

# United States Department of Agriculture Natural Resources Conservation Service

## Ecological Site Description

**Site Type:** Rangeland

**Site Name:** Shallow Sandy

**Site ID:** R058DY028SD

**Major Land Resource Area (MLRA):** 58D – Northern Rolling High Plains, Eastern Part



### Physiographic Features

This site occurs on moderate to steeply sloping uplands.

**Landform:** ridge

**Aspect:** N/A

	<u>Minimum</u>	<u>Maximum</u>
<b>Elevation (feet):</b>	2,300	4,000
<b>Slope (percent):</b>	6	40
<b>Water Table Depth (inches):</b>	80	80
<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>	Low	Low

### Climatic Features

The climate in this MLRA is typical of the drier portions of the Northern Great Plains where sagebrush steppes to the west yield to grassland to the east. Annual precipitation ranges from 14 to 16 inches. Most of the rainfall occurs as frontal storms early in the growing season. Some high intensity, convective thunderstorms occur in the summer. Precipitation in winter occurs as snow. Temperatures show a wide range between summer and winter and between daily maximums and minimums, due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Outbreaks of cold air from Canada in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Extreme storms may occur during the winter but most severely affect ranch operations during late winter and spring. The normal average annual temperature is about 44°F. January is the coldest month with average temperatures ranging from about 12°F (Marmarth, North Dakota (ND)), to about 20°F (Baker, Montana (MT)). July is the warmest month with temperatures averaging from about 70°F (Marmarth, ND), to about 76°F (Baker, MT). The range of normal average monthly temperatures between the coldest and warmest months is about 55°F. Hourly winds are estimated to average about 11 miles per hour (mph) annually, ranging from about 13 mph during the spring to about 10 mph during the summer. Daytime winds are generally stronger than nighttime and strong storms may bring brief periods of high winds with gusts to more than 50

mph.

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 can continue to early or mid-September. Greenup 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>	110	123
<b>Freeze-free period (days):</b>	130	140
<b>Mean Annual Precipitation (inches):</b>	14	16

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

	Precip. Min.	Precip. Max	Temp. Min.	Temp. Max.
January	0.39	0.46	-0.8	31.0
February	0.34	0.54	5.7	34.4
March	0.73	0.82	15.7	43.8
April	1.23	1.73	29.1	60.4
May	2.29	2.71	39.6	67.7
June	2.79	3.00	49.3	76.7
July	1.91	2.10	54.5	90.7
August	1.35	1.46	50.2	88.2
September	1.16	1.25	40.1	76.5
October	0.85	1.07	28.9	59.5
November	0.43	0.57	15.9	44.6
December	0.31	0.50	6.1	33.7

Climate Stations		Period	
Station ID	Location or Name	From	To
MT0412	Baker	1948	2005
SD1294	Camp Crook	1896	2006
SD3560	Harding 3 SE	1951	2006
ND5575	Marmarth	1950	2006
SD7062	Redig 11 NE	1948	2006

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

**Influencing Water Features**

No significant water features influence this site.

**Representative Soil Features**

The features common to soils in this site are the loamy fine sand or fine sandy loam textured surface layers and slopes of 6 to 40 percent. The soils in this site are excessively drained and formed in residuum weathered from sandstone. The surface layer is three to five inches thick. The texture of the subsurface layers range from loamy fine sand to fine sand. 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 vegetative barriers. The soil surface is stable and intact.

These soils are susceptible to wind and water erosion. The hazard of water erosion increases on slopes greater than about 15 percent. Loss of 50 percent or more of the surface layer of the soils on this site can result in a shift in species composition and/or production.

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

**Parent Material Kind:** residuum  
**Parent Material Origin:** sandstone  
**Surface Texture:** loamy fine sand, fine sandy loam  
**Surface Texture Modifier:** none  
**Subsurface Texture Group:** sandy  
**Surface Fragments ≤3” (% Cover):** 0-5  
**Surface Fragments >3” (%Cover):** 0-5  
**Subsurface Fragments ≤3” (% Volume):** 0-5  
**Subsurface Fragments >3” (% Volume):** 0-5

	<u>Minimum</u>	<u>Maximum</u>
<b>Drainage Class:</b>	excessively	excessively
<b>Permeability Class:</b>	moderately rapid	moderately rapid
<b>Depth to Bedrock (inches):</b>	10	20
<b>Electrical Conductivity (mmhos/cm)*:</b>	0	0
<b>Sodium Absorption Ratio*:</b>	0	0
<b>Soil Reaction (1:1 Water)*:</b>	6.6	8.4
<b>Soil Reaction (0.1M CaCl<sub>2</sub>)*:</b>	NA	NA
<b>Available Water Capacity (inches)*:</b>	1	2
<b>Calcium Carbonate Equivalent (percent)*:</b>	0	10

