

## United States Department of Agriculture Natural Resources Conservation Service

### Ecological Site Description

**Site Type:** Rangeland

**Site Name:** Thin Claypan

**Site ID:** R053CY015SD

**Major Land Resource Area (MLRA):** 53C – Southern Dark Brown Glaciated Plains

### Physiographic Features

This site occurs on nearly level to gently undulating or rolling sedimentary uplands.

**Landform:** plain, till plain

**Aspect:** N/A

	<u>Minimum</u>	<u>Maximum</u>
<b>Elevation (feet):</b>	1,300	2,300
<b>Slope (percent):</b>	1	4
<b>Water Table Depth (inches):</b>	30	60
<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>	High	Very high



### Climatic Features

MLRA 53C 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 typically ranges from 18 to 22 inches per year. The average annual temperature is about 45°F. January is the coldest month with average temperatures ranging from about 15°F (Stephan, South Dakota (SD)), to about 16°F (Onida 4 NW, SD). July is the warmest month with temperatures averaging from about 72°F (Stephan, SD), to about 74°F (Onida 4 NW, 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 12 miles per hour (mph) annually, ranging from about 13 mph during the spring to about 11 mph 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 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>
<b>Frost-free period (days):</b>	125	141
<b>Freeze-free period (days):</b>	142	160
<b>Mean Annual Precipitation (inches):</b>	18	22

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

	Precip. Min.	Precip. Max	Temp. Min.	Temp. Max.
January	0.25	0.56	3.6	26.4
February	0.37	0.57	7.8	30.9
March	1.02	1.04	19.5	43.1
April	1.68	3.01	31.0	58.7
May	2.68	3.35	42.6	70.1
June	3.17	3.41	53.3	79.1
July	2.50	3.34	58.7	88.7
August	1.73	2.06	56.8	87.6
September	1.94	2.48	47.3	77.3
October	1.35	1.67	33.7	62.3
November	0.52	0.77	20.8	42.4
December	0.21	0.34	8.5	31.2

Climate Stations		Period	
Station ID	Location or Name	From	To
SD3608	Harrold 12 SSW	1963	2008
SD6292	Onida 4 NW	1913	2008
SD7992	Stephan	1903	2008
SD9077	Wessington Springs 7 SW	1948	1998

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 the clay loam to clay textured subsoils and slopes of one to four percent. The soils in this site are typically moderately well-drained and formed in clayey till. The silt loam to silty clay loam surface layer is one to five inches thick. The extremely hard clayey Btn horizon has round-topped or “bun shaped” columnar or prismatic structured subsoil. These Btn horizons are high in sodium. The soils have a very slow infiltration rate. Wet surface compaction can occur with heavy traffic. This site should show slight to no evidence of rills, wind scoured areas, or pedestalled plants. The soil surface is stable and intact.

These soils are mainly susceptible to water erosion. The hazard of water erosion increases where vegetation is removed or severely disturbed. Loss of 30 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: clayey till  
Parent Material Origin:  
Surface Texture: loam, silt loam  
Subsurface Texture Group: clayey  
Surface Fragments ≤3" (% Cover): 0-0  
Surface Fragments >3" (%Cover): 0-0  
Subsurface Fragments ≤3" (% Volume): 0-4  
Subsurface Fragments >3" (% Volume): 0-0

	<u>Minimum</u>	<u>Maximum</u>
Drainage Class:	moderately well	moderately well
Permeability Class:	very slow	very slow
Depth (inches):	80	80
Electrical Conductivity (mmhos/cm)*:	0	16
Sodium Absorption Ratio*:	0	25
Soil Reaction (1:1 Water)*:	5.6	9
Soil Reaction (0.1M CaCl <sub>2</sub> )*:	NA	NA
Available Water Capacity (inches)*:	5	5
Calcium Carbonate Equivalent (percent)*:	0	5

