N D D U	N U D U	N D D U	N U D U	N U D U	N D D U
plains cottonwood	D U U D	D U U D	D U U D	D U D D	D U U D	D U U D	D U U D

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/Shrubs	2600	0.71
Blue Grama/Buffalograss/Western Wheatgrass	1800	0.49
Kentucky Bluegrass/Shrubs	1400	0.38

\*Based on 912 lbs./acre (air-dry weight) per Animal Unit Month (AUM), and on 30 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 varies from moderately slow to moderate and runoff potential varies from low to moderate depending on soil hydrologic group 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 exception would be where shortgrasses form a dense sod and dominate the site. 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

Wood products are limited mainly to harvest of aged trees for firewood.

## Other Products

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

## Supporting Information

### Associated Sites

(R063AY011SD) – Clayey

(R063AY021SD) – Clayey Overflow

(R063AY022SD) – Loamy Terrace

(R063AY017SD) – Shallow Clay

### Similar Sites

(R063AY011SD) – Clayey [more green needlegrass; lower production]

(R063AY022SD) – Loamy Terrace [less western wheatgrass, more green needlegrass and big bluestem; 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. Ocular estimates of plant composition and production have been collected to develop this site description.

### 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