

## United States Department of Agriculture Natural Resources Conservation Service

### Ecological Site Description

**Site Type:** Rangeland

**Site Name:** Loamy

**Site ID:** R061XN010SD

**Major Land Resource Area (MLRA):** 61 – Black Hills Foot Slopes

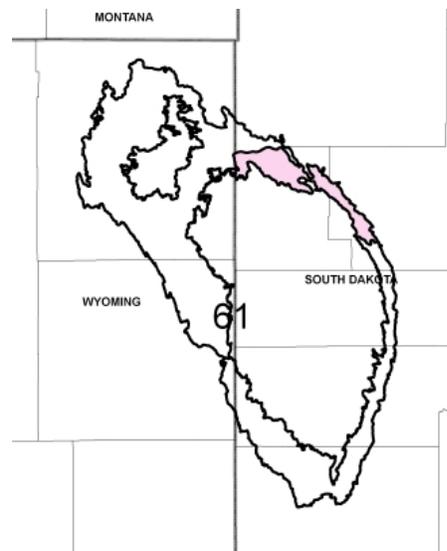
### Physiographic Features

This site occurs on nearly level to moderately sloping uplands.

**Landform:** hill, terrace, fan

**Aspect:** N/A

	<u>Minimum</u>	<u>Maximum</u>
<b>Elevation (feet):</b>	2,900	4,000
<b>Slope (percent):</b>	2	15
<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	High



### 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 steppes to the east. Annual precipitation ranges from 18 to 21 inches per year, with most occurring during the growing season. 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. Cold air outbreaks from Canada in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Chinook winds may occur in winter and bring rapid rises in temperature. Extreme storms may occur during the winter but most severely affect ranch operations during late winter and spring.

The average annual temperature is about 46°F. January is the coldest month with average temperatures ranging from about 20°F (Sundance, Wyoming (WY)), to about 26°F (Fort Meade, South Dakota (SD)). July is the warmest month with temperatures averaging from about 69°F (Sundance, WY), to about 72°F (Fort Meade, SD). The range of average monthly temperatures between the coldest and warmest months is about 48°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 occasional 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 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>
Frost-free period (days):	116	140
Freeze-free period (days):	143	167
Mean Annual Precipitation (inches):	18	21

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

	Precip. Min.	Precip. Max	Temp. Min.	Temp. Max.
January	0.53	0.74	9.3	37.5
February	0.71	0.72	12.6	38.3
March	1.05	1.33	18.9	46.8
April	1.89	2.38	29.0	58.1
May	2.73	4.15	38.9	66.6
June	3.25	3.42	47.7	76.5
July	2.00	2.57	54.6	85.5
August	1.43	1.68	52.8	84.7
September	1.28	1.40	43.0	76.0
October	1.34	1.68	32.6	62.6
November	0.80	0.87	20.9	49.5
December	0.58	0.74	12.8	38.8

Climate Stations		Period	
Station ID	Location or Name	From	To
SD3069	Fort Meade	1902	2008
SD7882	Spearfish	1893	2008
WY8705	Sundance	1915	2005

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 common features of soils in this site are loam to clay loam textured subsurface soils, with slopes ranging from about 2 to 15 percent. The soils in this site are well drained and formed in residuum and alluvium. The loam to silt loam surface layer is four to nine inches thick. The soils have a moderate to moderately slow infiltration rate. This site typically should show slight to 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. Subsurface soil layers are nonrestrictive to water movement and root penetration.

These soils are mainly susceptible to water erosion. The hazard of water erosion increases on slopes greater than about 10 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/>) for specific local soils information.

Parent Material Kind: residuum, alluvium  
Parent Material Origin:  
Surface Texture: loam, silt loam  
Surface Texture Modifier: none  
Subsurface Texture Group: loamy  
Surface Fragments ≤3” (% Cover): 0-4  
Surface Fragments >3” (%Cover): 0  
Subsurface Fragments ≤3” (% Volume): 0-4  
Subsurface Fragments >3” (% Volume): 0

	<u>Minimum</u>	<u>Maximum</u>
Drainage Class:	well	well
Permeability Class:	moderately slow	moderate
Depth (inches):	40	80
Electrical Conductivity (mmhos/cm)*:	0	4
Sodium Absorption Ratio*:	0	2
Soil Reaction (1:1 Water)*:	6.1	9.0
Soil Reaction (0.1M CaCl <sub>2</sub> )*:	NA	NA
Available Water Capacity (inches)*:	6	8
Calcium Carbonate Equivalent (percent)*:	0	20