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

## Plant Communities

### Ecological Dynamics of the Site

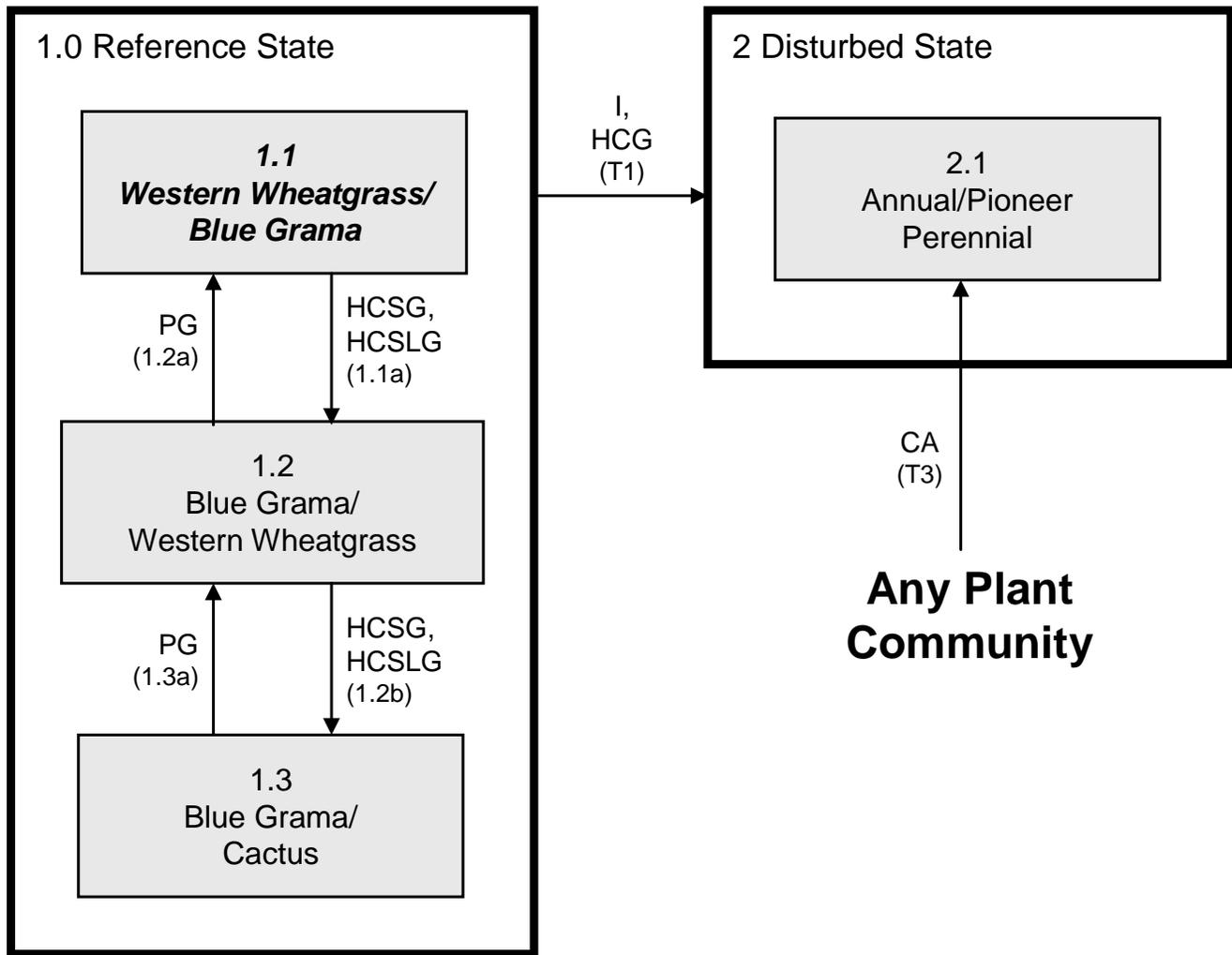
This site developed under Northern Great Plains climatic conditions, light to severe grazing by bison and other large herbivores, sporadic natural or man-caused wildfire (often of light intensities), and other biotic and abiotic factors that typically influence soil/site development. Changes will occur 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 repeated seasonal grazing (e.g., every spring, every summer) without adequate recovery periods following grazing events causes departure from the 1.1 Western Wheatgrass/Blue Grama Plant Community Phase. Blue grama will increase and eventually develop into a sod. Western wheatgrass will increase initially and then begin to decrease. Green needlegrass, needleandthread, and sideoats grama, will decrease in frequency and production. Extended periods of nonuse and/or lack of fire will result in excessive litter and a plant community strongly influenced by cool-season grasses such as Kentucky bluegrass, green needlegrass, and cheatgrass.

