

United States Department of Agriculture Natural Resources Conservation Service

Ecological Site Description

Site Type: Rangeland

Site Name: Porous Clay

Site ID: R060AY030SD

Major Land Resource Area (MLRA): 60A – Pierre Shale Plains



Physiographic Features

This site occurs on gently to moderately rolling uplands.

Landform: hill, plain

Aspect: N/A

	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	2,500	4,300
Slope (percent):	2	30
Water Table Depth (inches):	None	None
Flooding:		
Frequency:	None	None
Duration:	None	None
Ponding:		
Depth (inches):	None	None
Frequency:	None	None
Duration:	None	None
Runoff Class:	Medium	Very 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 13 to 18 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 masses 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 normal average annual temperature is about 46°F. January is the coldest month with average temperatures ranging from about 19°F (Moorcroft CAA, Wyoming (WY)), to about 22°F (Belle Fourche, South Dakota (SD)). July is the warmest month with temperatures averaging from about 70°F (Moorcroft CAA, WY), to about 72°F (Belle Fourche, SD). The range of normal average monthly temperatures between the coldest and warmest months is about 51°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 strong storms may bring brief periods of high winds with gusts to more than 50 mph.

Growth of cool-season plants begins in early to mid-March, slowing or ceasing in late June. Warm-season plants begin growth about mid-May and can continue to early or mid-September. Greenup of cool-season plants may occur in September and October when adequate soil moisture is present.

	<u>Minimum</u>	<u>Maximum</u>
Frost-free period (days):	122	129
Freeze-free period (days):	145	152
Mean Annual Precipitation (inches):	13	18

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

	Precip. Min.	Precip. Max	Temp. Min.	Temp. Max.
January	0.32	0.43	7.1	34.1
February	0.44	0.57	12.6	40.1
March	0.65	0.94	19.7	46.5
April	1.43	1.72	29.4	60.2
May	2.45	3.19	39.7	70.6
June	2.34	3.38	48.5	80.1
July	1.60	2.78	54.8	88.0
August	1.24	1.76	53.1	87.7
September	1.01	1.50	42.3	77.0
October	0.90	1.11	31.4	64.9
November	0.40	0.61	19.8	47.5
December	0.40	0.48	10.2	38.0

Climate Stations		Period	
Station ID	Location or Name	From	To
SD0236	Ardmore 2 N	1948	1999
SD0559	Belle Fourche	1948	1999
SD1124	Buffalo Gap	1951	1999
WY6395	Moorcroft CAA	1948	1998
WY9207	Upton 13 SW	1949	1998

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

Influencing Water Features

No significant water features influence this site.

Representative Soil Features

The soils of this site are channery clay loam textured surface soils and slopes of 2 to 30 percent. These soils are moderately deep to very deep, well-drained, and have moderately rapid permeability. The soils are formed from acid material weathered from shale and contain many small shale fragments. Subsurface soil texture is clay. This site should show slight to no evidence of rills. There may be some slight erosion due to wind and some pedestalling of plants does occur. Water flow paths are broken, irregular in appearance, or discontinuous with numerous debris dams or vegetative barriers. Soil blowing is a severe hazard.

More information can be found in the various soil survey reports. Contact the local USDA Service Center for soil survey reports that include more detail specific to your location.

Parent Material Kind: residuum, alluvium
Parent Material Origin: shale, acid
Surface Texture: clay loam
Surface Texture Modifier: channery
Subsurface Texture Group: clayey
Surface Fragments ≤3” (% Cover): 0-25
Surface Fragments >3” (%Cover): 0
Subsurface Fragments ≤3” (% Volume): 40-70
Subsurface Fragments >3” (% Volume): 0

	<u>Minimum</u>	<u>Maximum</u>
Drainage Class:	well	well
Permeability Class:	moderately rapid	moderately rapid
Depth (inches):	20	80
Electrical Conductivity (mmhos/cm)*:	0	2
Sodium Absorption Ratio*:	0	0
Soil Reaction (1:1 Water)*:	3.5	6.0
Soil Reaction (0.1M CaCl2)*:	NA	NA
Available Water Capacity (inches)*:	2	3
Calcium Carbonate Equivalent (percent)*:	0	10

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

Plant Communities

Ecological Dynamics of the Site:

This site developed under Northern Great Plains climatic conditions, natural influences of large herbivores, occasional fire, and other biotic and abiotic factors that typically influence soil/site development. Changes will occur in the plant communities due to short-term weather variations, impacts of native and/or exotic plant and animal species, and management actions. While the following plant community descriptions describe more typical transitions between communities that will occur, severe disturbances, such as periods of well-below average precipitation, can cause significant shifts in plant communities and/or species composition.

