

United States Department of Agriculture Natural Resources Conservation Service

Ecological Site Description

Site Type: Rangeland

Site Name: Loamy Overflow

Site ID: R053CY020SD

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

Physiographic Features

This site occurs on nearly level lowlands and drainageways.

Landform: swale, drainageway, floodplain **Aspect:** N/A



	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	1,300	2,300
Slope (percent):	1	2
Water Table Depth (inches):	48	72
Flooding:		
Frequency:	Rare	Frequent
Duration:	Very brief	Brief
Ponding:		
Depth (inches):	None	None
Frequency:	None	None
Duration:	None	None
Runoff Class:	Low	Medium

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>
Frost-free period (days):	125	141
Freeze-free period (days):	142	160
Mean Annual Precipitation (inches):	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

Stream Type: B6, C6 (Rosgen System)

Representative Soil Features

The soils in this site are moderately well-drained and formed in alluvium or till. Slopes are one to two percent. The loam to silty clay surface layer is 12 to 40 inches thick. Dark colors are very deep in these soils. The soils have a slow to moderately slow infiltration rate. This site should show no evidence of rills, wind scoured areas, or pedestalled plants. If present, water flow paths are broken, irregular in appearance, or discontinuous with numerous debris dams or vegetative barriers. The soil surface is stable and intact.

These soils are mainly susceptible to water erosion. The hazard of water erosion increases where vegetative cover is not adequate. A drastic loss of the soil surface layer on this site can result in a shift in species composition and/or production.

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

Parent Material Kind: loamy alluvium, loamy till, silty drift

Parent Material Origin:

Surface Texture: loamy, silty, silty clay

Surface Texture Modifier: none

Subsurface Texture Group: loam

Surface Fragments ≤3" (% Cover): 0-0

Surface Fragments >3" (%Cover): 0-0

Subsurface Fragments ≤3" (% Volume): 0-5

Subsurface Fragments >3" (% Volume): 0-2

	<u>Minimum</u>	<u>Maximum</u>
Drainage Class:	moderately well	moderately well
Permeability Class:	moderately slow	slow
Depth (inches):	80	80
Electrical Conductivity (mmhos/cm)*:	0	4
Sodium Absorption Ratio*:	0	2
Soil Reaction (1:1 Water)*:	5.6	8.4
Soil Reaction (0.1M CaCl ₂)*:	NA	NA
Available Water Capacity (inches)*:	6	8
Calcium Carbonate Equivalent (percent)*:	0	15

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

Plant Communities

Ecological Dynamics of the Site

This site developed under Northern Great Plains climatic conditions, 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.