Interpretations are primarily based on the 1.1 Western Wheatgrass/Blue Grama Plant Community Phase. 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: **CA** – Cropping followed by abandonment; **HCG** -Heavy Continuous Grazing; **HCSG** – Heavy continuous seasonal grazing; **HCSLG** – Heavy continuous season-long grazing; **I** – Inundation for prolonged periods; **PG** – Prescribed grazing.

Plant Community Composition and Group Annual Production

			1.1 Western Wheatgrass/Blue Grama		
COMMON/GROUP NAME	SCIENTIFIC NAME	SYMBOL	Group	lbs./acre	% Comp
<b>GRASSES &amp; GRASS-LIKES</b>				1040 - 1170	80 - 90
<b>WHEATGRASS</b>			<b>1</b>	<b>325 - 585</b>	<b>25 - 45</b>
western wheatgrass	Pascopyrum smithii	PASM	1	325 - 585	25 - 45
<b>SHORT WARM-SEASON GRASSES</b>			<b>2</b>	<b>260 - 455</b>	<b>20 - 35</b>
blue grama	Bouteloua gracilis	BOGR2	2	195 - 325	15 - 25
buffalograss	Bouteloua dactyloides	BODA2	2	26 - 195	2 - 15
inland saltgrass	Distichlis spicata	DISP	2	26 - 195	2 - 15
sand dropseed	Sporobolus cryptandrus	SPCR	2	0 - 65	0 - 5
<b>NEEDLEGRASS</b>			<b>3</b>	<b>26 - 130</b>	<b>2 - 10</b>
needleandthread	Hesperostipa comata ssp. comata	HECOC8	3	26 - 130	2 - 10
green needlegrass	Nassella viridula	NAV4	3	0 - 91	0 - 7
<b>MID WARM-SEASON GRASSES</b>			<b>4</b>	<b>0 - 65</b>	<b>0 - 5</b>
sideoats grama	Bouteloua curtipendula	BOCU	4	0 - 65	0 - 5
alkali sacaton	Sporobolus airoides	SPAI	4	0 - 65	0 - 5
<b>OTHER NATIVE GRASSES</b>			<b>5</b>	<b>26 - 65</b>	<b>2 - 5</b>
prairie junegrass	Koeleria macrantha	KOMA	5	13 - 65	1 - 5
Sandberg bluegrass	Poa secunda	POSE	5	13 - 39	1 - 3
tumblegrass	Schedonnardus paniculatus	SCPA	5	0 - 13	0 - 1
other grasses		2GRAM	5	0 - 39	0 - 3
<b>GRASS-LIKES</b>			<b>6</b>	<b>26 - 130</b>	<b>2 - 10</b>
needleleaf sedge	Carex duriuscula	CADU6	6	13 - 104	1 - 8
threadleaf sedge	Carex filifolia	CAFI	6	13 - 65	1 - 5
other grass-likes		2GL	6	0 - 39	0 - 3
<b>FORBS</b>			<b>8</b>	<b>65 - 130</b>	<b>5 - 10</b>
biscuitroot	Lomatium spp.	LOMAT	8	0 - 26	0 - 2
cudweed sagewort	Artemisia ludoviciana	ARLU	8	13 - 39	1 - 3
green sagewort	Artemisia campestris	ARCA12	8	0 - 26	0 - 2
heath aster	Symphotrichum ericoides	SYER	8	13 - 26	1 - 2
mealy goosefoot	Chenopodium incanum	CHIN2	8	0 - 13	0 - 1
Nuttall's violet	Viola nuttallii	VINU2	8	0 - 13	0 - 1
povertyweed	Iva axillaris	IVAX	8	0 - 13	0 - 1
pussytoes	Antennaria spp.	ANTEN	8	13 - 26	1 - 2
rush skeletonweed	Lygodesmia juncea	LYJU	8	0 - 13	0 - 1
scarlet gaura	Gaura coccinea	GACO5	8	13 - 26	1 - 2
scarlet globemallow	Sphaeralcea coccinea	SPCO	8	13 - 26	1 - 2
slimflower scurfpea	Psoraleidium tenuiflorum	PSTE5	8	13 - 26	1 - 2
spiny phlox	Phlox hoodii	PHHO	8	13 - 26	1 - 2
textile onion	Allium textile	ALTE	8	0 - 13	0 - 1
western yarrow	Achillea millefolium var. occidentalis	ACMO	8	0 - 26	0 - 2
wild parsley	Musineon divaricatum	MUDI	8	0 - 26	0 - 2
woolly Indianwheat	Plantago patagonica	PLPA2	8	13 - 26	1 - 2
native forbs		2FN	8	13 - 39	1 - 3
<b>SHRUBS</b>			<b>9</b>	<b>65 - 130</b>	<b>5 - 10</b>
brittle cactus	Opuntia fragilis	OPFR	9	13 - 26	1 - 2
broom snakeweed	Gutierrezia sarothrae	GUSA2	9	0 - 13	0 - 1
fringed sagewort	Artemisia frigida	ARFR4	9	13 - 52	1 - 4
plains pricklypear	Opuntia polyacantha	OPPO	9	13 - 26	1 - 2
rose	Rosa spp.	ROSA5	9	13 - 26	1 - 2
saltbush	Atriplex spp.	ATRIP	9	0 - 39	0 - 3
other shrubs		2SHRUB	9	0 - 26	0 - 2