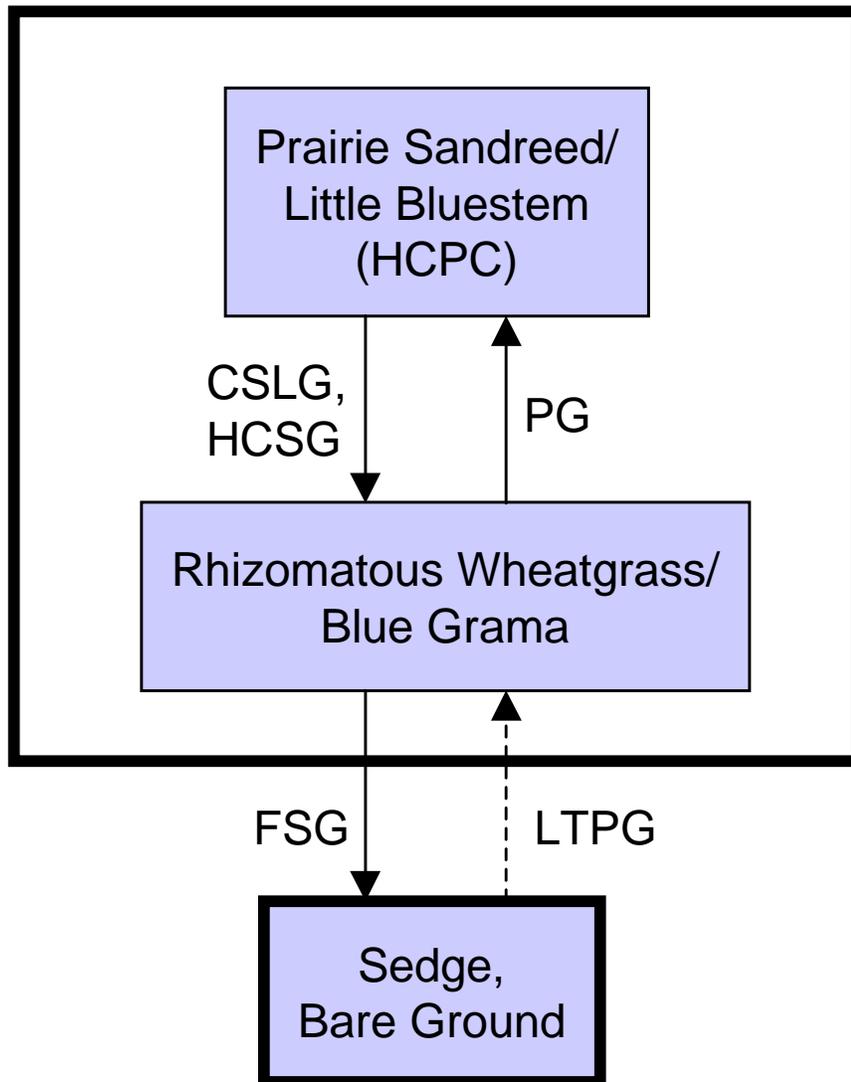
As this site deteriorates, species such as sedges, forbs, and blue grama will increase. Perennial grasses such as prairie sandreed, little bluestem, sand bluestem, and rhizomatous wheatgrass will decrease in frequency and production. Dunes may form due to lack of ground cover. The various plant communities on this site are often all contained within a dune-like area under the same grazing management. Soil erosion and dune formation greatly influence the existing plant communities. Depositional areas tend to be dominated by prairie sandreed and bluestem, while the areas from which soil is transported tend to be characterized by sedge, rush, and bare ground. However, the amount of deposition and transport can alter the plant communities. The historic and recent grazing impacts will also influence the plant composition. Prairie sandreed is an important plant to this site. Prairie sandreed has large rhizomes that help hold and bind the soil. As the prairie sandreed decreases along with bluestem and wheatgrass, the hazard for wind erosion increases. Areas can become bare dune-like areas. Where this site occurs adjacent to ponderosa pine woodlands, encroachment of ponderosa pine, bur oak, and juniper may occur.