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

## Plant Communities

### Ecological Dynamics of the Site

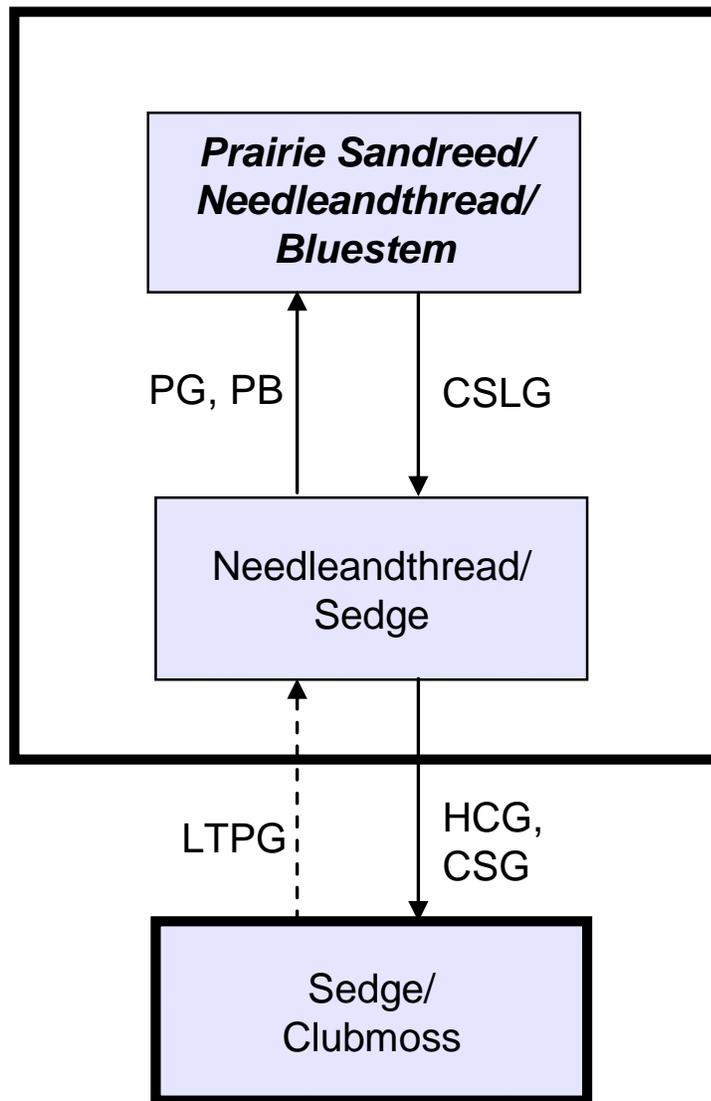
This site developed under Northern Great Plains climatic conditions, natural influences of large herbivores, occasional fire, and other biotic and abiotic factors that typically influence soil/site development. Changes will occur in the plant communities due to short-term weather variations, impacts 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.

As this site deteriorates, species such as threadleaf sedge and fringed sagewort will increase. Mid-grasses such as prairie sandreed and little bluestem will decrease in frequency and production.

The plant community upon which interpretations are primarily based is the Prairie Sandreed/Needleandthread/Bluestem Plant Community. This plant community has been determined by studying 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 are discussed in more detail in the plant community descriptions following the diagram.

## Plant Communities and Transitional Pathways



**CSG** – Continuous seasonal grazing; **CSLG** – Continuous season-long grazing; **HCG** – Heavy continuous grazing; **LTPG** – Long-term prescribed grazing; **PB** – Prescribed burning; **PG** – Prescribed grazing.

Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SCIENTIFIC NAME	SYMBOL	Prairie Sandreed/Needleandthread/ Bluestem			
			Group	lbs./acre	% Comp	
<b>GRASSES &amp; GRASS-LIKES</b>				1120 - 1260	80 - 90	
<b>TALL WARM-SEASON GRASSES</b>			1	280 - 490	20 - 35	
prairie sandreed	Calamovilfa longifolia	CALO	1	210 - 420	15 - 30	
sand bluestem	Andropogon hallii	ANHA	1	28 - 140	2 - 10	
big bluestem	Andropogon gerardii	ANGE	1	0 - 70	0 - 5	
<b>COOL-SEASON BUNCHGRASSES</b>			2	140 - 280	10 - 20	
needleandthread	Hesperostipa comata ssp. comata	HECOC8	2	140 - 280	10 - 20	
green needlegrass	Nassella viridula	NAVI4	2	0 - 70	0 - 5	
bluebunch wheatgrass	Pseudoroegneria spicata	PSSP6	2	0 - 70	0 - 5	
<b>WARM-SEASON GRASSES</b>			3	70 - 280	5 - 20	
little bluestem	Schizachyrium scoparium	SCSC	3	70 - 210	5 - 15	
plains muhly	Muhlenbergia cuspidata	MUCU3	3	14 - 140	1 - 10	
sideoats grama	Bouteloua curtipendula	BOCU	3	0 - 70	0 - 5	
other perennial grasses		2GP	3	0 - 70	0 - 5	
<b>SHORT WARM-SEASON GRASSES</b>			4	28 - 112	2 - 8	
blue grama	Bouteloua gracilis	BOGR2	4	14 - 70	1 - 5	
hairy grama	Bouteloua hirsuta	BOHI2	4	14 - 70	1 - 5	
sand dropseed	Sporobolus cryptandrus	SPCR	4	14 - 70	1 - 5	
red threeawn	Aristida purpurea var. longiseta	ARPUL	4	0 - 42	0 - 3	
<b>COOL-SEASON GRASSES</b>			5	70 - 210	5 - 15	
western wheatgrass	Pascopyrum smithii	PASM	5	28 - 140	2 - 10	
thickspike wheatgrass	Elymus lanceolatus ssp. lanceolatus	ELLAL	5	0 - 70	0 - 5	
prairie junegrass	Koeleria macrantha	KOMA	5	14 - 70	1 - 5	
Scribner panicum	Dichanthelium oligosanthes var. scribnerianum	DIOLS	5	14 - 28	1 - 2	
native grasses		2GN	5	0 - 70	0 - 5	
<b>GRASS-LIKES</b>			6	28 - 140	2 - 10	
threadleaf sedge	Carex filifolia	CAFI	6	28 - 140	2 - 10	
other grass-likes		2GL	6	14 - 70	1 - 5	
<b>FORBS</b>			8	70 - 140	5 - 10	
American pasqueflower	Pulsatilla patens ssp. multifida	PUPAM	8	0 - 14	0 - 1	
American vetch	Vicia americana	VIAM	8	14 - 28	1 - 2	
bracted spiderwort	Tradescantia bracteata	TRBR	8	0 - 14	0 - 1	
cudweed sagewort	Artemisia ludoviciana	ARLU	8	14 - 42	1 - 3	
false gromwell	Onosmodium molle	ONMO	8	0 - 14	0 - 1	
gayfeather	Liatris spp.	LIATR	8	14 - 28	1 - 2	
goldenrod	Solidago spp.	SOLID	8	14 - 28	1 - 2	
green sagewort	Artemisia campestris	ARCA12	8	14 - 42	1 - 3	
hairy goldaster	Heterotheca villosa	HEVI4	8	14 - 28	1 - 2	
Lambert crazyweed	Oxytropis lambertii	OXLA3	8	0 - 14	0 - 1	
milkvetch	Astragalus spp.	ASTRA	8	0 - 14	0 - 1	
narrowleaf gromwell	Lithospermum incisum	LIIN2	8	0 - 14	0 - 1	
penstemon	Penstemon spp.	PENST	8	0 - 14	0 - 1	
prairie coneflower	Ratibida columnifera	RACO3	8	14 - 28	1 - 2	
purple coneflower	Echinacea angustifolia	ECAN2	8	0 - 14	0 - 1	
purple prairie clover	Dalea purpurea	DAPU5	8	14 - 28	1 - 2	
pusstoes	Antennaria spp.	ANTEN	8	0 - 14	0 - 1	
rush skeletonweed	Lygodesmia juncea	LYJU	8	0 - 14	0 - 1	
scarlet gaura	Gaura coccinea	GACO5	8	14 - 28	1 - 2	
scurfpea	Psoralidium spp.	PSORA2	8	14 - 28	1 - 2	
spiny phlox	Phlox hoodii	PHHO	8	0 - 14	0 - 1	
stiff sunflower	Helianthus pauciflorus	HEPA19	8	14 - 42	1 - 3	
wavyleaf thistle	Cirsium undulatum	CIUN	8	0 - 14	0 - 1	
western ragweed	Ambrosia psilostachya	AMPS	8	0 - 14	0 - 1	
western yarrow	Achillea millefolium var. occidentalis	ACMIO	8	0 - 14	0 - 1	
native forbs		2FN	8	14 - 70	1 - 5	
<b>SHRUBS</b>			9	70 - 140	5 - 10	
cactus	Opuntia spp.	OPUNT	9	0 - 14	0 - 1	
fringed sagewort	Artemisia frigida	ARFR4	9	14 - 28	1 - 2	
rose	Rosa spp.	ROSA5	9	14 - 42	1 - 3	
skunkbush sumac	Rhus trilobata	RHTR	9	0 - 42	0 - 3	
western sandcherry	Prunus pumila var. besseyi	PRPUB	9	14 - 28	1 - 2	
yucca	Yucca glauca	YUGL	9	14 - 28	1 - 2	
other shrubs		2SHRUB	9	0 - 70	0 - 5	
<b>Annual Production lbs./acre</b>				LOW	RV	HIGH
<b>GRASSES &amp; GRASS-LIKES</b>				770	1190	1690
<b>FORBS</b>				65	105	155
<b>SHRUBS</b>				65	105	155
<b>TOTAL</b>				900	1400	2000