Annual Production lbs./acre	LOW	RV	HIGH
<b>GRASSES &amp; GRASS-LIKES</b>	680 -	1105	- 1510
<b>FORBS</b>	60 -	98	- 145
<b>SHRUBS</b>	60 -	98	- 145
<b>TOTAL</b>	800 -	1300	- 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.

Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SYMBOL	1.1 Western Wheatgrass/ Blue Grama			1.2 Blue Grama/ Western Wheatgrass			1.3 Blue Grama/Cactus		
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp
<b>GRASSES &amp; GRASS-LIKES</b>			1040 - 1170	80 - 90		675 - 810	75 - 90		490 - 560	70 - 80
<b>WHEATGRASS</b>		1	325 - 585	25 - 45	1	90 - 180	10 - 20	1	7 - 70	1 - 10
western wheatgrass	PASM	1	325 - 585	25 - 45	1	90 - 180	10 - 20	1	7 - 70	1 - 10
<b>SHORT WARM-SEASON GRASSES</b>		2	260 - 455	20 - 35	2	270 - 450	30 - 50	2	175 - 350	25 - 50
blue grama	BOGR2	2	195 - 325	15 - 25	2	180 - 360	20 - 40	2	70 - 280	10 - 40
buffalograss	BODA2	2	26 - 195	2 - 15	2	45 - 225	5 - 25	2	21 - 140	3 - 20
inland saltgrass	DISP	2	26 - 195	2 - 15	2	18 - 180	2 - 20	2	21 - 140	3 - 20
sand dropseed	SPCR	2	0 - 65	0 - 5	2	0 - 72	0 - 8	2	0 - 70	0 - 10
<b>NEEDLEGRASS</b>		3	26 - 130	2 - 10	3	0 - 45	0 - 5	3	0 - 14	0 - 2
needleandthread	HECOC8	3	26 - 130	2 - 10	3	0 - 45	0 - 5	3	0 - 14	0 - 2
green needlegrass	NAVI4	3	0 - 91	0 - 7	3	0 - 18	0 - 2			
<b>MID WARM-SEASON GRASSES</b>		4	0 - 65	0 - 5	4			4		
sideoats grama	BOCU	4	0 - 65	0 - 5						
alkali sacaton	SPAI	4	0 - 65	0 - 5						
<b>OTHER NATIVE GRASSES</b>		5	26 - 65	2 - 5	5	18 - 45	2 - 5	5	14 - 35	2 - 5
prairie junegrass	KOMA	5	13 - 65	1 - 5	5	9 - 27	1 - 3	5	7 - 14	1 - 2
Sandberg bluegrass	POSE	5	13 - 39	1 - 3	5	9 - 36	1 - 4	5	7 - 35	1 - 5
tumblegrass	SCPA	5	0 - 13	0 - 1	5	0 - 18	0 - 2	5	0 - 21	0 - 3
other grasses	2GRAM	5	0 - 39	0 - 3	5	0 - 36	0 - 4	5	0 - 21	0 - 3
<b>GRASS-LIKES</b>		6	26 - 130	2 - 10	6	45 - 135	5 - 15	6	35 - 140	5 - 20
needleleaf sedge	CADU6	6	13 - 104	1 - 8	6	18 - 90	2 - 10	6	21 - 105	3 - 15
threadleaf sedge	CAFI	6	13 - 65	1 - 5	6	9 - 63	1 - 7	6	7 - 56	1 - 8
other grass-likes	2GL	6	0 - 39	0 - 3	6	0 - 27	0 - 3	6	0 - 14	0 - 2
<b>NON-NATIVE GRASSES</b>		7			7	0 - 90	0 - 10	7	0 - 56	0 - 8