The plant community upon which interpretations are primarily based is the Historic Climax Plant Community (HCPC). The HCPC has been determined by studying rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily grazed to lightly grazed areas, seasonal use

pastures, and historical accounts also have been used. Plant communities, states, transitional pathways, and thresholds have been determined through similar studies and experience.

The following is a diagram that illustrates the common plant communities that can occur on the site and the transition pathways between communities. The ecological processes are discussed in more detail in the plant community descriptions following the diagram.

Plant Communities and Transitional Pathways



CSLG - Continuous season-long grazing; **FSG** - Frequent and severe grazing; **HCPC** - Historic Climax Plant Community; **HCSG** - Heavy, continuous seasonal grazing; **LTPG** - Long-term prescribed grazing; **PG** - Prescribed grazing.

Plant Community Composition and Group Annual Production

			Prairie Sandreed/ Bluestem (HPCP) Little		
COMMON/GROUP NAME	SCIENTIFIC NAME	SYMBOL	Group	lbs./acre	% Comp
GRASSES & GRASS-LIKES				1125 - 1275	75 - 85
prairie sandreed	Calamovilfa longifolia	CALO	1	300 - 450	20 - 30
little bluestem	Schizachyrium scoparium	SCSC	2	300 - 450	20 - 30
RHIZOMATOUS WHEATGRASS			3	75 - 225	5 - 15
western wheatgrass	Pascopyrum smithii	PASM	3	75 - 225	5 - 15
thickspike wheatgrass	Elymus lanceolatus ssp. lanceolatus	ELLAL	3	75 - 225	5 - 15
WARM-SEASON GRASSES			4	75 - 375	5 - 25
switchgrass	Panicum virgatum	PAVI2	4	0 - 150	0 - 10
sand bluestem	Andropogon hallii	ANHA	4	75 - 225	5 - 15
big bluestem	Andropogon gerardii	ANGE	4	75 - 225	5 - 15
sideoats grama	Bouteloua curtipendula	BOCU	4	0 - 150	0 - 10
prairie cordgrass	Spartina pectinata	SPPE	4	0 - 75	0 - 5
NATIVE GRASSES & GRASS-LIKES			5	75 - 225	5 - 15
sun sedge	Carex inops ssp. heliophila	CAINH2	5	15 - 75	1 - 5
blue grama	Bouteloua gracilis	BOGR2	5	0 - 75	0 - 5
needleandthread	Hesperostipa comata ssp. comata	HECOC8	5	0 - 75	0 - 5
threadleaf sedge	Carex filifolia	CAFI	5	0 - 75	0 - 5
needleleaf sedge	Carex duriuscula	CADU6	5	0 - 75	0 - 5
Sandberg bluegrass	Poa secunda	POSE	5	15 - 75	1 - 5
prairie junegrass	Koeleria macrantha	KOMA	5	15 - 75	1 - 5
Dudley's rush	Juncus dudleyi	JUDU2	5	15 - 75	1 - 5
plains reedgrass	Calamagrostis montanensis	CAMO	5	0 - 75	0 - 5
other perennial grasses		2GP	5	0 - 75	0 - 5
FORBS			7	150 - 225	10 - 15
American vetch	Vicia americana	VIAM	7	0 - 45	0 - 3
aster	Aster spp.	ASTER	7	0 - 45	0 - 3
biscuitroot	Lomatium spp.	LOMAT	7	0 - 45	0 - 3
bluebells	Mertensia spp.	MERTE	7	15 - 45	1 - 3
cudweed sagewort	Artemisia ludoviciana	ARLU	7	15 - 45	1 - 3
dotted gayfeather	Liatris punctata	LIPU	7	0 - 30	0 - 2
field pussytoes	Antennaria neglecta	ANNE	7	0 - 15	0 - 1
goldenpea	Thermopsis rhombifolia	THRH	7	15 - 45	1 - 3
hairy goldaster	Heterotheca villosa	HEVI4	7	0 - 45	0 - 3
Indian breadroot	Pediomelum esculentum	PEES	7	0 - 45	0 - 3
milkvetch	Astragalus spp.	ASTRA	7	15 - 30	1 - 2
Missouri goldenrod	Solidago missouriensis	SOMI2	7	0 - 45	0 - 3
prairie coneflower	Ratibida columnifera	RACO3	7	0 - 45	0 - 3
purple prairie clover	Dalea purpurea	DAPU5	7	0 - 45	0 - 3
rose pussytoes	Antennaria rosea	ANRO2	7	0 - 15	0 - 1
scarlet gaura	Gaura coccinea	GACO5	7	0 - 15	0 - 1
stemless hymenoxys	Tetranneuris acaulis	TEAC	7	0 - 30	0 - 2
tapertip hawksbeard	Crepis acuminata	CRAC2	7	0 - 45	0 - 3
western yarrow	Achillea millefolium	ACMI2	7	0 - 30	0 - 2
white prairie clover	Dalea candida	DACA7	7	0 - 45	0 - 3
wild onion	Allium spp.	ALLIU	7	0 - 15	0 - 1
yellow wild buckwheat	Eriogonum flavum var. flavum	ERFLF	7	0 - 30	0 - 2
other perennial forbs		2FP	7	0 - 45	0 - 3
SHRUBS			8	75 - 150	5 - 10
leadplant	Amorpha canescens	AMCA6	8	15 - 45	1 - 3
rose	Rosa spp.	ROSA5	8	0 - 45	0 - 3
skunkbush sumac	Rhus trilobata	RHTR	8	0 - 45	0 - 3
yucca	Yucca glauca	YUGL	8	0 - 30	0 - 2
other shrubs		2SHRUB	8	0 - 30	0 - 2