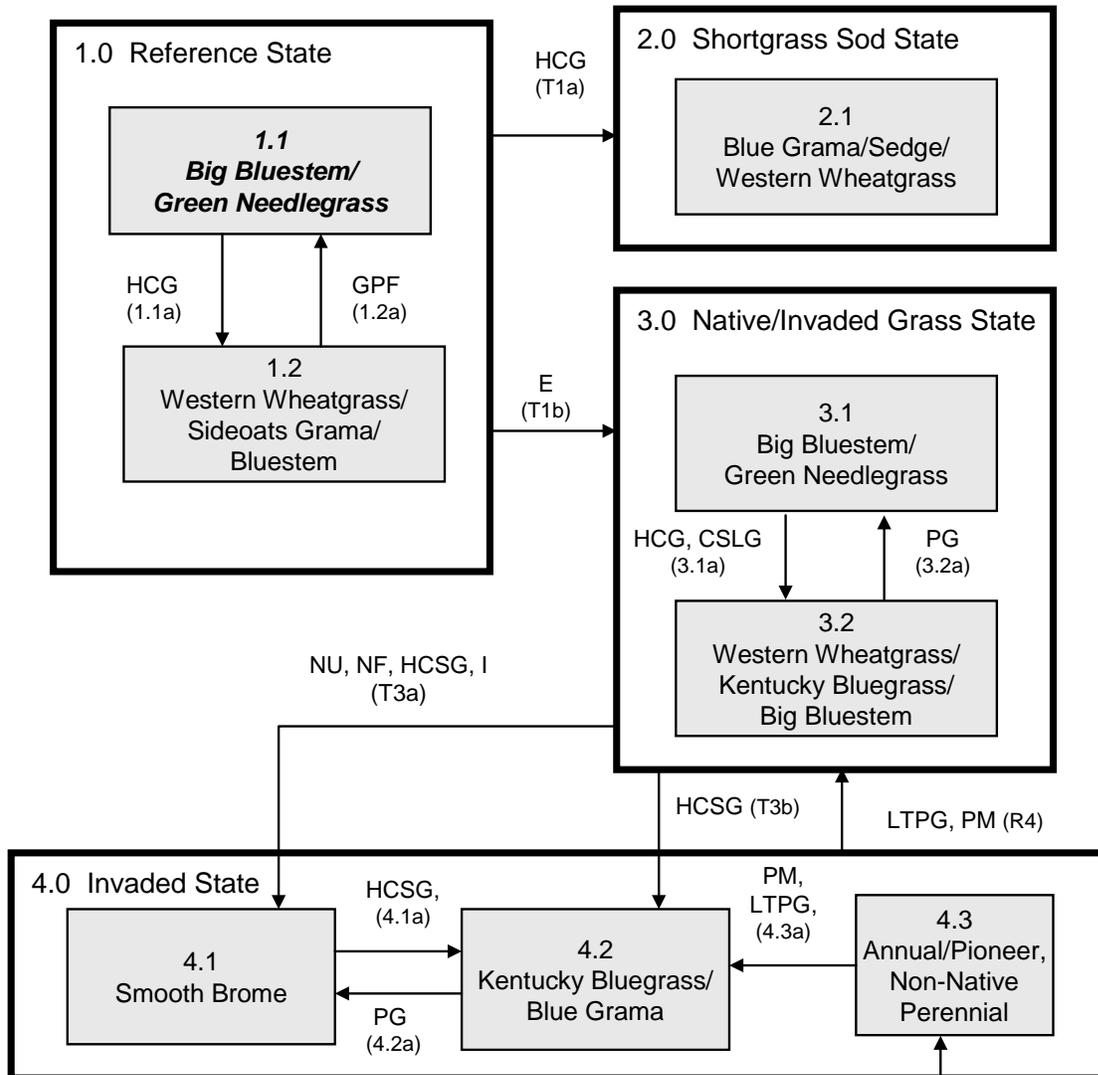
Continuous grazing without adequate recovery periods following each grazing occurrence over several years causes a departure from the 1.1 Big Bluestem/Green Needlegrass Plant Community Phase. Species such as western wheatgrass will initially increase. Big bluestem, little bluestem, and green needlegrass will decrease in frequency and production. Heavy, continuous grazing causes blue grama and/or Kentucky bluegrass to increase and eventually develops into a sod condition. Extended periods of nonuse and no fire will result in a plant community having high litter levels which favors an increase in Kentucky bluegrass and smooth brome. Heavy continuous grazing, especially during the middle summer, can result in the dominance of exotic species such as smooth brome and Kentucky bluegrass. Loamy overflow sites may be particularly subject to this grazing pressure as forages typically remain green and productive later in the growing season relative to the adjacent uplands. In time, shrubs such as western snowberry and chokecherry will also increase.

Interpretations are primarily based on the 1.1 Big Bluestem/Green Needlegrass 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.

Due to a general invasion of exotic species (such as Kentucky bluegrass and smooth brome) across the MLRA within this site, returning to the 1.1 Big Bluestem/Green Needlegrass plant community phase may not be possible.

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; **GPF** – Grazing, precipitation, and/or fire returning to more normal disturbance regime levels and frequencies; **HCG** – Heavy continuous grazing; **HCSG** – Heavy continuous seasonal grazing; **HCSLG** – Heavy continuous season-long grazing; **I** – Inundation; **LTPG** – Long-term prescribed grazing; **NU, NF** – Non-use, no fire; **PG** – Prescribed grazing; **PM** – Pest management (herbicide); **S** – Seeding.