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

## Plant Communities

### Ecological Dynamics of the Site

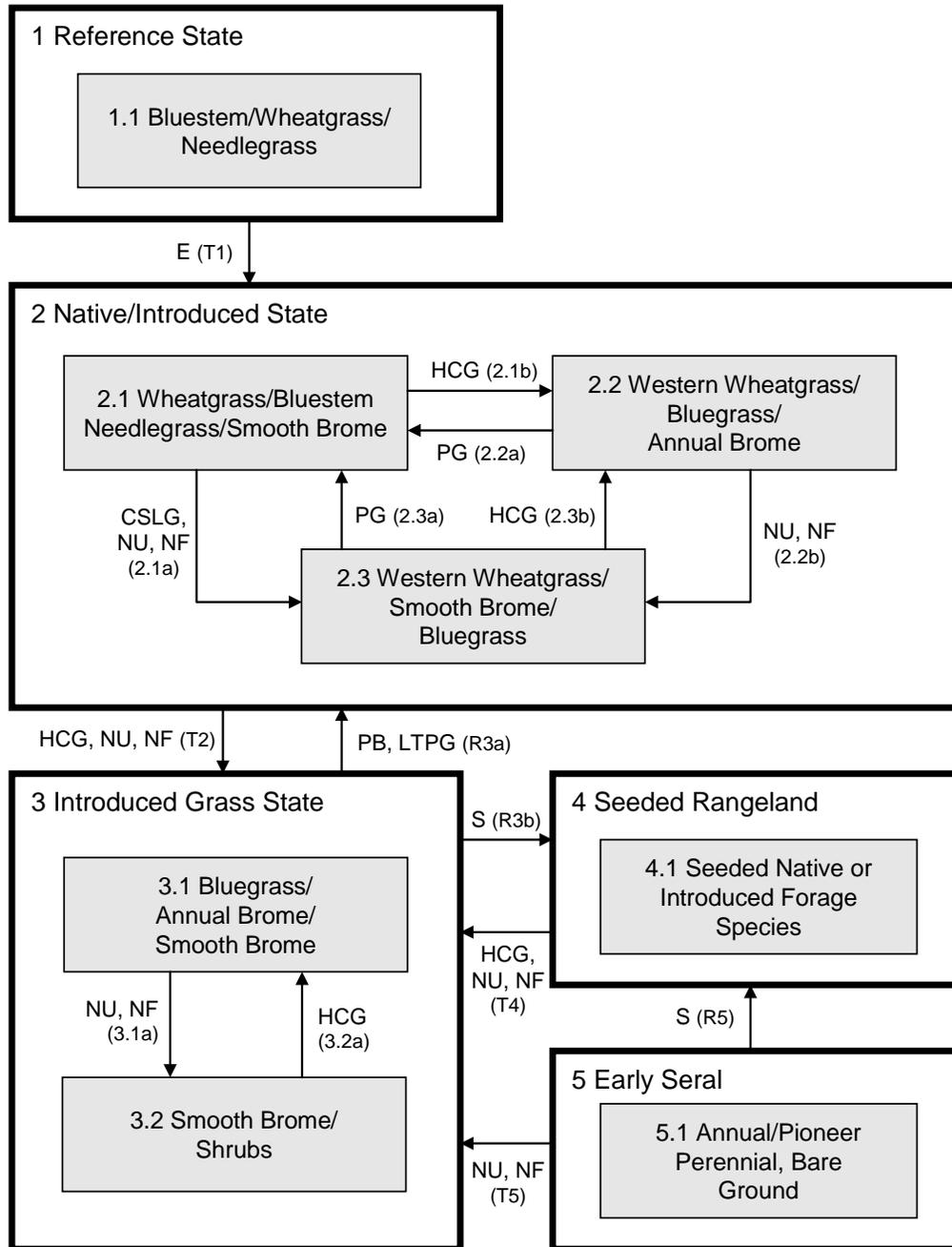
This site developed under Northern Great Plains climatic conditions, light to severe grazing by bison and other large herbivores, sporadic natural or man-caused wildfire (often of light intensities), and other biotic and abiotic factors that typically influence soil/site development. Changes will occur 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 heavy continuous grazing (e.g., every spring and/or every summer at moderate to heavy stocking levels) without adequate recovery periods following grazing events causes departure from the Wheatgrass/Bluestem/Needlegrass/Smooth Brome Plant Community. Bluegrass will increase and eventually develop into a sod. Western wheatgrass will increase initially and then begin to decrease. Needleandthread, green needlegrass, big bluestem, sideoats grama, Indiagrass and little bluestem will decrease in frequency and production. Excessive defoliation can cause threeawn and annuals to increase and dominate the site. Extended periods of nonuse and/or lack of fire will result in excessive litter and a plant community dominated by cool-season grasses such as green needlegrass, western wheatgrass, bluegrass, smooth brome grass, and cheatgrass.

Interpretations are primarily based on the Bluestem/Wheatgrass/Needlegrass Plant Community Phase (1.1). 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 community phases, states, transitional pathways, and thresholds have been determined through similar studies and experience.

The following is a diagram that illustrates the common plant community phases that can occur on the site and the transition pathways between communities. These are the most common plant community phases based on current knowledge and experience, and changes may be made as more data is collected. Narratives following the diagram contain more detail pertaining to the ecological processes.

### Plant Communities and Transitional Pathways



Refer to narrative for details on pathways: **C** – Cropped, abandoned; **CSLG** – Continuous season-long grazing; **E** – Encroachment of introduced species; **HCG** – Heavy continuous grazing; **HD** – Heavy disturbance; **LTPG** – Long-term prescribed grazing; **NU, NF** – Non-use, no fire; **PB** – Prescribed burning; **PG** – Prescribed grazing; **S** – Seeding.