Annual Production lbs./acre	LOW	RV	HIGH
GRASSES & GRASS-LIKES	685 -	1200	- 1515
FORBS	145 -	188	- 230
SHRUBS	70 -	113	- 155
TOTAL	900 -	1500	- 1900

This list of plants and their relative proportions are based on near normal years. Fluctuations in species composition and relative production may change from year to year dependent upon precipitation or other climatic factors. RV = Representative value.

Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SYMBOL	Prairie Sandreed/ Little Bluestem (HCPC)			Rhizomatous Wheatgrass/ Blue Grama			Sedge, Bare Ground			
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	
GRASSES & GRASS-LIKES			1125 - 1275	75 - 85		630 - 720	70 - 80		225 - 255	75 - 85	
prairie sandreed	CALO	1	300 - 450	20 - 30	1	0 - 45	0 - 5	1			
little bluestem	SCSC	2	300 - 450	20 - 30	2	0 - 90	0 - 10	2	0 - 15	0 - 5	
RHIZOMATOUS WHEATGRASS		3	75 - 225	5 - 15	3	180 - 360	20 - 40	3	0 - 30	0 - 10	
western wheatgrass	PASM	3	75 - 225	5 - 15	3	90 - 315	10 - 35	3	0 - 30	0 - 10	
thickspike wheatgrass	ELLAL	3	75 - 225	5 - 15	3	90 - 180	10 - 20	3	0 - 15	0 - 5	
WARM-SEASON GRASSES		4	75 - 375	5 - 25	4	18 - 90	2 - 10	4	0 - 9	0 - 3	
switchgrass	PAVI2	4	0 - 150	0 - 10	4	0 - 45	0 - 5				
sand bluestem	ANHA	4	75 - 225	5 - 15	4	0 - 27	0 - 3				
big bluestem	ANGE	4	75 - 225	5 - 15	4	0 - 27	0 - 3				
sideoats grama	BOCU	4	0 - 150	0 - 10	4	0 - 45	0 - 5	4	0 - 9	0 - 3	
prairie cordgrass	SPPE	4	0 - 75	0 - 5							
NATIVE GRASSES & GRASS-LIKES		5	75 - 225	5 - 15	5	135 - 360	15 - 40	5	90 - 180	30 - 60	
sun sedge	CAINH2	5	15 - 75	1 - 5	5	45 - 90	5 - 10	5	15 - 60	5 - 20	
blue grama	BOGR2	5	0 - 75	0 - 5	5	90 - 225	10 - 25	5	0 - 30	0 - 10	
needleandthread	HECOC8	5	0 - 75	0 - 5	5	0 - 45	0 - 5	5	0 - 15	0 - 5	
threadleaf sedge	CAFI	5	0 - 75	0 - 5	5	18 - 90	2 - 10	5	15 - 45	5 - 15	
needleleaf sedge	CADU6	5	0 - 75	0 - 5	5	18 - 90	2 - 10	5	15 - 45	5 - 15	
Sandberg bluegrass	POSE	5	15 - 75	1 - 5	5	9 - 45	1 - 5	5	6 - 24	2 - 8	
prairie junegrass	KOMA	5	15 - 75	1 - 5	5	9 - 45	1 - 5	5	3 - 15	1 - 5	
Dudley's rush	JUDU2	5	15 - 75	1 - 5	5	18 - 72	2 - 8	5	9 - 30	3 - 10	
plains reedgrass	CAMO	5	0 - 75	0 - 5	5	0 - 27	0 - 3				
threeawn	ARIST				5	0 - 27	0 - 3	5	0 - 15	0 - 5	
other perennial grasses	2GP	5	0 - 75	0 - 5	5	0 - 18	0 - 2	5	0 - 6	0 - 2	
NON-NATIVE GRASSES		6			6	0 - 45	0 - 5	6	0 - 30	0 - 10	
cheatgrass	BRTE				6	0 - 45	0 - 5	6	0 - 24	0 - 8	