Any Plant Community

Plant Community Composition and Group Annual Production

			1.1 Big Bluestem/Green Needlegrass		
COMMON/GROUP NAME	SCIENTIFIC NAME	SYMBOL	Group	lbs./acre	% Comp
GRASSES & GRASS-LIKES				2800 - 3150	80 - 90
TALL WARM-SEASON GRASSES			1	875 - 1750	25 - 50
big bluestem	Andropogon gerardii	ANGE	1	700 - 1575	20 - 45
switchgrass	Panicum virgatum	PAV12	1	105 - 525	3 - 15
Indiangrass	Sorghastrum nutans	SONU2	1	70 - 350	2 - 10
green muhly	Muhlenbergia glomerata	MUJL3	1	0 - 175	0 - 5
COOL-SEASON BUNCHGRASSES			2	350 - 875	10 - 25
green needlegrass	Nassella viridula	NAVI4	2	175 - 875	5 - 25
porcupine grass	Hesperostipa spartea	HESP11	2	70 - 350	2 - 10
Canada wildrye	Elymus canadensis	ELCA4	2	0 - 105	0 - 3
WHEATGRASS			3	175 - 525	5 - 15
western wheatgrass	Pascopyrum smithii	PASM	3	175 - 525	5 - 15
slender wheatgrass	Elymus trachycaulus	ELTR7	3	0 - 175	0 - 5
OTHER WARM-SEASON GRASSES			4	175 - 350	5 - 10
little bluestem	Schizachyrium scoparium	SCSC	4	35 - 350	1 - 10
sideoats grama	Bouteloua curtipendula	BOCU	4	0 - 245	0 - 7
blue grama	Bouteloua gracilis	BOGR2	4	0 - 70	0 - 2
other grasses		2GRAM	4	0 - 175	0 - 5
OTHER COOL-SEASON GRASSES			5	35 - 140	1 - 4
prairie junegrass	Koeleria macrantha	KOMA	5	0 - 70	0 - 2
Scribner panicum	Dichanthelium oligosanthes var. scribnerian	DIOLS	5	0 - 70	0 - 2
other grasses		2GRAM	5	35 - 140	1 - 4
GRASS-LIKES			6	35 - 140	1 - 4
sedge	Carex spp.	CAREX	6	35 - 140	1 - 4
other grass-likes		2GL	6	0 - 105	0 - 3
FORBS			8	175 - 350	5 - 10
American licorice	Glycyrrhiza lepidota	GLLE3	8	0 - 70	0 - 2
American stickseed	Hackelia deflexa var. americana	HADEA	8	0 - 35	0 - 1
blue verbena	Verbena hastata	VEHA2	8	0 - 35	0 - 1
cudweed sagewort	Artemisia ludoviciana	ARLU	8	35 - 105	1 - 3
dotted gayfeather	Liatris punctata	LIPU	8	35 - 70	1 - 2
false boneset	Brickellia eupatorioides	BREU	8	0 - 70	0 - 2
false Solomon's-seal	Maianthemum stellatum	MAST4	8	0 - 35	0 - 1
goldenrod	Solidago spp.	SOLID	8	35 - 105	1 - 3
heartleaf Alexanders	Zizia aptera	ZIAP	8	0 - 35	0 - 1
heath aster	Symphotrichum ericoides	SYER	8	0 - 70	0 - 2
Illinois bundleflower	Desmanthus illinoensis	DEIL	8	0 - 70	0 - 2
Maximilian sunflower	Helianthus maximiliani	HEMA2	8	35 - 105	1 - 3
northern bedstraw	Galium boreale	GABO2	8	0 - 35	0 - 1
purple prairie clover	Dalea purpurea	DAPU5	8	0 - 35	0 - 1
scarlet gaura	Gaura coccinea	GACO5	8	35 - 70	1 - 2
scurfpea	Psoraleidum spp.	PSORA2	8	0 - 70	0 - 2
wavyleaf thistle	Cirsium undulatum	CIUN	8	0 - 70	0 - 2
western ragweed	Ambrosia psilostachya	AMPS	8	0 - 35	0 - 1
western yarrow	Achillea millefolium var. occidentalis	ACMIO	8	35 - 70	1 - 2
native forbs		2FN	8	35 - 140	1 - 4
SHRUBS			9	70 - 350	2 - 10
American plum	Prunus americana	PRAM	9	0 - 70	0 - 2
chokecherry	Prunus virginiana	PRVI	9	0 - 70	0 - 2
golden currant	Ribes aureum	RIAU	9	0 - 105	0 - 3
leadplant	Amorpha canescens	AMCA6	9	35 - 105	1 - 3
poison ivy	Toxicodendron rydbergii	TORY	9	0 - 35	0 - 1
rose	Rosa spp.	ROSA5	9	35 - 105	1 - 3
western snowberry	Symphoricarpos occidentalis	SYOC	9	35 - 140	1 - 4
other shrubs		2SHRUB	9	0 - 105	0 - 3
TREES			10	0 - 70	0 - 2
American elm	Ulmus americana	ULAM	10	0 - 70	0 - 2
boxelder	Acer negundo	ACNE2	10	0 - 70	0 - 2
bur oak	Quercus macrocarpa	QUMA2	10	0 - 70	0 - 2
green ash	Fraxinus pennsylvanica	FRPE	10	0 - 70	0 - 2
other trees		2TREE	10	0 - 70	0 - 2

Annual Production lbs./acre	LOW	RV	HIGH
GRASSES & GRASS-LIKES	2580	2993	3405
FORBS	155	263	410
SHRUBS	65	210	410
TREES	0	35	75
TOTAL	2800	3500	4300