annual bromegrass	BROMU				7	0 - 90	0 - 10	7	0 - 56	0 - 8
bluegrass	POA				7	0 - 45	0 - 5	7	0 - 21	0 - 3
crested wheatgrass	AGCR				7	0 - 72	0 - 8	7	0 - 35	0 - 5
<b>FORBS</b>		8	65 - 130	5 - 10	8	18 - 90	2 - 10	8	14 - 70	2 - 10
biscuitroot	LOMAT	8	0 - 26	0 - 2						
cudweed sagewort	ARLU	8	13 - 39	1 - 3	8	0 - 27	0 - 3	8	0 - 14	0 - 2
green sagewort	ARCA12	8	0 - 26	0 - 2	8	0 - 18	0 - 2	8	0 - 21	0 - 3
heath aster	SYER	8	13 - 26	1 - 2	8	0 - 9	0 - 1			
mealy goosefoot	CHIN2	8	0 - 13	0 - 1	8	0 - 9	0 - 1	8	0 - 7	0 - 1
Nuttall's violet	VINU2	8	0 - 13	0 - 1						
povertyweed	IVAX	8	0 - 13	0 - 1	8	0 - 9	0 - 1	8	0 - 7	0 - 1
pussytoes	ANTEN	8	13 - 26	1 - 2	8	0 - 9	0 - 1	8	0 - 7	0 - 1
rush skeletonweed	LYJU	8	0 - 13	0 - 1						
scarlet gaura	GACO5	8	13 - 26	1 - 2						
scarlet globemallow	SPCO	8	13 - 26	1 - 2	8	9 - 18	1 - 2	8	0 - 7	0 - 1
slimflower scurfpea	PSTE5	8	13 - 26	1 - 2	8	0 - 9	0 - 1			
spiny phlox	PHHO	8	13 - 26	1 - 2	8	9 - 18	1 - 2	8	0 - 14	0 - 2
textile onion	ALTE	8	0 - 13	0 - 1						
western yarrow	ACMO	8	0 - 26	0 - 2	8	0 - 27	0 - 3	8	0 - 7	0 - 1
wild parsley	MUDI	8	0 - 26	0 - 2						
woolly Indianwheat	PLPA2	8	13 - 26	1 - 2	8	9 - 27	1 - 3	8	7 - 28	1 - 4
native forbs	2FN	8	13 - 39	1 - 3	8	0 - 18	0 - 2	8	0 - 21	0 - 3
introduced forbs	2FI				8	9 - 63	1 - 7	8	7 - 56	1 - 8
<b>SHRUBS</b>		9	65 - 130	5 - 10	9	45 - 135	5 - 15	9	70 - 140	10 - 20
brittle cactus	OPFR	9	13 - 26	1 - 2	9	9 - 36	1 - 4	9	7 - 56	1 - 8
broom snakeweed	GUSA2	9	0 - 13	0 - 1	9	0 - 27	0 - 3	9	0 - 28	0 - 4
fringed sagewort	ARFR4	9	13 - 52	1 - 4	9	18 - 63	2 - 7	9	14 - 84	2 - 12
plains pricklypear	OPPO	9	13 - 26	1 - 2	9	9 - 36	1 - 4	9	7 - 42	1 - 6
rose	ROSA5	9	13 - 26	1 - 2	9	0 - 9	0 - 1			
saltbush	ATRIP	9	0 - 39	0 - 3						
other shrubs	2SHRUB	9	0 - 26	0 - 2	9	0 - 18	0 - 2	9	0 - 14	0 - 2
<b>Annual Production lbs./acre</b>			LOW RV HIGH			LOW RV HIGH			LOW RV HIGH	
<b>GRASSES &amp; GRASS-LIKES</b>			680 - 1105 - 1510			545 - 756 - 955			425 - 553 - 770	
<b>FORBS</b>			60 - 98 - 145			15 - 54 - 95			10 - 42 - 75	
<b>SHRUBS</b>			60 - 98 - 145			40 - 90 - 150			65 - 105 - 155	
<b>TOTAL</b>			800 - 1300 - 1800			600 - 900 - 1200			500 - 700 - 1000	