**C, HD (T6)**  
 Any Plant Community

Plant Community Composition and Group Annual Production

			1.1 Bluestem/Wheatgrass/Needlegrass			
COMMON/GROUP NAME	SCIENTIFIC NAME	SYMBOL	Group	lbs./acre	% Comp	
<b>GRASSES &amp; GRASS-LIKES</b>				2250 - 2550	75 - 85	
<b>TALL WARM-SEASON GRASSES</b>			1	300 - 750	10 - 25	
big bluestem	Andropogon gerardii	ANGE	1	300 - 750	10 - 25	
Indiangrass	Sorghastrum nutans	SONU2	1	30 - 150	1 - 5	
switchgrass	Panicum virgatum	PAVI2	1	0 - 90	0 - 3	
<b>WHEATGRASS</b>			2	300 - 750	10 - 25	
western wheatgrass	Pascopyrum smithii	PASM	2	300 - 600	10 - 20	
slender wheatgrass	Elymus trachycaulus	ELTR7	2	30 - 300	1 - 10	
<b>COOL-SEASON BUNCHGRASSES</b>			3	300 - 600	10 - 20	
needleandthread	Hesperostipa comata ssp. comata	HECOC8	3	150 - 450	5 - 15	
green needlegrass	Nassella viridula	NAVI4	3	150 - 450	5 - 15	
Idaho fescue	Festuca idahoensis	FEID	3	0 - 150	0 - 5	
Canada wildrye	Elymus canadensis	ELCA4	3	0 - 60	0 - 2	
<b>MID WARM-SEASON GRASSES</b>			4	300 - 600	10 - 20	
sideoats grama	Bouteloua curtipendula	BOCU	4	150 - 450	5 - 15	
little bluestem	Schizachyrium scoparium	SCSC	4	60 - 300	2 - 10	
plains muhly	Muhlenbergia cuspidata	MUCU3	4	30 - 150	1 - 5	
prairie dropseed	Sporobolus heterolepis	SPHE	4	30 - 150	1 - 5	
<b>GRASS-LIKES</b>			5	60 - 150	2 - 5	
threadleaf sedge	Carex filifolia	CAFI	5	30 - 150	1 - 5	
sun sedge	Carex inops ssp. heliophila	CAINH2	5	30 - 90	1 - 3	
other grass-likes		2GL	5	0 - 150	0 - 5	
<b>OTHER NATIVE GRASSES</b>			6	60 - 150	2 - 5	
blue grama	Bouteloua gracilis	BOGR2	6	30 - 150	1 - 5	
prairie junegrass	Koeleria macrantha	KOMA	6	30 - 90	1 - 3	
Cusick's bluegrass	Poa cusickii	POCU3	6	0 - 90	0 - 3	
other grasses		2GRAM	6	0 - 150	0 - 5	
<b>FORBS</b>			8	150 - 450	5 - 15	
American vetch	Vicia americana	VIAM	8	30 - 60	1 - 2	
cinquefoil	Potentilla spp.	POTEN	8	0 - 30	0 - 1	
cutweed sagewort	Artemisia ludoviciana	ARLU	8	30 - 90	1 - 3	
deathcamas	Zigadenus spp.	ZIGAD	8	0 - 30	0 - 1	
dotted gayfeather	Liatris punctata	LIPU	8	30 - 60	1 - 2	
false boneset	Brickellia eupatorioides	BREU	8	30 - 60	1 - 2	
false gromwell	Onosmodium bejariense var. occidentale	ONBEO	8	30 - 60	1 - 2	
fleabane	Erigeron spp.	ERIGE2	8	0 - 30	0 - 1	
four o'clock	Mirabilis spp.	MIRAB	8	0 - 30	0 - 1	
goldenrod	Solidago spp.	SOLID	8	30 - 60	1 - 2	
Lambert crazyweed	Oxytropis lambertii	OXLA3	8	30 - 60	1 - 2	
penstemon	Penstemon spp.	PENST	8	30 - 60	1 - 2	
prairie clover	Dalea spp.	DALEA	8	30 - 90	1 - 3	
prairie coneflower	Ratibida columnifera	RACO3	8	30 - 60	1 - 2	
purple coneflower	Echinacea angustifolia	ECAN2	8	30 - 60	1 - 2	
scarlet gaura	Gaura coccinea	GACO5	8	30 - 60	1 - 2	
scurfspea	Psoraleidum spp.	PSORA2	8	30 - 90	1 - 3	
spiny phlox	Phlox hoodii	PHHO	8	0 - 30	0 - 1	
western ragweed	Ambrosia psilostachya	AMPS	8	30 - 60	1 - 2	
western wallflower	Erysimum capitatum var. capitatum	ERCAC	8	0 - 30	0 - 1	
western yarrow	Achillea millefolium var. occidentalis	ACMIO	8	30 - 60	1 - 2	
white prairie aster	Symphotrichum falcatum	SYFA	8	30 - 60	1 - 2	
wild bergamot	Monarda fistulosa	MOFI	8	0 - 30	0 - 1	
native forbs		2FN	8	30 - 120	1 - 4	
<b>SHRUBS</b>			9	150 - 300	5 - 10	
big sagebrush	Artemisia tridentata	ARTR2	9	0 - 60	0 - 2	
cactus	Opuntia spp.	OPUNT	9	0 - 30	0 - 1	
fringed sagewort	Artemisia frigida	ARFR4	9	30 - 60	1 - 2	
leadplant	Amorpha canescens	AMCA6	9	30 - 120	1 - 4	
rose	Rosa spp.	ROSA5	9	30 - 60	1 - 2	
silver sagebrush	Artemisia cana	ARCA13	9	0 - 30	0 - 1	
western snowberry	Symphoricarpos occidentalis	SYOC	9	30 - 90	1 - 3	
wild plum	Prunus americana	PRAM	9	0 - 30	0 - 1	
other shrubs		2SHRUB	9	0 - 60	0 - 2	
<b>Annual Production lbs./acre</b>				LOW	RV	HIGH
<b>GRASSES &amp; GRASS-LIKES</b>				1930 -	2475	·2920
<b>FORBS</b>				135 -	300	·535
<b>SHRUBS</b>				135 -	225	·345
<b>TOTAL</b>				2200 -	3000	·3800