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	Prairie Sandreed/Needleandthread/ Bluestem			Needleandthread/Sedge			Sedge/Clubmoss		
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp
<b>GRASSES &amp; GRASS-LIKES</b>			1120 - 1260	80 - 90		880 - 990	80 - 90		560 - 680	70 - 85
<b>TALL WARM-SEASON GRASSES</b>		<b>1</b>	<b>280 - 490</b>	<b>20 - 35</b>	<b>1</b>	<b>22 - 165</b>	<b>2 - 15</b>	<b>1</b>	<b>0 - 40</b>	<b>0 - 5</b>
prairie sandreed	CALO	1	210 - 420	15 - 30	1	22 - 165	2 - 15	1	0 - 40	0 - 5
sand bluestem	ANHA	1	28 - 140	2 - 10	1	0 - 44	0 - 4			
big bluestem	ANGE	1	0 - 70	0 - 5	1	0 - 33	0 - 3			
<b>COOL-SEASON BUNCHGRASSES</b>		<b>2</b>	<b>140 - 280</b>	<b>10 - 20</b>	<b>2</b>	<b>165 - 275</b>	<b>15 - 25</b>	<b>2</b>	<b>8 - 64</b>	<b>1 - 8</b>
needleandthread	HECOC8	2	140 - 280	10 - 20	2	165 - 275	15 - 25	2	8 - 64	1 - 8
green needlegrass	NAV14	2	0 - 70	0 - 5	2	0 - 33	0 - 3			
bluebunch wheatgrass	PSSP6	2	0 - 70	0 - 5						
<b>WARM-SEASON GRASSES</b>		<b>3</b>	<b>70 - 280</b>	<b>5 - 20</b>	<b>3</b>	<b>0 - 55</b>	<b>0 - 5</b>	<b>3</b>	<b>0 - 16</b>	<b>0 - 2</b>
little bluestem	SCSC	3	70 - 210	5 - 15	3	0 - 55	0 - 5	3	0 - 16	0 - 2
plains muhly	MUCU3	3	14 - 140	1 - 10	3	0 - 55	0 - 5			
sideoats grama	BOCU	3	0 - 70	0 - 5	3	0 - 33	0 - 3			
other perennial grasses	2GP	3	0 - 70	0 - 5	3	0 - 55	0 - 5			
<b>SHORT WARM-SEASON GRASSES</b>		<b>4</b>	<b>28 - 112</b>	<b>2 - 8</b>	<b>4</b>	<b>110 - 220</b>	<b>10 - 20</b>	<b>4</b>	<b>120 - 200</b>	<b>15 - 25</b>
blue grama	BOGR2	4	14 - 70	1 - 5	4	55 - 165	5 - 15	4	80 - 160	10 - 20
hairy grama	BOH12	4	14 - 70	1 - 5	4	22 - 88	2 - 8	4	16 - 80	2 - 10
sand dropseed	SPCR	4	14 - 70	1 - 5	4	22 - 88	2 - 8	4	8 - 80	1 - 10
red threeawn	ARPUL	4	0 - 42	0 - 3	4	11 - 55	1 - 5	4	8 - 80	1 - 10
<b>COOL-SEASON GRASSES</b>		<b>5</b>	<b>70 - 210</b>	<b>5 - 15</b>	<b>5</b>	<b>55 - 110</b>	<b>5 - 10</b>	<b>5</b>	<b>16 - 64</b>	<b>2 - 8</b>
western wheatgrass	PASM	5	28 - 140	2 - 10	5	11 - 55	1 - 5	5	0 - 8	0 - 1
thickspike wheatgrass	ELLAL	5	0 - 70	0 - 5	5	0 - 33	0 - 3			
prairie junegrass	KOMA	5	14 - 70	1 - 5	5	11 - 55	1 - 5	5	8 - 32	1 - 4
Scribner panicum	DIOLS	5	14 - 28	1 - 2	5	11 - 33	1 - 3	5	8 - 16	1 - 2
native grasses	2GN	5	0 - 70	0 - 5	5	0 - 55	0 - 5	5	0 - 40	0 - 5
<b>GRASS-LIKES</b>		<b>6</b>	<b>28 - 140</b>	<b>2 - 10</b>	<b>6</b>	<b>165 - 275</b>	<b>15 - 25</b>	<b>6</b>	<b>160 - 320</b>	<b>20 - 40</b>
threadleaf sedge	CAFI	6	28 - 140	2 - 10	6	110 - 220	10 - 20	6	120 - 280	15 - 35
other grass-likes	2GL	6	14 - 70	1 - 5	6	22 - 110	2 - 10	6	40 - 120	5 - 15
<b>NON-NATIVE GRASSES</b>		<b>7</b>			<b>7</b>	<b>11 - 55</b>	<b>1 - 5</b>	<b>7</b>	<b>8 - 56</b>	<b>1 - 7</b>
bluegrass	POA				7	0 - 55	0 - 5	7	0 - 40	0 - 5
cheatgrass	BRTE				7	11 - 55	1 - 5	7	8 - 56	1 - 7