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 Big Bluestem/ Green Needlegrass			2.1 Blue Grama/Sedge/ Western Wheatgrass			3.2 Western Wheatgrass/Kentucky			4.2 Kentucky Bluegrass/ Blue Grama			
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	
GRASSES & GRASS-LIKES			2800 - 3150	80 - 90		1600 - 1800	80 - 90		2175 - 2465	75 - 85		1260 - 1530	70 - 85	
TALL WARM-SEASON GRASSES		1	875 - 1750	25 - 50	1	20 - 200	1 - 10	1	435 - 725	15 - 25	1	0 - 54	0 - 3	
big bluestem	ANGE	1	700 - 1575	20 - 45	1	20 - 100	1 - 5	1	290 - 725	10 - 25	1	0 - 54	0 - 3	
switchgrass	PAV2	1	105 - 525	3 - 15	1	0 - 100	0 - 5	1	0 - 87	0 - 3	1	0 - 18	0 - 1	
Indiangrass	SONU2	1	70 - 350	2 - 10	1	0 - 60	0 - 3	1	0 - 58	0 - 2				
green muhly	MUGL3	1	0 - 175	0 - 5	1	0 - 40	0 - 2	1	0 - 29	0 - 1				
COOL-SEASON BUNCHGRASSES		2	350 - 875	10 - 25	2	20 - 120	1 - 6	2	58 - 290	2 - 10	2	0 - 36	0 - 2	
green needlegrass	NAV4	2	175 - 875	5 - 25	2	20 - 80	1 - 4	2	58 - 290	2 - 10	2	0 - 36	0 - 2	
porcupine grass	HESP11	2	70 - 350	2 - 10	2	0 - 60	0 - 3	2	0 - 145	0 - 5				
Canada wildrye	ELCA4	2	0 - 105	0 - 3				2	0 - 58	0 - 2				
WHEATGRASS		3	175 - 525	5 - 15	3	300 - 600	15 - 30	3	435 - 725	15 - 25	3	18 - 72	1 - 4	
western wheatgrass	PASM	3	175 - 525	5 - 15	3	300 - 600	15 - 30	3	435 - 725	15 - 25	3	18 - 72	1 - 4	
slender wheatgrass	ELTR7	3	0 - 175	0 - 5	3			3	0 - 116	0 - 4				
OTHER WARM-SEASON		4	175 - 350	5 - 10	4	300 - 600	15 - 30	4	29 - 232	1 - 8	4	90 - 450	5 - 25	
little bluestem	SCSC	4	35 - 350	1 - 10	4	0 - 60	0 - 3	4	0 - 58	0 - 2	4	0 - 18	0 - 1	
sideoats grama	BOCU	4	0 - 245	0 - 7	4	0 - 80	0 - 4	4	0 - 116	0 - 4	4	0 - 36	0 - 2	
blue grama	BOGR2	4	0 - 70	0 - 2	4	200 - 500	10 - 25	4	0 - 116	0 - 4	4	90 - 450	5 - 25	
other grasses	2GRAM	4	0 - 175	0 - 5	4	0 - 100	0 - 5	4	0 - 87	0 - 3	4	0 - 54	0 - 3	
OTHER COOL-SEASON		5	35 - 140	1 - 4	5	40 - 100	2 - 5	5	0 - 145	0 - 5	5	0 - 54	0 - 3	
prairie junegrass	KOMA	5	0 - 70	0 - 2	5	20 - 40	1 - 2	5	0 - 29	0 - 1	5	0 - 18	0 - 1	
Scribner panicum	DIOLS	5	0 - 70	0 - 2	5	0 - 40	0 - 2	5	0 - 29	0 - 1	5	0 - 18	0 - 1	
other grasses	2GRAM	5	35 - 140	1 - 4	5	20 - 80	1 - 4	5	0 - 145	0 - 5	5	0 - 54	0 - 3	
GRASS-LIKES		6	35 - 140	1 - 4	6	100 - 300	5 - 15	6	29 - 145	1 - 5	6	18 - 90	1 - 5	
sedge	CAREX	6	35 - 140	1 - 4	6	100 - 300	5 - 15	6	29 - 145	1 - 5	6	18 - 90	1 - 5	
other grass-likes	2GL	6	0 - 105	0 - 3	6	0 - 60	0 - 3	6	0 - 58	0 - 2	6	0 - 54	0 - 3	
NON-NATIVE GRASSES		7			7	20 - 140	1 - 7	7	290 - 725	10 - 25	7	720 - 1080	40 - 60	
annual bromegrass	BROMU				7	20 - 80	1 - 4	7	0 - 145	0 - 5	7	0 - 90	0 - 5	
bluegrass	POA				7	0 - 100	0 - 5	7	145 - 435	5 - 15	7	540 - 1080	30 - 60	
smooth bromegrass	BRIN2				7	0 - 20	0 - 1	7	58 - 290	2 - 10	7	36 - 180	2 - 10	
FORBS		8	175 - 350	5 - 10	8	100 - 200	5 - 10	8	145 - 290	5 - 10	8	180 - 360	10 - 20	
American licorice	GLLE3	8	0 - 70	0 - 2	8	0 - 20	0 - 1	8	0 - 58	0 - 2				
American stickseed	HADEA	8	0 - 35	0 - 1										
blue verbena	VEHA2	8	0 - 35	0 - 1	8	0 - 60	0 - 3	8	0 - 58	0 - 2	8	0 - 36	0 - 2	