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	1.1 Bluestem/Wheatgrass/ Needlegrass			2.1 Wheatgrass/Bluestem/ Needlegrass/Smooth Brome			2.2 Western Wheatgrass/ Bluegrass/Annual Brome			2.3 Western Wheatgrass/ Smooth Brome/Bluegrass		
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp
<b>GRASSES &amp; GRASS-LIKES</b>													
2250 - 2550 75 - 85 2000 - 2250 80 - 90 1520 - 1710 80 - 90 1610 - 1955 70 - 85													
<b>TALL WARM-SEASON GRASSES</b>													
big bluestem	ANGE	1	300 - 750	10 - 25	1	50 - 375	2 - 15	1	0 - 95	0 - 5	1	23 - 230	1 - 10
Indiangrass	SONU2	1	30 - 150	1 - 5	1	0 - 50	0 - 2						
switchgrass	PAV12	1	0 - 90	0 - 3	1	0 - 25	0 - 1				1	0 - 23	0 - 1
<b>WHEATGRASS</b>													
western wheatgrass	PASM	2	300 - 750	10 - 25	2	375 - 750	15 - 30	2	95 - 570	5 - 30	2	230 - 690	10 - 30
slender wheatgrass	ELTR7	2	30 - 300	1 - 10	2	0 - 125	0 - 5	2	0 - 57	0 - 3	2	0 - 115	0 - 5
<b>COOL-SEASON BUNCHGRASSES</b>													
needleandthread	HECOC8	3	300 - 600	10 - 20	3	250 - 625	10 - 25	3	57 - 190	3 - 10	3	115 - 345	5 - 15
green needlegrass	NAV14	3	150 - 450	5 - 15	3	125 - 500	5 - 20	3	38 - 190	2 - 10	3	23 - 184	1 - 8
Idaho fescue	FEID	3	150 - 450	5 - 15	3	125 - 375	5 - 15	3	19 - 152	1 - 8	3	115 - 345	5 - 15
Idaho fescue	FEID	3	0 - 150	0 - 5	3	0 - 125	0 - 5				3	0 - 46	0 - 2
Canada wildrye	ELCA4	3	0 - 60	0 - 2	3	0 - 50	0 - 2				3	0 - 69	0 - 3
<b>MID WARM-SEASON GRASSES</b>													
sideoats grama	BOCU	4	300 - 600	10 - 20	4	125 - 375	5 - 15	4	19 - 95	1 - 5	4	23 - 115	1 - 5
little bluestem	SCSC	4	150 - 450	5 - 15	4	50 - 250	2 - 10	4	19 - 95	1 - 5	4	23 - 69	1 - 3
plains muhly	MUCU3	4	60 - 300	2 - 10	4	50 - 250	2 - 10	4	0 - 95	0 - 5	4	0 - 92	0 - 4
prairie dropseed	SPHE	4	30 - 150	1 - 5	4	0 - 75	0 - 3				4	0 - 23	0 - 1
<b>GRASS-LIKES</b>													
threadleaf sedge	CAFI	5	60 - 150	2 - 5	5	50 - 125	2 - 5	5	95 - 285	5 - 15	5	23 - 115	1 - 5
sun sedge	CAINH2	5	30 - 150	1 - 5	5	25 - 125	1 - 5	5	38 - 190	2 - 10	5	23 - 92	1 - 4
other grass-likes	2GL	5	30 - 90	1 - 3	5	25 - 75	1 - 3	5	19 - 95	1 - 5	5	0 - 46	0 - 2
<b>OTHER NATIVE GRASSES</b>													
blue grama	BOGR2	6	60 - 150	2 - 5	6	50 - 125	2 - 5	6	95 - 285	5 - 15	6	46 - 115	2 - 5
prairie junegrass	KOMA	6	30 - 150	1 - 5	6	25 - 125	1 - 5	6	38 - 190	2 - 10	6	23 - 92	1 - 4
Cusick's bluegrass	POCU3	6	30 - 90	1 - 3	6	25 - 75	1 - 3	6	19 - 76	1 - 4	6	23 - 46	1 - 2
other grasses	2GRAM	6	0 - 90	0 - 3	6	0 - 50	0 - 2	6	0 - 19	0 - 1	6	0 - 23	0 - 1
other grasses	2GRAM	6	0 - 150	0 - 5	6	0 - 125	0 - 5	6	0 - 76	0 - 4	6	0 - 115	0 - 5
<b>NON-NATIVE GRASSES</b>													
annual bromegrass	BROMU	7	125 - 375	5 - 15	7	125 - 375	5 - 15	7	95 - 475	5 - 25	7	230 - 690	10 - 30
bluegrass	POA	7	25 - 75	1 - 3	7	25 - 75	1 - 3	7	38 - 190	2 - 10	7	23 - 184	1 - 8
smooth bromegrass	BRIN2	7	25 - 125	1 - 5	7	25 - 125	1 - 5	7	95 - 285	5 - 15	7	115 - 460	5 - 20
timothy	PHPR3	7	25 - 250	1 - 10	7	25 - 250	1 - 10	7	0 - 95	0 - 5	7	115 - 575	5 - 25
timothy	PHPR3	7	0 - 75	0 - 3	7	0 - 75	0 - 3				7	23 - 184	1 - 8
<b>FORBS</b>													
American vetch	VIAM	8	150 - 450	5 - 15	8	125 - 250	5 - 10	8	95 - 190	5 - 10	8	115 - 345	5 - 15
cinquefoil	POTEN	8	30 - 60	1 - 2	8	25 - 50	1 - 2	8	0 - 19	0 - 1	8	23 - 46	1 - 2
cudweed sawwort	ARLU	8	0 - 30	0 - 1	8	0 - 25	0 - 1	8	0 - 19	0 - 1	8	0 - 23	0 - 1
deathcamas	ZIGAD	8	30 - 90	1 - 3	8	25 - 75	1 - 3	8	19 - 76	1 - 4	8	23 - 69	1 - 3
dotted gayfeather	LIPU	8	0 - 30	0 - 1	8	0 - 25	0 - 1	8	0 - 19	0 - 1	8	0 - 23	0 - 1
false bonaset	BREU	8	30 - 60	1 - 2	8	25 - 50	1 - 2	8	0 - 19	0 - 1	8	0 - 23	0 - 1
false gromwell	ONBEO	8	30 - 60	1 - 2	8	0 - 50	0 - 2	8	0 - 19	0 - 1	8	0 - 23	0 - 1
fleabane	ERIGE2	8	30 - 60	1 - 2	8	0 - 50	0 - 2	8	0 - 19	0 - 1	8	0 - 23	0 - 1
four o'clock	MIRAB	8	0 - 30	0 - 1	8	0 - 25	0 - 1				8	0 - 23	0 - 1
goldenrod	SOLID	8	30 - 60	1 - 2	8	25 - 50	1 - 2	8	19 - 57	1 - 3	8	23 - 69	1 - 3
Lambert crazyweed	OXLA3	8	30 - 60	1 - 2	8	25 - 50	1 - 2	8	0 - 19	0 - 1	8	0 - 23	0 - 1
penstemon	PENST	8	30 - 60	1 - 2	8	0 - 25	0 - 1				8	0 - 23	0 - 1
prairie clover	DALEA	8	30 - 60	1 - 2	8	25 - 50	1 - 2	8	0 - 19	0 - 1	8	23 - 46	1 - 2
prairie coneflower	RACO3	8	30 - 90	1 - 3	8	25 - 50	1 - 2	8	0 - 19	0 - 1	8	23 - 46	1 - 2
purple coneflower	ECAN2	8	30 - 60	1 - 2	8	25 - 50	1 - 2	8	0 - 19	0 - 1	8	0 - 23	0 - 1
scarlet gaura	GACO5	8	30 - 60	1 - 2	8	25 - 50	1 - 2	8	0 - 19	0 - 1	8	0 - 23	0 - 1
scurfpea	PSORA2	8	30 - 60	1 - 2	8	25 - 50	1 - 2	8	0 - 19	0 - 1	8	0 - 23	0 - 1
spiny phlox	PHHO	8	30 - 90	1 - 3	8	25 - 75	1 - 3	8	19 - 57	1 - 3	8	23 - 46	1 - 2
western ragweed	AMPS	8	0 - 30	0 - 1	8	0 - 25	0 - 1	8	0 - 19	0 - 1	8	0 - 23	0 - 1
western wallflower	ERCAC	8	30 - 60	1 - 2	8	25 - 50	1 - 2	8	19 - 57	1 - 3	8	23 - 46	1 - 2
western yarrow	ACMIO	8	0 - 30	0 - 1	8	0 - 25	0 - 1				8	0 - 23	0 - 1
white prairie aster	SYFA	8	30 - 60	1 - 2	8	25 - 50	1 - 2	8	19 - 38	1 - 2	8	23 - 46	1 - 2
wild bergamot	MOFI	8	30 - 60	1 - 2	8	25 - 50	1 - 2	8	19 - 38	1 - 2	8	23 - 69	1 - 3
native forbs	2FN	8	0 - 30	0 - 1	8	0 - 25	0 - 1	8	0 - 19	0 - 1	8	0 - 46	0 - 2
native forbs	2FN	8	30 - 120	1 - 4	8	25 - 75	1 - 3	8	0 - 57	0 - 3	8	23 - 69	1 - 3
introduced forbs	2FI							8	19 - 57	1 - 3	8	23 - 115	1 - 5
<b>SHRUBS</b>													
big sagebrush	ARTR2	9	150 - 300	5 - 10	9	125 - 250	5 - 10	9	95 - 190	5 - 10	9	115 - 345	5 - 15
cactus	OPUNT	9	0 - 60	0 - 2	9	0 - 50	0 - 2	9	0 - 38	0 - 2	9	0 - 92	0 - 4
fringed sawwort	ARFR4	9	0 - 30	0 - 1	9	0 - 25	0 - 1	9	0 - 38	0 - 2	9	0 - 23	0 - 1
leadplant	AMCA6	9	30 - 60	1 - 2	9	25 - 50	1 - 2	9	19 - 95	1 - 5	9	23 - 92	1 - 4
rose	ROSA5	9	30 - 120	1 - 4	9	25 - 75	1 - 3	9	0 - 19	0 - 1	9	0 - 46	0 - 2
silver sagebrush	ARCA13	9	30 - 60	1 - 2	9	25 - 50	1 - 2	9	19 - 38	1 - 2	9	23 - 69	1 - 3
western snowberry	SYOC	9	0 - 30	0 - 1	9	0 - 25	0 - 1	9	0 - 19	0 - 1	9	0 - 69	0 - 3
wild plum	PRAM	9	30 - 90	1 - 3	9	25 - 100	1 - 4	9	19 - 76	1 - 4	9	23 - 230	1 - 10
other shrubs	2SHRUB	9	0 - 30	0 - 1	9	0 - 25	0 - 1				9	0 - 46	0 - 2
other shrubs	2SHRUB	9	0 - 60	0 - 2	9	0 - 50	0 - 2	9	0 - 19	0 - 1	9	0 - 46	0 - 2
<b>Annual Production lbs./acre</b>													
<b>GRASSES &amp; GRASS-LIKES</b>													
1930 - 2475 - 2920 1580 - 2125 - 2630 1220 - 1615 - 2070 1490 - 1840 - 2090													
<b>FORBS</b>													
135 - 300 - 535 110 - 188 - 285 90 - 143 - 215 105 - 230 - 405													
<b>SHRUBS</b>													
135 - 225 - 345 110 - 188 - 285 90 - 143 - 215 105 - 230 - 405													
<b>TOTAL</b>													
2200 - 3000 - 3800 1800 - 2500 - 3200 1400 - 1900 - 2500 1700 - 2300 - 2900													