<b>FORBS</b>		<b>8</b>	<b>70 - 140</b>	<b>5 - 10</b>	<b>8</b>	<b>55 - 110</b>	<b>5 - 10</b>	<b>8</b>	<b>40 - 120</b>	<b>5 - 15</b>
American pasqueflower	PUPAM	8	0 - 14	0 - 1						
American vetch	VIAM	8	14 - 28	1 - 2	8	0 - 11	0 - 1			
bracted spiderwort	TRBR	8	0 - 14	0 - 1	8	0 - 11	0 - 1			
cutweed sagewort	ARLU	8	14 - 42	1 - 3	8	11 - 55	1 - 5	8	16 - 56	2 - 7
false gromwell	ONMO	8	0 - 14	0 - 1						
gayfeather	LIATR	8	14 - 28	1 - 2	8	0 - 11	0 - 1			
goldenrod	SOLID	8	14 - 28	1 - 2	8	11 - 22	1 - 2	8	8 - 16	1 - 2
green sagewort	ARCA12	8	14 - 42	1 - 3	8	11 - 55	1 - 5	8	8 - 56	1 - 7
hairy goldaster	HEV14	8	14 - 28	1 - 2	8	0 - 11	0 - 1			
Lambert crazyweed	OXLA3	8	0 - 14	0 - 1	8	0 - 11	0 - 1			
milkvetch	ASTRA	8	0 - 14	0 - 1	8	0 - 11	0 - 1	8	0 - 8	0 - 1
narrowleaf gromwell	LIIN2	8	0 - 14	0 - 1						
penstemon	PENST	8	0 - 14	0 - 1						
prairie coneflower	RACO3	8	14 - 28	1 - 2	8	0 - 11	0 - 1			
purple coneflower	ECAN2	8	0 - 14	0 - 1	8	0 - 11	0 - 1			
purple prairie clover	DAPU5	8	14 - 28	1 - 2	8	0 - 11	0 - 1			
pussytoes	ANTEN	8	0 - 14	0 - 1	8	0 - 11	0 - 1	8	0 - 8	0 - 1
rush skeletonweed	LYJU	8	0 - 14	0 - 1	8	0 - 11	0 - 1	8	0 - 8	0 - 1
scarlet gaura	GACO5	8	14 - 28	1 - 2	8	0 - 11	0 - 1			
scurfpea	PSORA2	8	14 - 28	1 - 2	8	11 - 33	1 - 3	8	8 - 40	1 - 5
spiny phlox	PHHO	8	0 - 14	0 - 1	8	0 - 11	0 - 1	8	0 - 8	0 - 1
stiff sunflower	HEPA19	8	14 - 42	1 - 3	8	0 - 11	0 - 1			
wavyleaf thistle	CIUN	8	0 - 14	0 - 1	8	0 - 11	0 - 1			
western ragweed	AMPS	8	0 - 14	0 - 1	8	11 - 22	1 - 2	8	8 - 24	1 - 3
western yarrow	ACMIO	8	0 - 14	0 - 1	8	0 - 22	0 - 2	8	0 - 24	0 - 3
native forbs	2FN	8	14 - 70	1 - 5	8	11 - 55	1 - 5	8	8 - 40	1 - 5
introduced forbs	2FI				8	0 - 55	0 - 5	8	8 - 56	1 - 7
<b>SHRUBS</b>		<b>9</b>	<b>70 - 140</b>	<b>5 - 10</b>	<b>9</b>	<b>55 - 110</b>	<b>5 - 10</b>	<b>9</b>	<b>40 - 120</b>	<b>5 - 15</b>
cactus	OPUNT	9	0 - 14	0 - 1	9	0 - 22	0 - 2	9	8 - 32	1 - 4
fringed sagewort	ARFR4	9	14 - 28	1 - 2	9	11 - 55	1 - 5	9	16 - 80	2 - 10
rose	ROSA5	9	14 - 42	1 - 3	9	11 - 22	1 - 2	9	0 - 8	0 - 1
skunkbush sumac	RHTR	9	0 - 42	0 - 3	9	0 - 22	0 - 2			
western sandcherry	PRPUB	9	14 - 28	1 - 2	9	0 - 11	0 - 1			
yucca	YUGL	9	14 - 28	1 - 2	9	11 - 44	1 - 4	9	8 - 64	1 - 8
other shrubs	2SHRUB	9	0 - 70	0 - 5	9	0 - 55	0 - 5	9	0 - 24	0 - 3
<b>CRYPTOGAMS</b>		<b>10</b>			<b>10</b>	<b>0 - 33</b>	<b>0 - 3</b>	<b>10</b>	<b>0 - 40</b>	<b>0 - 5</b>
clubmoss	SEDE2				10	0 - 33	0 - 3	10	0 - 40	0 - 5
<b>Annual Production lbs./acre</b>			LOW RV HIGH		LOW RV HIGH		LOW RV HIGH		LOW RV HIGH	
<b>GRASSES &amp; GRASS-LIKES</b>			770 - 1190 - 1690		600 - 935 - 1360		430 - 640 - 1040			
<b>FORBS</b>			65 - 105 - 155		50 - 83 - 120		35 - 80 - 130			
<b>SHRUBS</b>			65 - 105 - 155		50 - 83 - 120		35 - 80 - 130			
<b>CRYPTOGAMS</b>			0 - 2 - 5		0 - 2 - 5		0 - 3 - 10			
<b>TOTAL</b>			900 - 1400 - 2000		700 - 1100 - 1600		500 - 800 - 1300			