cudweed sagewort	ARLU	8	35 - 105	1 - 3	8	20 - 100	1 - 5	8	29 - 145	1 - 5	8	18 - 108	1 - 6	
dotted gayfeather	LIPU	8	35 - 70	1 - 2	8	0 - 20	0 - 1	8	0 - 29	0 - 1				
false boneset	BREU	8	0 - 70	0 - 2				8	0 - 29	0 - 1				
false Solomon's-seal	MAST4	8	0 - 35	0 - 1										
goldenrod	SOLID	8	35 - 105	1 - 3	8	20 - 100	1 - 5	8	29 - 145	1 - 5	8	18 - 90	1 - 5	
heartleaf Alexanders	ZIAP	8	0 - 35	0 - 1										
heath aster	SYER	8	0 - 70	0 - 2	8	0 - 60	0 - 3	8	0 - 87	0 - 3	8	0 - 72	0 - 4	
Illinois bundleflower	DEIL	8	0 - 70	0 - 2				8	0 - 29	0 - 1				
Maximilian sunflower	HEMA2	8	35 - 105	1 - 3	8	0 - 20	0 - 1	8	0 - 58	0 - 2				
northern bedstraw	GABO2	8	0 - 35	0 - 1										
purple prairie clover	DAPU5	8	0 - 35	0 - 1				8	0 - 29	0 - 1				
scarlet gaura	GACO5	8	35 - 70	1 - 2	8	0 - 20	0 - 1							
scurfpea	PSORA2	8	0 - 70	0 - 2	8	0 - 40	0 - 2	8	0 - 87	0 - 3	8	0 - 36	0 - 2	
wavyleaf thistle	CIUN	8	0 - 70	0 - 2	8	0 - 20	0 - 1	8	0 - 58	0 - 2				
western ragweed	AMPS	8	0 - 35	0 - 1	8	0 - 80	0 - 4	8	29 - 116	1 - 4	8	18 - 90	1 - 5	
western yarrow	ACMO	8	35 - 70	1 - 2	8	20 - 60	1 - 3	8	29 - 58	1 - 2	8	18 - 72	1 - 4	
native forbs	2FN	8	35 - 140	1 - 4	8	20 - 40	1 - 2	8	0 - 87	0 - 3	8	0 - 54	0 - 3	
introduced forbs	2FI				8	0 - 100	0 - 5	8	0 - 145	0 - 5	8	54 - 270	3 - 15	
SHRUBS		9	70 - 350	2 - 10	9	40 - 200	2 - 10	9	58 - 435	2 - 15	9	18 - 108	1 - 6	
American plum	PRAM	9	0 - 70	0 - 2	9	0 - 60	0 - 3	9	0 - 87	0 - 3	9	0 - 18	0 - 1	
chokecherry	PRV1	9	0 - 70	0 - 2	9	0 - 20	0 - 1	9	0 - 87	0 - 3				
golden currant	RIAU	9	0 - 105	0 - 3	9	0 - 20	0 - 1	9	0 - 58	0 - 2				
leadplant	AMCA6	9	35 - 105	1 - 3	9	0 - 20	0 - 1	9	0 - 58	0 - 2				
poison ivy	TORY	9	0 - 35	0 - 1	9	0 - 60	0 - 3	9	0 - 87	0 - 3	9	0 - 18	0 - 1	
rose	ROSA5	9	35 - 105	1 - 3	9	20 - 40	1 - 2	9	29 - 87	1 - 3	9	0 - 18	0 - 1	
western snowberry	SYOC	9	35 - 140	1 - 4	9	20 - 140	1 - 7	9	29 - 348	1 - 12	9	18 - 90	1 - 5	
other shrubs	2SHRUB	9	0 - 105	0 - 3	9	0 - 60	0 - 3	9	0 - 87	0 - 3	9	0 - 36	0 - 2	
TREES		10	0 - 70	0 - 2	10	0 - 40	0 - 2	10	0 - 58	0 - 2	10	0 - 36	0 - 2	
American elm	ULAM	10	0 - 70	0 - 2	10	0 - 40	0 - 2	10	0 - 58	0 - 2	10	0 - 36	0 - 2	
boxelder	ACNE2	10	0 - 70	0 - 2	10	0 - 40	0 - 2	10	0 - 58	0 - 2	10	0 - 36	0 - 2	
bur oak	QUMA2	10	0 - 70	0 - 2	10	0 - 40	0 - 2	10	0 - 58	0 - 2	10	0 - 36	0 - 2	
green ash	FRPE	10	0 - 70	0 - 2	10	0 - 40	0 - 2	10	0 - 58	0 - 2	10	0 - 36	0 - 2	
other trees	2TREE	10	0 - 70	0 - 2	10	0 - 40	0 - 2	10	0 - 58	0 - 2	10	0 - 36	0 - 2	
Annual Production lbs./acre			LOW	RV	HIGH	LOW	RV	HIGH	LOW	RV	HIGH	LOW	RV	HIGH
GRASSES & GRASS-LIKES			2580 - 2993	-3405		1270 - 1710	-2105		1815 - 2407	-2885		1025 - 1449	-1820	
FORBS			155 - 263	-410		95 - 150	-225		130 - 218	-335		160 - 270	-420	
SHRUBS			65 - 210	-410		35 - 120	-225		55 - 247	-520		15 - 63	-120	
TREES			0 - 35	-75		0 - 20	-45		0 - 29	-60		0 - 18	-40	
TOTAL			2800 - 3500	-4300		1400 - 2000	-2600		2000 - 2900	-3800		1200 - 1800	-2400	