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

### Reference State (State 1)

This state represents the natural range of variability that dominated the dynamics of this ecological site. This state was codominated by cool- and warm-season grasses. In pre-European times, the primary disturbance mechanisms for this site in the reference condition included frequent fire and grazing by large herding ungulates. Timing of fires and grazing coupled with weather events dictated the dynamics that occurred within the natural range of variability. Taller cool- and warm-season grasses would have declined and a corresponding increase in short statured grass and grass-like species would have occurred. Today, a similar state can be found on areas that are properly managed with grazing and/or prescribed burning and sometimes on areas receiving occasional short periods of rest.

#### 1.1 Bluestem/Wheatgrass/Needlegrass Plant Community Phase

Interpretations are based primarily on the Bluestem/Wheatgrass/Needlegrass Plant Community Phase (this is also considered to be climax). The potential vegetation was about 75 percent grasses or grass-like plants, 15 percent forbs, and 10 percent shrubs. The community was co-dominated by cool- and warm-season grasses. The major grasses included big bluestem, western wheatgrass, needleandthread, green needlegrass, and sideoats grama. Other grass or grass-like species included little bluestem, slender wheatgrass, Indiangrass, switchgrass, Idaho fescue, plains muhly, prairie dropseed, and threadleaf sedge. This plant community was resilient and well adapted to the Northern Great Plains climatic conditions. The diversity in plant species allowed for high drought tolerance. This was 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: SD6103

Growth curve name: Black Hills Foot Slopes, 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 were as follows:

- T1 – Encroachment of nonnative grasses such as Kentucky bluegrass and smooth brome grass, and disruption of natural disturbance regimes (typically as a result of fire suppression following settlement) led this state over a threshold to the *Native/Introduced State (State 2)*.

#### Native/Introduced State (State 2)

This state represents the more common range of variability that exists with higher levels of grazing management but in the absence of periodic fire due to fire suppression. This state is dominated by cool-season grasses, with warm-season grasses being subdominant. It can be found on areas that are properly managed with grazing and/or prescribed burning, and sometimes on areas receiving occasional short periods of rest. Native cool- and warm-season species can decline and a corresponding increase in nonnative species will occur.

#### 2.1 Wheatgrass/Bluestem/Needlegrass/Smooth Brome Plant Community Phase

This plant community phase is similar to the 1.1 Bluestem/Wheatgrass/Needlegrass Plant Community Phase, but it also contains minor amounts of nonnative invasive grass species such as Kentucky bluegrass and smooth brome grass (up to about 15 percent by air-dry weight). The potential

vegetation is about 80 percent grasses or grass-like plants, 10 percent forbs, and 10 percent shrubs. The community is codominated by cool- and warm-season grasses. The major grasses include western wheatgrass, needleandthread, big bluestem, green needlegrass, sideoats grama, and little bluestem. Other grass or grass-like species include slender wheatgrass, Idaho fescue, plains muhly, prairie dropseed, threadleaf sedge, blue grama, and smooth brome. This plant community is resilient and well adapted to the Northern Great Plains climatic conditions. 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. However, the presence of smooth brome and other invasive species will begin to alter the soil biotic community and potentially lead to further invasion of nonnative species.



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: SD6102

Growth curve name: Black Hills Foot Slopes, 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:

- 2.1a – Continuous season-long grazing (stocking levels at light to moderate levels for the entire growing season), or non-use and no fire for extended periods will shift this community to the *2.3 Western Wheatgrass/Smooth Brome/Bluegrass Plant Community Phase*. With continuous

season long grazing, stocking levels are typically light enough that livestock selectively graze preferred species which results in a patch-grazing effect.

- 2.1b – Heavy continuous grazing (stocking levels well above carrying capacity for extended portions of the growing season) or a combination of disturbances for extended periods of time will lead to the *2.2 Western Wheatgrass/Bluegrass/Annual Brome Plant Community Phase*.