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 dominates the dynamics of this ecological site (ES). This state is dominated by cool-season grasses with warm-season grasses being subdominant. In pre-European times, the primary disturbance mechanisms for this site in the reference condition included precipitation cycles and grazing by large herding ungulates. Fire was not a major factor influencing vegetation as this site does not typically have sufficient fuel loads to carry a fire. Timing of grazing coupled with weather events dictated the dynamics that occurred within the natural range of variability. Today, this state can be found on areas that are properly managed with grazing, and sometimes on areas receiving occasional short periods of rest. Cool-season species can decline and a corresponding increase in short, warm-season grasses will occur.

### 1.1 Western Wheatgrass/Blue Grama Plant Community Phase

Interpretations are based primarily on the 1.1 Western Wheatgrass/Blue Grama Plant Community which is also considered to be climax. This plant community evolved with grazing by large herbivores and variations in precipitation cycles, and can be maintained with prescribed grazing, or by occasional short periods of rest or deferment. The potential vegetation is about 85 percent grasses or grass-like plants, 10 percent forbs, and 5 percent shrubs. Cool-season grasses and warm-season grasses codominate the site. The major grasses include western wheatgrass and blue grama. Other grasses and grass-likes occurring on this site include buffalograss, inland saltgrass, needleandthread, and sedge. The dominant forbs include scarlet globemallow, cudweed sagewort, heath aster, and woolly Indianwheat. Shrubs that can occur in this plant community are brittle cactus, saltbush, and plains pricklypear.

This plant community is well adapted to the Northern Great Plains climatic conditions. Individual species can vary greatly in production depending on growing conditions (timing and amount of precipitation and temperature). Community dynamics, nutrient cycle, water cycle, and energy flow are functioning at the site's potential. Plant litter is properly distributed with some movement offsite and natural plant mortality is low. Low to moderate available water capacity coupled with high accumulations of sodium and slow permeability strongly influences the soil-water-plant relationships.

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: SD5303

Growth curve name: Southern Dark Brown Glaciated 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 were as follows:

- 1.1a – Heavy Continuous Seasonal Grazing with stocking levels well above carrying capacity for extended portions of the growing season, and at the same time of year, each year, or Heavy Continuous Season-Long Grazing with stocking levels well above carrying capacity utilizing available forage through the majority of the growing season in the absence of adequate rest periods and grazing at the same period each year will shift this plant community to the 1.2 Blue Grama/Western Wheatgrass Plant Community Phase.