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)

The 1.0 Reference State description represents the natural range of variability that dominated the dynamics of this ecological site (ES). This state was typically dominated by warm-season grasses, primarily big bluestem, with occasional shifts to a near co-dominance of cool- and warm-season grasses. In pre-European times, the primary disturbance mechanisms for this site in the reference condition included periods of below and/or above average precipitation, periodic fire, and herbivory by insects and large ungulates. Timing of fires and herbivory coupled with weather events dictated the dynamics that occurred within the natural range of variability. A combination of disturbances would likely have caused a shift to more cool-season grasses with a corresponding decrease in tall warm-season grasses. An increase in fire frequency or fire followed by occasional grazing would have caused an increase in warm-season grasses. This state possesses a long-growing season and high herbaceous productivity potential. These sites are differentiated by the presence of exotic species such as Kentucky bluegrass and smooth brome. On most Loamy Overflow ESs within the MLRA, these species have invaded and are now present. It is likely that attaining the reference state as described here (without the presence of exotic herbaceous species) is not possible.

1.1 Big Bluestem/Green Needlegrass Plant Community Phase

Interpretations are based primarily on the 1.1 Big Bluestem/Needlegrass Plant Community Phase (this is also considered to be climax). The potential vegetation was about 80-90 percent grasses or grass-like plants, 10 percent forbs, and 5 percent shrubs. The community was dominated by warm-season grasses. The major grasses included big bluestem, green needlegrass, western wheatgrass, switchgrass, and little bluestem. Other grass or grass-like species included Indiangrass, porcupine grass, sideoats grama, sedge, slender wheatgrass, and Canada wildrye. In some cases, big bluestem would dominate the site. 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: 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 were as follows:

- 1.1a – 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 1.2 Western Wheatgrass/Sideoats Grama/Bluestem Plant Community Phase.

1.2 Western Wheatgrass/Sideoats Grama/Bluestem Plant Community Phase

This plant community evolved under heavy continuous grazing or from over utilization during extended drought periods. The potential plant community was made up of approximately 80 percent grasses and grass-like species, 10 percent forbs, and 10 percent shrubs. Dominant grasses included western wheatgrass, sideoats grama, little bluestem, big bluestem, and green needlegrass. Grass and grass-like species of secondary importance included sedge, switchgrass, Indiangrass, porcupine grass, slender wheatgrass, and Canada wildrye. Forbs commonly found in this plant community included cudweed sagewort, prairie coneflower, and western yarrow. This plant community had

similar plant composition to the 3.2 Western Wheatgrass/Kentucky Bluegrass/Big Bluestem Plant Community Phase (refer to the plant composition tables). The main difference is that this plant community phase did not have the presence of nonnative invasive species such as Kentucky bluegrass and smooth brome.

When compared to the 1.1 Big Bluestem/Green Needlegrass Plant Community Phase, western wheatgrass, sideoats grama, and sedges increased. Green needlegrass and big bluestem decreased and production of all tall warm-season grasses was reduced. This plant community was 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: 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 are as follows:

- 1.2a – Grazing, Precipitation, and Fire returned to normal disturbance regime levels and frequencies, along with precipitation and periodic light to moderate grazing with possible periodic rest, will shift this community to the 1.1 Big Bluestem/Green Needlegrass Plant Community Phase.

Transitions from Reference State (State 1) to Short grass Sod State (State 2)

- T1a – 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 2.0 Shortgrass Sod State.

Transitions from Reference State (State 1) to Native/Invaded Grass State (State 3)

- T1b – Encroachment of nonnative species such as Kentucky bluegrass and smooth brome, in combination of disruption of natural regimes (typically fire suppression following settlement) will shift this plant community to the 3.0 Native/Invaded Grass State.

Shortgrass Sod State (State 2)

This state is the result of heavy continuous grazing by large herbivores or excessive grazing by rodents. Extended drought periods attribute to and may hasten the transition to this state. This state is characterized by a dominance of blue grama. Heavy, repeated continuous grazing eventually reduces the vigor and occurrence of the tall- and mid-grasses characteristic of the 1.0 Reference and 3.0 Native/Invaded Grass States. Low growth forms and low and late extending growing points allow blue grama and upland sedges to tolerate and sometimes avoid heavy continuous grazing. This state had a high level of resiliency and changes occurred very slowly with long-term prescribed grazing.

2.1 Blue Grama/Sedge/Western Wheatgrass Plant Community Phase

This plant community evolved under heavy continuous grazing or from over utilization during extended drought periods. The potential plant community was made up of about 85 percent grasses or grass-like species, 10 percent forbs, and 5 percent shrubs. The dominant grass is blue grama.