## 2.2 Western Wheatgrass/Bluegrass/Annual Brome Plant Community Phase

This plant community is a result of heavy continuous grazing, continuous season-long grazing at moderate to heavy levels or from over utilization during extended drought periods. The potential plant community is made up of approximately 80 percent grass and grass-like species, 10 percent forbs, and 10 percent shrubs. Dominant grass and grass-like species include western wheatgrass, Kentucky and/or Canada bluegrass, needleandthread, blue grama, threadleaf sedge, and annual brome (cheatgrass and/or Japanese brome). Grasses of secondary importance include green needlegrass, sideoats grama, big bluestem, little bluestem, prairie Junegrass, and smooth brome. Forbs commonly found in this plant community include cudweed sagewort, western ragweed, goldenrod, scurfpea, western yarrow, and white prairie aster.

When compared to the Bluestem/Wheatgrass/Needlegrass Plant Community Phase (1.1), blue grama and threadleaf sedge has increased, and bluegrass has invaded and increased. Needleandthread and green needlegrass have decreased and production of mid- and tall warm-season grasses has also been reduced. This plant community is moderately resistant to change. The herbaceous species present are well adapted to grazing; however, species composition can be further altered through long-term overgrazing. If the herbaceous component is intact, it tends to be resilient if the disturbance is not long-term.

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: SD6102

Growth curve name: Black Hills Foot Slopes, 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:

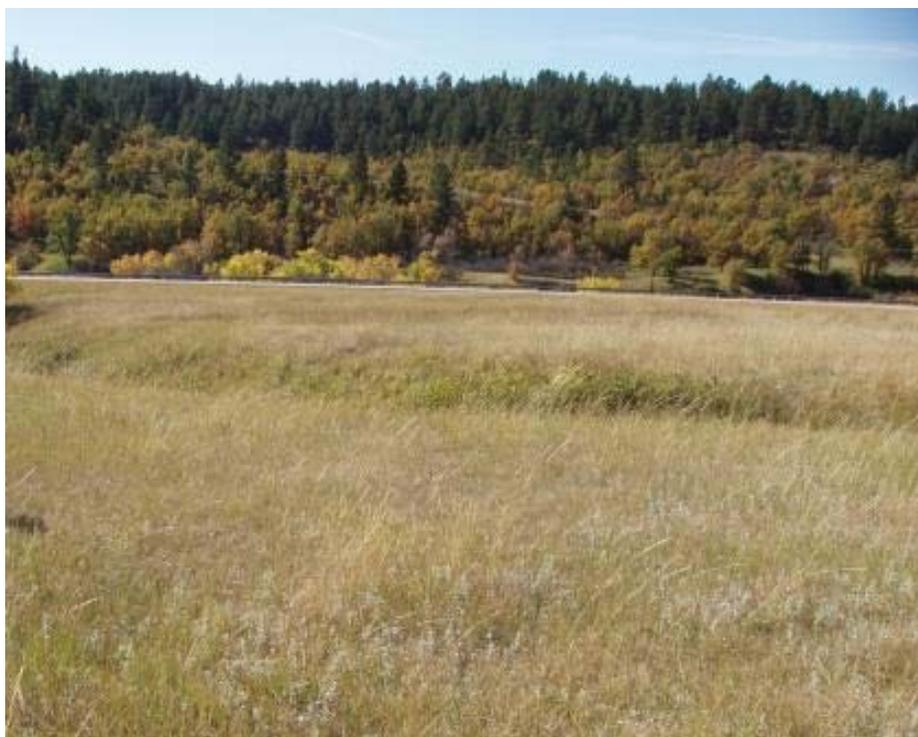
- 2.2b – Non-use and no fire for extended periods of time will result in an increase of the invasive cool-season grasses and result in the *2.3 Western Wheatgrass/Smooth Brome/Bluegrass Plant Community Phase*.
- 2.2a – Prescribed grazing (alternating season of use and providing adequate recovery periods) or periodic light to moderate grazing possibly including periodic rest will convert this plant community to the *2.1 Wheatgrass/Bluestem/Needlegrass/Smooth Brome Plant Community Phase*.

## 2.3 Western Wheatgrass/Smooth Brome/Bluegrass Plant Community Phase

This plant community is a result of a lack of disturbance over prolonged periods of time or from light continuous season-long stocking. In the latter case, this plant community may be intermingled with heavily grazed patches. The potential plant community is made up of approximately 70 percent grass and grass-like species, 15 percent forbs, and 15 percent shrubs. Dominant grasses include western wheatgrass, green needlegrass, smooth brome, and Kentucky and/or Canada bluegrass. Grasses and grass-like species of secondary importance included slender wheatgrass, sideoats

grama, needleandthread, little bluestem, threadleaf sedge, and blue grama. Forbs commonly found in this plant community include cudweed sagewort, goldenrod, white prairie aster, and western yarrow.

When compared to the Bluestem/Wheatgrass/Needlegrass Plant Community Phase (1.1), smooth brome grass, and bluegrass have invaded and increased to sub-dominance. Green needlegrass and sideoats grama decreased, and production of mid and tall warm-season grasses is also reduced. This plant community is moderately resistant to change. The herbaceous species present were well adapted to grazing; however, species composition could be altered through long-term overgrazing. If the herbaceous component was intact, it tended to be resilient if the disturbance was not long-term.



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: SD6101

Growth curve name: Black Hills Foot Slopes, 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:

- 2.3b – Heavy continuous grazing (stocking levels well above carrying capacity for extended portions of the growing season) will convert this plant community to the 2.2 *Western Wheatgrass/Bluegrass/Annual Brome Plant Community Phase*.
- 2.3a – Prescribed grazing (alternating season of use and providing adequate recovery periods) or periodic light to moderate grazing possibly including periodic rest will convert this plant community to the 2.1 *Wheatgrass/Bluestem/Needlegrass/Smooth Brome Plant Community Phase*.

### Transition from Native/Introduced State (State 2) to Introduced Grass State (State 3)

- T2 – Heavy continuous grazing or nonuse and no fire for prolonged periods of time (several years) will lead this plant community phase over a threshold to the *Introduced Grass State (State 3)*.

### Introduced Grass State (State 3)

This state is the result of invasion and dominance of introduced species. This state is characterized by the dominance of Kentucky bluegrass and smooth brome grass and an increasing thatch layer that effectively blocks introduction of other plants into the system. Plant litter accumulation tends to favor the more shade tolerant introduced grass species. The nutrient cycle is also impaired and the result is typically a higher level of nitrogen which also favors the introduced species. Increasing plant litter decreases the amount of sunlight reaching plant crowns thereby shifting competitive advantage to shade tolerant introduced grass species. Studies indicate that soil biological activity is altered and this shift apparently exploits the soil microclimate and encourages growth of the introduced grass species. Once the threshold is crossed, a change in grazing management alone cannot cause a reduction in the invasive grass dominance. Preliminary studies would tend to indicate this threshold may exist when Kentucky bluegrass exceeds 30 percent of the plant community and native grasses represent less than 40 percent of the plant community composition.