### 1.2 Blue Grama/Western Wheatgrass Plant Community Phase

This plant community can develop from the adverse effects of heavy continuous seasonal grazing and/or heavy continuous season-long grazing. Short grasses tend to increase to dominate the site

and annual production decreases dramatically. Lack of litter and short plant heights result in higher soil temperatures, poor water infiltration rates, and high evaporation, which gives blue grama a competitive advantage over cool-season midgrasses. This plant community can occur throughout the pasture, on spot grazed areas, and around water sources where season-long grazing patterns occur. Blue grama and western wheatgrass are the dominant species. Other grasses and grass-likes occurring include buffalograss, Sandberg bluegrass, sedge, and sometimes annual grasses. Forbs such as cudweed sagewort, scarlet globemallow, and woolly Indianwheat may also be present. Some nonnative species will begin to invade this plant community including western salsify, sweet clover, and annual brome grass. There is usually more than 25 percent bare ground.

This plant community is quite resilient. The thick sod and competitive advantage prevents other species from establishing. This plant community is less productive than the 1.1 Western Wheatgrass/Blue Grama Plant Community Phase. Runoff increases and infiltration will decrease. 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: SD5304

Growth curve name: Southern Dark Brown Glaciated 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	17	25	25	15	7	1	0	0

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

- 1.2a – Prescribed Grazing that includes alternating season of utilization while providing adequate rest recovery periods of periodic light to moderate will shift this plant community to the 1.1 Western Wheatgrass/Blue Grama Plant Community Phase.
- 1.2b – Heavy Continuous Seasonal Grazing with stocking levels well above carrying capacity for extended portions of the growing season, and at the same time of year, each year, or Heavy Continuous Season-Long Grazing, with stocking levels well above carrying capacity utilizing available forage through the majority of the growing season in the absence of adequate rest periods, grazing at the same period each year will shift this plant community to the 1.3 Blue Grama/Cactus Plant Community Phase.

### 1.3 Blue Grama/Cactus Plant Community Phase

This plant community can develop from the adverse effects of heavy continuous seasonal grazing and/or heavy continuous season-long grazing. Blue Grama and plains pricklypear, as well as, short warm-season grasses tend to increase to dominate the site and annual production decreases further. Lack of litter and short plant heights result in higher soil temperatures, poor water infiltration rates, and high evaporation, which gives cactus and short warm-season grasses a competitive advantage. This plant community can occur throughout the pasture, on spot grazed areas, and around water sources where season-long grazing patterns occur. Blue grama, brittle cactus, and plains pricklypear are the dominant species. Other grasses and grass-likes occurring include western wheatgrass, buffalograss, Sandberg bluegrass, and sedge. Forbs, such as, cudweed sagewort, common dandelion, sweet clover, and woolly Indianwheat may also be present. In addition to the cactus, fringed sagewort is also a prevalent shrub. There is usually more than 25 percent bare ground.

This plant community is quite resilient. The thick sod and competitive advantage prevents other species from establishing. This plant community is the least productive plant community phase. Runoff increases and infiltration will decrease. Soil erosion will be minimal due to the sod forming habit of the short warm-season grasses.

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: SD5305

Growth curve name: Southern Dark Brown Glaciated Plains, warm-season dominant.

Growth curve description: Warm-season dominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	2	5	15	25	30	15	7	1	0	0

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

- 1.3a – Prescribed grazing that includes alternating season of utilization while providing adequate rest recovery periods of periodic light to moderate grazing will shift this plant community to the *1.2 Blue Grama/Western Wheatgrass Plant Community Phase*.

### Transition from Reference State (State 1) to Disturbed State (State 2)

- T1 – Inundation of water for extended periods beyond normal ponding and drying patterns and/or heavy continuous grazing at the same time of year, each year, without adequate recovery periods or chronic heavy grazing will shift this community to the *Disturbed State (State 2)*. In addition, repeated early season grazing can expedite this shift with mechanical disturbance due to trampling.