Kentucky bluegrass	POPR				6	0 - 45	0 - 5	6	0 - 9	0 - 3	
FORBS		7	150 - 225	10 - 15	7	90 - 180	10 - 20	7	30 - 45	10 - 15	
American vetch	VIAM	7	0 - 45	0 - 3							
aster	ASTER	7	0 - 45	0 - 3	7	0 - 27	0 - 3	7	0 - 9	0 - 3	
biscuitroot	LOMAT	7	0 - 45	0 - 3	7	0 - 18	0 - 2				
bluebells	MERTE	7	15 - 45	1 - 3	7	0 - 18	0 - 2				
cutweed sagewort	ARLU	7	15 - 45	1 - 3	7	9 - 36	1 - 4	7	3 - 15	1 - 5	
curlycup gumweed	GRSQ				7	0 - 27	0 - 3	7	0 - 15	0 - 5	
dotted gayfeather	LIPU	7	0 - 30	0 - 2	7	0 - 18	0 - 2	7	0 - 6	0 - 2	
field pussytoes	ANNE	7	0 - 15	0 - 1	7	0 - 18	0 - 2	7	0 - 3	0 - 1	
goldenpea	THRH	7	15 - 45	1 - 3	7	9 - 36	1 - 4	7	3 - 12	1 - 4	
hairy goldaster	HEVI4	7	0 - 45	0 - 3	7	0 - 18	0 - 2				
Indian breadroot	PEES	7	0 - 45	0 - 3							
milkvetch	ASTRA	7	15 - 30	1 - 2	7	9 - 18	1 - 2	7	3 - 6	1 - 2	
Missouri goldenrod	SOMI2	7	0 - 45	0 - 3	7	0 - 27	0 - 3	7	0 - 9	0 - 3	
prairie coneflower	RACO3	7	0 - 45	0 - 3	7	0 - 27	0 - 3	7	0 - 6	0 - 2	
purple prairie clover	DAPU5	7	0 - 45	0 - 3	7	0 - 18	0 - 2	7	0 - 6	0 - 2	
rose pussytoes	ANRO2	7	0 - 15	0 - 1	7	0 - 18	0 - 2	7	0 - 3	0 - 1	
salsify	TRAGO				7	0 - 27	0 - 3	7	0 - 15	0 - 5	
scarlet gaura	GACO5	7	0 - 15	0 - 1							
stemless hymenoxys	TEAC	7	0 - 30	0 - 2	7	0 - 18	0 - 2	7	0 - 6	0 - 2	
tapertip hawksbeard	CRAC2	7	0 - 45	0 - 3							
thistle	CIRSI				7	0 - 27	0 - 3	7	0 - 15	0 - 5	
western yarrow	ACMI2	7	0 - 30	0 - 2	7	9 - 27	1 - 3	7	0 - 12	0 - 4	
white prairie clover	DACA7	7	0 - 45	0 - 3	7	0 - 9	0 - 1				
wild onion	ALLIU	7	0 - 15	0 - 1	7	0 - 18	0 - 2	7	0 - 3	0 - 1	
yellow wild buckwheat	ERFLF	7	0 - 30	0 - 2	7	0 - 18	0 - 2	7	0 - 9	0 - 3	
other perennial forbs	2FP	7	0 - 45	0 - 3	7	0 - 27	0 - 3	7	0 - 15	0 - 5	
other annual forbs	2FA				7	0 - 36	0 - 4	7	0 - 15	0 - 5	
SHRUBS		8	75 - 150	5 - 10	8	45 - 90	5 - 10	8	3 - 15	1 - 5	
leadplant	AMCA6	8	15 - 45	1 - 3							
rose	ROSA5	8	0 - 45	0 - 3	8	0 - 27	0 - 3	8	0 - 9	0 - 3	
skunkbush sumac	RHTR	8	0 - 45	0 - 3	8	0 - 27	0 - 3	8	0 - 9	0 - 3	
yucca	YUGL	8	0 - 30	0 - 2	8	0 - 36	0 - 4	8	0 - 6	0 - 2	
other shrubs	2SHRUB	8	0 - 30	0 - 2	8	0 - 27	0 - 3	8	0 - 6	0 - 2	
Annual Production lbs./acre			LOW	RV	HIGH	LOW	RV	HIGH	LOW	RV	HIGH
GRASSES & GRASS-LIKES			685	1200	1515	475	698	920	75	254	430
FORBS			145	188	230	85	135	185	25	38	50
SHRUBS			70	113	155	40	68	95	0	9	20
TOTAL			900	1500	1900	600	900	1200	100	300	500