Sedges and western wheatgrass were usually of secondary importance. Cudweed sagewort and a variety of introduced forbs were also present. When compared to the 1.1 Big Bluestem/Green Needlegrass Plant Community Phase, tall- and mid-grasses decreased significantly. This plant community phase was very resistant to change and the herbaceous species tolerated heavy grazing use. This plant community yields significantly less biomass than most other plant community phases found on this site. A thick “sod” of blue grama and sedges reduces the opportunity for other species to establish on this site. Low growth form and low and late extending growing points allow blue grama, buffalograss, and upland sedges to tolerate and sometimes avoid heavy continuous grazing. Loamy overflow sites are susceptible to heavy continuous and repeated grazing events, particularly under season-long grazing, due to its extended growing period due to the benefit of additional runoff moisture. Herbaceous species on this site remain palatable for more of the growing season relative to surrounding uplands and are therefore more frequently sought out.

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

Native/Invaded Grass State (State 3)

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 codominated by cool- and warm-season grasses. 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. Taller grass species can decline and a corresponding increase in short statured grass will occur.

3.1 Big Bluestem/Green Needlegrass Plant Community Phase

This plant community phase is similar to the 1.1 Big Bluestem/Green Needlegrass Plant Community Phase but it also contains minor amounts of nonnative invasive grass species such as Kentucky bluegrass and smooth brome (up to about 20 percent by air-dry weight). The potential vegetation is about 82 percent grasses or grass-like plants, 10 percent forbs, and 8 percent shrubs. The community is dominated by warm-season grasses. The major grasses include big bluestem, green needlegrass, western wheatgrass, switchgrass, and little bluestem. Other grass or grass-like species include Indiangrass, porcupine grass, sideoats grama, sedge, slender wheatgrass, Canada wildrye, Kentucky bluegrass, 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.

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:

- 3.1a – Heavy Continuous Grazing at the same time of year, each year, without adequate recovery periods or Continuous Season-Long Grazing or chronic heavy grazing or utilizing available forages through the majority of the growing season in the absence of adequate rest periods and livestock grazing returning year after year will shift this plant community to the 3.2 Western Wheatgrass/Kentucky Bluegrass/Big Bluestem Plant Community Phase.

3.2 Western Wheatgrass/Kentucky Bluegrass/Big Bluestem Plant Community Phase

This plant community is a result of heavy continuous grazing, continuous season-long grazing, or from over utilization during extended drought periods. The potential plant community is made up of approximately 80 percent grasses and grass-like species, 10 percent forbs, and 10 percent shrubs. Dominant grasses include western wheatgrass, Kentucky bluegrass, and big bluestem. Grasses of secondary importance include sideoats grama, green needlegrass, porcupine grass, smooth brome, and sedge. Forbs commonly found in this plant community include cudweed sagewort, prairie coneflower, and western yarrow.

When compared to the 1.1 Big Bluestem/Green Needlegrass Plant Community Phase, western wheatgrass has increased and big bluestem has decreased. Green needlegrass has 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 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: 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 are as follows:

3.2a – Prescribed Grazing that includes alternating seasons of utilization and periodic light to moderate grazing with possible rest periods will shift this plant community to the 3.1 Big Bluestem/Green Needlegrass Plant Community Phase.

Transitions from Native/Invaded Grass State (State 3) to Invaded State (State 4)

- T3a – Non-use and no fire for extended periods of time (typically for 10 or more years) and/or Heavy Continuous Grazing at the same time of year, each year, without adequate recovery periods or chronic heavy grazing and/or Inundation of water for extended periods beyond normal ponding and drying patterns will cause a plant community shift to the 4.1 Smooth Brome Plant Community Phase within the 4.0 Invaded State. In addition, repeated early season grazing can expedite this shift with mechanical disturbance due to trampling.
- T3b – 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, will shift this plant community to the 4.2 Kentucky Bluegrass/Blue Grama Plant Community Phase within the 4.0 Invaded State.

Invaded State (State 4)

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.

4.1 Smooth Brome Plant Community Phase

This plant community phase is a result of extended periods of nonuse and no fire. Due to the relatively high grazing tolerance of smooth brome, this plant community phase may also be the result of heavy continuous grazing that eventually eliminates many native grass species. It is characterized by a dominance of smooth brome. Kentucky bluegrass may also be present in varying amounts within this plant community phase but will rarely exceed 15 percent of total biomass. 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.

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: SD5301

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

Growth curve description: Cool-season dominant.

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

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

- 4.1a – 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, will shift this plant community to the 4.2 Kentucky Bluegrass/Blue Grama Plant Community Phase.

4.2 Kentucky Bluegrass/Blue Grama Community Phase

This plant community phase is a result of heavy, continuous seasonal grazing or heavy and continuous season-long grazing. It is characterized by a dominance of Kentucky bluegrass and blue grama. 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, and blue grama productivity is relatively low. Energy capture is also reduced. Biological activity in the soil is likely reduced significantly in this phase. This plant community is very stable and resilience is high.

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: SD5302

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

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

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

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

- 4.2a – 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 4.1 Smooth Brome Plant Community Phase.