### Disturbed State (State 2)

This state is the result of disturbance levels beyond normal disturbance regimes. The most typical scenarios are from prolonged heavy grazing especially when the soils are saturated causing excessive trampling, extended periods of lower than normal precipitation patterns, or from prolonged periods of inundation which causes a shift in species composition. Many of the climax dominant species will be at least temporarily replaced with prolonged inundation. This state can also result from areas abandoned after cropping practices have taken place. Bare ground typically increases significantly in every situation.

### 2.1 Annual/Pioneer Perennial Plant Community Phase

This plant community developed under prolonged heavy continuous grazing, prolonged inundation, or abandonment after cropping. The potential plant community is highly variable often made up of annual introduced forbs and sometimes being almost devoid of vegetation. Plant diversity is low. 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.

No growth curve has been assigned to this plant community phase.

## **Ecological Site Interpretations**

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

-- Under Development --

**Western Wheatgrass/Blue Grama Plant Community Phase (1.1):**

**Blue Grama/Western Wheatgrass Plant Community Phase (1.2):**

**Blue Grama/Cactus Plant Community Phase (1.3):**

**Annual/Pioneer Perennial Plant Community Phase (2.1):**

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

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
<b>Grasses and Grasslikes</b>							
alkali sacaton	U D D U	N U N N	U D D U	N U N N	N U N N	U D D U	U D D U
blue grama	U D P U	D P P D	U D P U	D P P D	D P P D	U D P U	U D P U
buffalograss	U U D U	N U D U	U U D U	N U D U	N U D U	U U D U	U U D U
green needlegrass	U P U D	N P N P	U P U D	N P N P	N P N P	U P U D	U P U D
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
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
Sandberg bluegrass	N U N N	N D N N	N U N N	N D N N	N D N N	N U N N	N U N N
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
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
tumblegrass	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
western wheatgrass	U P D U	N D N N	U P D U	N D N N	N D N N	U P D U	U P D U
<b>Forbs</b>							
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
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
heath aster	U U D U	U U P U	U U D U	U U P U	U U P U	U U D U	U U P U
mealy goosefoot	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
Nuttall's violet	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
povertyweed	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
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 globemallow	U U D U	U D D U	U U D U	U D D U	U D D U	U U D U	U D D U
slimflower 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
textile onion	U D U U	U D D U	U D U U	U D D U	U D D U	U D U U	U D D U
wild parsley	U D U U	U D D U	U D U U	U D D U	U D D U	U D U U	U D D U
woolly Indianwheat	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>							
brittle 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
broom snakeweed	N N N N	U U U U	N N N N	U U U U	U U U U	N N N N	U U U U
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
plains pricklypear	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
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
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

**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 ES 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/Blue Grama (1.1):	1,300	0.36
Blue Grama/Western Wheatgrass (1.2):	900	0.25
Blue Grama/Cactus (1.3):	700	0.19
Annual/Pioneer Perennial (2.1):	400	0.11

\*Based on 912 lbs./acre (air-dry weight) per Animal Unit Month (AUM), and on 25 percent harvest efficiency (refer to 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 D. Infiltration varies from very slow to slow and runoff potential for this site varies from high to very 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

Claypan (R053CY013SD), Clayey (R053CY011SD), Clayey Overflow (R053CY021SD)

### Similar Sites

(R053CY013SD) – Claypan [more green needlegrass; less blue grama; 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: Stan Boltz, Range Management Specialist (RMS), NRCS; Shane Deranleau, RMS, NRCS; and Mitch Faulkner, RMS, NRCS.

### State Correlation

This site has been correlated in SD in MLRA 53C.

### Field Offices/Counties

Chamberlain	Brule/Buffalo	Huron	Beadle	Plankinton	Aurora
Faulkton	Faulk	Miller	Hand	Selby	Walworth
Gettysburg	Potter	Onida	Sully	Wessington Springs	Jerauld
Highmore	Hyde	Pierre	Hughes		

### Relationship to Other Established Classifications

Level IV Ecoregions of the Conterminous United States: 42a – Missouri Coteau, 42e – Southern Missouri Coteau, 42f – Southern Missouri Coteau Slope.

### 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