Once the state is well established, even drastic events such as high intensity fires driven by high fuel loads of litter and thatch will not result in more than a very short-term reduction of Kentucky bluegrass. These events may reduce the dominance of Kentucky bluegrass, but due to the large amount of rhizomes in the soil, there is no opportunity for the native species to establish and dominate before Kentucky bluegrass rebounds and again dominates the system.

### 3.1 Bluegrass/Annual Brome/Smooth Brome Plant Community Phase

This plant community phase is a result of heavy, continuous seasonal grazing or heavy, continuous season-long grazing. It is characterized by a dominance of Kentucky bluegrass and/or Canada bluegrass. The dominance is at times so complete that other species are difficult to find on the site. A relatively thick duff layer can sometimes accumulate at or above the soil surface. Nutrient cycling is greatly reduced, and native plants have great difficulty becoming established. Infiltration is greatly reduced and runoff is high. Production will be significantly reduced when compared to the interpretive plant community. The period that palatability is high is relatively short, as Kentucky bluegrass matures rapidly. Energy capture is also reduced. Biological activity in the soil is likely reduced significantly in this phase.

Along with bluegrass, other species that will be present at varying amounts can include cheatgrass, Japanese brome grass, smooth brome grass, and other invasive species that can tolerate repeated heavy grazing. Native species such as western wheatgrass and green needlegrass may be present in minor amounts. Production of this plant community will be approximately 1,600 pounds/acre on an air-dry basis, but can be slightly more or considerably less depending on conditions.

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: SD6101

Growth curve name: Black Hills Foot Slopes, 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:

- 3.1a – Nonuse and no fire for extended periods of time (usually three or more years) or possibly prescribed grazing (alternating season of use and providing adequate recovery periods) or periodic light to moderate grazing possibly including periodic rest may convert this plant community to the 3.2 Smooth Brome/Shrubs Plant Community Phase.

### **3.2 Smooth Brome/Shrubs Plant Community Phase**

This plant community phase is a result of extended periods of nonuse and no fire. It is characterized by a dominance of smooth brome and Kentucky bluegrass. The dominance is at times so complete that other species are difficult to find on the site. A thick duff layer also accumulates at or above the soil surface. Nutrient cycling is greatly reduced and native plants have great difficulty becoming established. When dominated by smooth brome, infiltration is moderately reduced and runoff is moderate. Production can be equal to or higher than the interpretive plant community. However, when dominated by Kentucky bluegrass, infiltration is greatly reduced and runoff is high. Production in this case will likely be significantly less. In either case, the period that palatability is high is relatively short as these cool-season species mature rapidly. Energy capture is also reduced.

At times, shrubs, such as snowberry, can also increase significantly in this plant community phase. Other nonnative invasive species that can commonly occur include timothy, intermediate wheatgrass, cheatgrass, and Japanese brome. In the early stages of this phase, production can be quite high, sometimes surpassing the production of the 1.1 Bluestem/Wheatgrass/Needlegrass Plant Community Phase. However, over time with the accumulation of plant litter, vegetative reproduction is reduced, and plant vigor suffers as well. This results in a gradual decrease in production. Production of this plant community will be approximately 2,800 pounds/acre on an air-dry basis but can be more or less depending on conditions.



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: SD6101

Growth curve name: Black Hills Foot Slopes, 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:

- 3.2a – Heavy continuous grazing (stocking levels well above carrying capacity for extended portions of the growing season, typically at the same time of year each year) or heavy continuous season-long grazing will convert this plant community to the *3.1 Bluegrass/Annual Brome/Smooth Brome Plant Community Phase*.

### Restoration Pathways from the Introduced Grass State (State 3) to other States

- R3a – Prescribed burning, followed by long-term prescribed grazing (moderate stocking levels coupled with adequate recovery periods, or other grazing systems such as high-density, low-frequency intended to treat specific species dominance, or periodic light to moderate stocking levels possibly including periodic rest) may lead this plant community phase over a threshold to the *Native/Introduced State (State 2)*. Pest management (i.e., herbicide) may also be needed to suppress cool-season invasive grasses. This will likely take a long period of time, possibly up to 10 years or more, and recovery may not be attainable. Success depends on whether native reproductive propagules remain intact on the site.
- R3b – Seeding of introduced forage-type species, seeding of improved/selected varieties of native species or a combination of the two may lead this plant community phase over a threshold to the *Seeded Rangeland State (State 4)*. While the biotic integrity of the plant community may not be improved, the hydrologic function will likely be significantly improved compared to the Introduced Grass State (State 3).

### Seeded Rangeland State (State 4)

This state is the result of seeding of introduced forage-type species, improved/selected varieties of native species, or a combination thereof. The soil and site stability, and the hydrologic function will typically be improved as compared to either the Introduced Grass State (State 3) or Early Seral State (State 5). The biotic integrity will also likely be improved depending on the species established.

#### 4.1 Seeded Native or Introduced Forage Species Plant Community Phase

This plant community phase is the result of seeding of introduced forage-type species, improved/selected varieties of native species, or a combination thereof. Typical nonnative species that are seeded include intermediate and/or pubescent wheatgrass and alfalfa or other adapted forage legume species. Refer to the related Forage Suitability Group Description for more information about adapted species and management-dependent production levels.

### Transition from Seeded Rangeland State (State 4) to Introduced Grass State (State 3)

- T4 – Heavy continuous grazing or non-use and no fire for prolonged periods of time (typically five or more years) will lead this plant community phase over a threshold to the *Introduced Grass State (State 3)*. Refer to the associated Forage Suitability Group Description and the Field Office Technical Guide for management guidance related to maintaining stands of introduced forage species.

### Transition Pathway from Any Plant Community to the 5.1 Annual/Pioneer Perennial, Bare Ground Plant Community Phase within the Early Seral State (State 5)

- T6 – Abandonment of cropping, encroachment of non-native invasive/noxious species, or extremely heavy disturbance (such as areas with concentrated animal/rodent use) may lead this plant community phase over a threshold to the *Early Seral State (State 5)* and more specifically to the *5.1 Annual/Pioneer Perennial, Bare Ground Plant Community Phase*.