4.3 Annual/Pioneer, Non-Native Perennial Plant Community Phase

This plant community developed under continuous heavy grazing or other excessive disturbances (e.g., heavy use areas, defoliation by rodents, etc.). The potential plant community is made up of approximately 40 to 80 percent grasses and grass-like species, 20 to 60 percent forbs, and 0 to 5 percent shrubs. The species present in this phase are highly variable but often include nonnative invasive and/or early seral species. 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. This community can be renovated to improve the production capability; however, if management changes are not made the vegetation could revert back to a threawn/annual community.

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

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

- 4.3a – Pest Management using chemical or mechanical treatment to control target species and/or Long-Term Prescribed Grazing with moderate stocking levels coupled with adequate recovery periods, or grazing systems such as high density, low frequency, etc., intended to treat specific species, or periodic light to moderate stocking levels including will shift this plant community to the 4.2 Kentucky Bluegrass/Blue Grama Plant Community Phase.

Restoration Pathway from Invaded State (State 4) to Native/Invaded State (State 3)

- R4 - Long-Term Prescribed Grazing with moderate stocking levels coupled with adequate recovery periods, or grazing systems such as high-density, low-frequency, etc., intended to treat specific species, or periodic light to moderate stocking levels including possible rest periods or Pest Management using chemical or mechanical treatment to control target species will shift this community to the 3.0 Native/Invaded Grass State. Success depends on whether native reproductive propagates remain intact onsite and may take a long period of time (10 years or more). Recovery may not be attainable.

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

-- Under Development --

Big Bluestem/Green Needlegrass Plant Community Phase (1.1):

Western Wheatgrass/Sideoats Grama/Bluestem Plant Community Phase (1.2):

Blue Grama/Sedge/Western Wheatgrass Plant Community Phase (2.1):

Big Bluestem/Green Needlegrass Plant Community Phase (3.1):

Western Wheatgrass/Kentucky Bluegrass/Big Bluestem Plant Community Phase (3.2):

Smooth Brome Plant Community Phase (4.1):

Kentucky Bluegrass/Blue Grama Plant Community Phase (4.2):

Annual/Pioneer, Non-native Perennial Plant Community Phase (4.3):

Animal Preferences (Quarterly – 1,2,3,4[†])

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
Grasses and Grasslikes							
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
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
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
green muhly	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
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
porcupine grass	U P U D	N D N U	U P U D	N D N U	N D N U	U P U D	U P U D
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
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
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
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
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
prairie junegrass	U D U D	N D N U	U D U D	N D N U	N D N U	U D U D	U D U D
Scribner panicum	U U D U	N U N N	U U D U	N U N N	N U N N	U U D U	U U D U
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
Forbs							
American licorice	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
blue verbena	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
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 Solomon's-seal	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
flatspine stickseed	N N N N	N U D N	N N N N	N U D N	N U D N	N N N N	N N N N
heartleaf Alexanders	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
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
Illinois bundleflower	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
Maximilian sunflower	U D P U	U D P U	U D P U	U D P U	U D P U	U D P U	U D P U
Missouri 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
northern bedstraw	N N N N	N U D N	N N N N	N U D N	N U D N	N N N N	N N N N
purple prairie clover	U D P U	U P P U	U D P U	U P P U	U P P U	U D P U	U P P U
scarlet gaura	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
scurfpea	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
wavyleaf thistle	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N
western ragweed	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N
western yarrow	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
Shrubs and Trees							
American 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
chokecherry	D T T D	D T T D	D T T D	P U D P	D U U D	D T T D	P U U P
golden currant	U D D U	U P P D	U D D U	U P P D	U U U U	U D D U	U P P 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
poison ivy	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
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
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
American elm	N N N N	N N N N	N N N N	N U D N	N N N N	N N N N	N N N N
boxelder	N N N U	N N U U	N N N U	N N U U	N N U U	N N N U	N N U U
bur oak	T T T T	T T T T	N N N N	N U D U	N N N N	T T T T	N U D U
green ash	N U D U	N D D U	N U D U	N D D U	N U D U	N U D U	N D D U

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

[†] 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)
Big Bluestem/Green Needlegrass (1.1):	3,500	0.96
Blue Grama/Sedge/Western Wheatgrass (2.1):	2,000	0.55
Western Wheatgrass/Kentucky Bluegrass/Big Bluestem (3.2):	2,900	0.79
Kentucky Bluegrass/Blue Grama (4.2):	1,800	0.49
Annual/Pioneer, Non-native Perennial (4.3):	1,200	0.33

*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 B, with localized areas 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 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

Clayey (R053CY011SD), Thin Upland (R053CY012SD), Loamy (R053CY010SD)

Similar Sites

(R053CY010SD) – Loamy [less big bluestem; lower production]

(R053CY011SD) – Clayey [more green needlegrass; less big bluestem; lower 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/Bufalo	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

SD, State Range Management Specialist

Date