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 repeatable plant communities. The plant composition tables shown above have been developed from the best available knowledge at the time of this revision. As more information is collected, some of these plant community descriptions may be revised or removed, and new ones 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.

### Prairie Sandreed/Needleandthread/Bluestem Plant Community

The plant community upon which interpretations are primarily based is the Prairie Sandreed/Needleandthread/Bluestem Plant Community. This is also considered climax. Potential vegetation is about 80 to 90 percent grasses or grass-like plants, 5 to 10 percent forbs, and 5 to 10 percent shrubs. The plant community is a mix of warm- and cool-season grasses. Major grasses include prairie sandreed, needleandthread, and little bluestem. Other significant grasses present include sand bluestem, plains muhly, western wheatgrass, and sedge. The plant community is stable and well adapted to the Northern Great Plains climatic conditions. The diversity in plant species allows for high drought resistance. This is a sustainable plant community (site/soil stability, watershed function, and biologic integrity).

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

Growth curve number: SD5804

Growth curve name: Northern Rolling High 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:

- Continuous season-long grazing will convert the plant community to the *Needleandthread/Sedge Plant Community*.

### Needleandthread/Sedge Plant Community

This plant community is the result of continuous season-long grazing. The dominant grass and grass-like species include needleandthread, sedge, prairie sandreed, and blue grama. When compared to the Prairie Sandreed/Needleandthread/Bluestem Plant Community, prairie sandreed, sand bluestem, and little bluestem have decreased. Sedge, needleandthread, and blue grama have increased. This community is well suited to grazing by both domestic livestock and wildlife, during the spring summer and fall. The communities' soil, biotic integrity and watershed are intact, although more than normal runoff may occur due to the sod forming vegetation.

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

Growth curve number: SD5803

Growth curve name: Northern Rolling High 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

Transitional pathways leading to other plant communities are as follows:

- Prescribed grazing or prescribed burning followed by prescribed grazing will return this plant community to the *Prairie Sandreed/Needleandthread/Bluestem Plant Community*.
- Heavy continuous grazing or continuous seasonal grazing (grazing at the same time of year every year with inadequate recovery periods) will convert this plant community to the *Sedge/Clubmoss Plant Community*.