#### Early Seral State (State 5)

This state is the result of very heavy, concentrated disturbance such as cropping, concentrated rodent activity, or concentrated livestock areas. This state can also result from invasion by highly competitive weed species such as Canada thistle, hound's tongue, leafy spurge, or knapweeds. In most cases, this phase is dominated by annual and/or pioneer perennial species. Bare ground is also typically much higher than on any other plant community phase.

#### 5.1 Annual/Pioneer Perennial, Bare Ground Plant Community Phase

This plant community developed under continuous heavy grazing or other excessive disturbances (e.g., heavy use areas, abandoned cropland, defoliation by rodents, etc.). The potential plant community is made up of approximately 60 to 80 percent grasses and grass-like species, 15 to 35 percent forbs, and 2 to 5 percent shrubs. The dominant grass is often threeawn. Other grasses may include cheatgrass, annual brome grass (Japanese brome and cheatgrass), sedge, blue grama, sand dropseed, bluegrass, and western wheatgrass. The dominant forbs include fetid marigold, sweetclover, western ragweed, cudweed sagewort, and other invader-like species. The dominant shrubs include fringed sagewort, broom snakeweed and cactus. A wide variety of other early seral plant species can occupy this site in varying amounts. This plant community is susceptible to invasion of Canada thistle and other nonnative species because of the relatively high percent of bare ground.



Compared to the Bluestem/Wheatgrass/Needlegrass Plant Community Phase (1.1), red threeawn, annual brome grasses, and percent of bare ground has increased. Western wheatgrass, needlegrasses and other cool-season grasses have decreased as have the warm-season species including big bluestem, sideoats grama, and little bluestem. Plant diversity is low (plant richness may be high but areas are often dominated by a few species). The ecological processes are difficult to restore because of the loss of plant diversity and overall soil disturbance. Soil erosion is potentially very high because of the bare ground and shallow rooted herbaceous plant community. Water runoff will increase and infiltration will decrease due to animal related soil compaction and loss of root mass due to low plant diversity and vigor. This plant community will require significant economic inputs and time to move towards another plant community. This movement is highly variable in its succession. This is due to the loss of diversity (including the loss of the seed bank), within the existing plant community, and the plant communities on adjacent sites.

Transitions or restoration pathways leading to other states are as follows:

- R5 – Seeding of introduced forage-type species, seeding of improved/selected varieties of native species, or a combination of the two may lead this plant community phase over a threshold to the *Seeded Rangeland State (State 4)*.
- T4 – Non-use and no fire for prolonged periods of time (typically five or more years) will lead this plant community phase over a threshold to the *Introduced Grass State (State 3)*.

## **Ecological Site Interpretations**

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

-- Under Development --

**Bluestem/Wheatgrass/Needlegrass Plant Community Phase (1.1):**

**Wheatgrass/Bluestem/Needlegrass/Smooth Brome Plant Community Phase (2.1):**

**Western Wheatgrass/Bluegrass/Annual Brome Plant Community Phase (2.2):**

**Western Wheatgrass/Smooth Brome/Bluegrass Plant Community Phase (2.3):**

**Bluegrass/Annual Brome/Smooth Brome Plant Community Phase (3.1):**

**Smooth Brome/Shrubs Plant Community Phase (3.2):**

**Seeded Native or Introduced Forage Species Plant Community Phase (4.1):**

**Annual/Pioneer Perennial, Bare Ground Plant Community Phase (5.1):**

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

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
<b>Grasses and Grass-like</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
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
Cusick's bluegrass	U P U D	D P U D	U P U D	U P N D	U P N D	U P U D	U P U 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
Idaho fescue	U P D U	U P U D	U P D U	U D U U	U D U U	U P D U	U P D U
Indiangrass	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
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 dropseed	N U P U	N U D U	N U P U	N U D U	N U D U	N U P U	N U P 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
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
switchgrass	U D D U	U D U U	U D D U	N N N N	N N 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 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
cinquefoil	U U D U	U U U U	U U D U	U U U U	U U U U	U U D U	U U U 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
deathcamas	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
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
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
fleabane	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
four o'clock	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
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
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
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 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
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
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
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 wallflower	U D U U	N U U N	U D U U	N U U N	N U U N	U D U U	N U U 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 bergamot	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
<b>Shrubs</b>							
big sagebrush	U N U U	D U U D	U N U U	P U D P	P P P P	U N U U	D U U U
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
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 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
western 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

**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)
Bluestem/Wheatgrass/Needlegrass (1.1)	3,000	0.82
Wheatgrass/Bluestem/Needlegrass/Smooth Brome (2.1)	2,500	0.69
Western Wheatgrass/Bluegrass/Annual Brome (2.2)	1,900	0.52
Western Wheatgrass/Smooth Brome/Bluegrass (2.3)	2,300	0.63
Bluegrass/Annual Brome/Smooth Brome (3.1)	1,600	0.44
Smooth Brome/Shrubs (3.2)	2,800	0.77
Annual/Pioneer Perennial, Bare Ground (5.1)	800	0.22

\*Based on 912 lbs./acre (air-dry weight) per Animal Unit Month (AUM), and on 25 percent harvest efficiency (refer to the United States Department of Agriculture (USDA) Natural Resources Conservation Service (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 B. 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 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 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**

Thin Upland (R061XN012SD), Shallow Loamy (R061XN024SD), Loamy Overflow (R061XY020SD)

### **Similar Sites**

(R061XY020SD) – Loamy Overflow [more big bluestem; higher production]

(R061XN011SD) – Clayey [more green needlegrass; less needleandthread and big bluestem]

### **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: Stan Boltz, Range Management Specialist (RMS), NRCS; Cynthia Englebert, RMS, Forest Service; George Gamblin, RMS, NRCS; Tate Lantz, RMS, NRCS; Ryan Murray, RMS, NRCS; Cheryl Nielsen, RMS, NRCS; L. Michael Stirling, RMS, NRCS; and Jim Westerman, Soil Scientist, NRCS.

### **State Correlation**

This site has been correlated with SD WY in MLRA 61.

### **Field Offices/Counties**

Belle Fourche, SD Butte and Lawrence Sturgis, SD Meade Sundance, WY Crook

### **Relationship to Other Established Classifications**

Level IV Ecoregions of the Conterminous United States: 17a – Black Hills Foothills.

### **Other References**

High Plains Regional Climate Center, University of Nebraska, 830728 Chase Hall, Lincoln, NE 68583-0728. (<http://hpccsun.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**

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SD, State Range Management Specialist

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Date

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WY, State Range Management Specialist

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Date