### Sedge/Clubmoss Plant Community

This plant community is the result of heavy continuous grazing or continuous seasonal grazing. Mid- and tall cool-season and warm-season grasses have decreased and sedge and blue grama increase along with clubmoss forming a very stable sod condition. Yucca and fringed sagewort have also increased. Total annual production is significantly reduced.

The soil is generally well protected on this plant community. The biotic integrity is reduced due to low vegetative production. The sod formed by these grasses is resistant to water infiltration. While this sod protects the site, offsite areas are affected by excessive runoff that may cause gully erosion. This sod is resistant to change and may require practices such as long-term prescribed grazing to return to a mid-/tall grass community.

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

Growth curve number: SD5802

Growth curve name: Northern Rolling High 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:

- Long-term prescribed grazing will eventually return this plant community to the *Needleandthread/Sedge/Broom Plant Community*.

## Ecological Site Interpretations

### Animal Community – Wildlife Interpretations

Major Land Resource Area (MLRA) 58D lies within the drier portion of Northern mixed-grass prairie ecosystem where sagebrush steppes to the west yield to grassland steppes to the east. Prior to European settlement, this area consisted of diverse grass/shrub land habitats interspersed with varying densities of depressional, instream wetlands, and woody riparian corridors. These habitats provided critical life cycle components for many of its users. Many species of grassland birds, small mammals, reptiles, amphibians, and herds of roaming bison, elk, and pronghorn were among the inhabitants adapted to this semi-arid region. Roaming herbivores, as well as, several small mammal and insect species, were the primary consumers linking the grassland resources to predators such as the wolf, mountain lion, and grizzly bear, as well as, smaller carnivores such as the coyote, bobcat, fox, and raptors. The black-tailed prairie dog was once abundant; however, the species remains a

keystone species within its range. The black-footed ferret, burrowing owl, ferruginous hawk, mountain plover, and swift fox were associated with prairie dog complexes.

Historically, the Northern mixed-grass prairie was a disturbance-driven ecosystem with fire, herbivory, and climate functioning as the primary disturbance factors either singly or in combination. Following European settlement, livestock grazing, cropland conversion, elimination of fire, energy development and other anthropogenic factors influenced species composition and abundance. Introduced and invasive species further impacted plant and animal communities. Bison were historically a keystone species but have been extirpated as a free-ranging herbivore. The loss of the bison, reduction of prairie dog colonies, and loss of fire as ecological drivers greatly influenced the character of the remaining native plant communities and altered wildlife habitats. Human development has reduced habitat quality for area-sensitive species.

Within MLRA 58D, the Shallow Sandy Ecological Site (ES) provides upland grassland cover with an associated forb and shrub component. It was typically part of an expansive grassland landscape that included combinations of Loamy, Shallow Loamy, Shallow Clayey, Thin Loamy, Claypan, Sands, Sandy, Sandy Claypan, Clayey, and Thin Claypan ESs. This site provided habitat for species requiring unfragmented grassland. Important habitat features include upland nesting habitat for grassland birds, forbs, and insects for brood habitat, and a forage source for small and large herbivores. Many grassland and shrub steppe nesting bird populations are declining. Extirpated species include free-ranging bison, grizzly bear, gray wolf, black-footed ferret, mountain plover, Rocky Mountain locust, and swift fox.

The majority of the Shallow Sandy ES remains intact and provides increasingly important habitat for grassland nesting birds, small rodents, coyotes, and a variety of reptiles, amphibians, and insects. Invasive species such as annual brome grasses and crested wheat have impacted the biological integrity of the site for some grassland birds.

**Prairie Sandreed/Needleandthread/Bluestem and Needleandthread/Sedge:** The predominance of grasses plus high diversity of forbs and shrubs in this community favors grazers and mixed-feeders, such as deer and pronghorn. Insects, such as pollinators, play a large role in maintaining the forb community and provide a forage base for grassland birds and other species. The complex plant structural diversity provides habitat for a wide array of migratory and resident birds. Grasshopper sparrow, chestnut-collared longspur, Sprague's pipit, horned lark, lark bunting, and sharp-tailed grouse are common and benefit from the structure and composition this plant community provides. Diverse prey populations are available for grassland raptors such as ferruginous hawk, Swainson's hawk, golden eagle, and prairie falcon.

The diversity of grasses, forbs, and shrubs provide high nutrition levels for small and large herbivores including voles, mice, thirteen-lined ground squirrel, white-tailed jackrabbit, and deer. The higher stature of this plant community provides thermal, protective, and escape cover for herbivores and grassland birds. Predators utilizing this plant community include coyote, American badger, red fox, and long-tailed weasel. This plant community provides habitat for herptiles such as the spade foot toad, bull snake, and western rattlesnake.

Resulting from continuous season-long grazing, the warm-season grass component has been substantially reduced and a shift to a needleandthread and sedge community occurs. The forb and shrub diversity has not substantially decreased. The shift from the HCPC to the needleandthread/sedge community does not result in a significant change to the wildlife community.

**Sedge/Clubmoss:** Resulting from heavy, continuous grazing or continuous seasonal grazing sedges and clubmoss will dominate. The decrease in diversity of grasses, forbs, and shrubs will result in less seed production or lower quality nutrition for small herbivores including voles, mice, and thirteen-lined ground squirrel. Species such as horned lark, upland sandpiper, and white-tailed jackrabbit will increase due to the loss of the tall grass component.

The short stature of this plant community limits suitable thermal, protective, and escape cover. Prey populations are reduced and are more vulnerable to raptor and mammalian predation. Predators utilizing this plant community include the coyote, American badger, red fox, and long-tailed weasel.

Extreme impairment of the ecological processes impacts offsite aquatic habitats through excessive runoff, nutrient, and sediment loads. Elevated surface temperatures resulting from reduced cover and litter will greatly reduce habitat for most amphibian species, grassland birds, and mammals.

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

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
<b>Grasses and 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
bluebunch wheatgrass	U P D D	P P P P	U P D D	D D D D	D D D D	U P D D	U P D D
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
hairy 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
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
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
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 U D U	U U D U	U D D U	U D D U
red 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
sand 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
sand 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
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
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
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
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 pasqueflower	N N N N	N U N N	N N N N	N U N N	N U N N	N N N N	N N N N
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
bracted spiderwort	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
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
false gromwell	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
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
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
green sagewort	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
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
Lambert crazyweed	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T
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
narrowleaf gromwell	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
penstemon	U U U U	U P P U	U U U U	U P P U	U P P U	U U U U	U P 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 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
rush skeletonweed	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
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
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
spiny phlox	U D U U	U P P U	U D U U	U P P U	U P P U	U D U U	U P P U
stiff 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
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
<b>Shrubs</b>							
cactus	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
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
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
western sandcherry	D P P D	D U U D	D P P D	P U D P	D U U D	D P P D	P U U P
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

**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

As this site improves in condition through proper management (from the more shortgrass dominated plant communities to the interpretive plant community), the advantage for livestock production includes: higher forage production, improved summer forage production, and higher water infiltration. The Sedge/Clubmoss Plant Community is of limited value for livestock production.

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 C. Infiltration and runoff potential for this site varies from moderate to high 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 exception would be where shortgrasses form a strong sod and dominate the site. Normally, 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 opportunities for upland game species. The wide varieties of plants which bloom from spring until fall have an esthetic value that appeals to visitors.

## Wood Products

No appreciable wood products are typically present on this site.

## Other Products

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

## Supporting Information

### Associated Sites

Loamy (R058DY010SD), Sandy (R058DY009SD), Thin Sandy (R058DY026SD)

### Similar Sites

(R058DY010SD) – Loamy [more western wheatgrass; less needleandthread; more production]  
(R058DY009SD) – Sandy [more western wheatgrass; more production]

## Inventory Data References

Information presented here has been derived from NRCS clipping data and other inventory data. Field observations and experience were also used. Those involved in developing this site description include: Ryan Beer, Range Management Specialist (RMS), NRCS; Stan Boltz, RMS, NRCS; Dave Dewald, Wildlife BIO, NRCS; Jody Forman, RMS, NRCS; Dennis Froemke, RMS, NRCS; Cheryl Nielsen, RMS, NRCS; Jeff Printz, RMS, NRCS; Mike Stirling, RMS, NRCS; and Darrell Vanderbusch, Soil Scientist, NRCS.

<u>Data Source</u>	<u>Number of Records</u>	<u>Sample Period</u>	<u>State</u>	<u>County</u>
SCS-RANGE-417				

### State Correlation

This site has been correlated between MT, ND, and South Dakota (SD) in MLRA 58D.

### Field Offices

Baker, MT (Fallon County)	Belle Fourche, SD (Butte County)
Bowman, ND (Bowman and Slope Counties)	Buffalo, SD (Harding County)
Ekalaka, MT (Carter County)	

### Relationship to Other Established Classifications

Level IV Ecoregions of the Conterminous United States: 43e – Sagebrush Steppe.

### 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

\_\_\_\_\_  
MT, State Range Management Specialist

\_\_\_\_\_  
Date

\_\_\_\_\_  
ND, State Range Management Specialist

\_\_\_\_\_  
Date

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

\_\_\_\_\_  
Date