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 and Vegetation State Narratives

Following are the narratives for each of the described plant communities. These plant communities may not represent every possibility, but they are the most prevalent and repeatable plant communities. The plant composition tables shown above have been developed from the best available knowledge at the time of this revision. As more information is collected, some of these plant community descriptions may be revised or removed, and new ones added. None of these plant communities should necessarily be thought of as “Desired Plant Communities” (DPCs). According to the USDA Natural Resources Conservation Service (NRCS) National Range and Pasture Handbook, DPCs will be determined by the decision makers and will meet minimum quality criteria established by the NRCS. The main purpose for including any description of a plant community here is to capture the current knowledge and experience at the time of this revision.

Prairie Sandreed/Little Bluestem Plant Community

The plant community upon which interpretations are primarily based is the Prairie Sandreed/Little Bluestem Plant Community. This is also considered the HCPC. This plant community is about 75-85 percent grasses or grass-likes, 10-15 percent forbs, and 5-10 percent shrubs by weight. A mix of warm and cool season mid-grasses dominates this plant community. Major grasses include prairie sandreed, little bluestem, rhizomatous wheatgrasses, and sand or big bluestem. Other grasses occurring in this plant community include needleandthread, blue grama, sun sedge, threadleaf sedge, and prairie cordgrass. Forbs occurring in this plant community are cudweed sagewort, golden pea, scurfpea, and western yarrow. Significant shrubs include leadplant, and rose.

Overall, this plant community has the appearance of being stable, diverse, and productive. Plant litter is properly distributed with very little movement offsite and natural plant mortality is very low. Most plant species have a wide range of age classes represented and reproduction is not limited. Plant roots occupy most of the soil profile, which provides for soil stability and promotes infiltration. Occasionally, this plant community will have areas influenced by natural geologic erosion and will exhibit characteristics similar to the Sedge, Bare Ground Plant Community.

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

Growth curve number: SD6004

Growth curve name: Pierre Shale Plains, warm-season dominant, cool-season subdominant.

Growth curve description: Warm-season dominant, cool-season subdominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	7	18	25	25	15	7	1	0	0

Transitional pathways and/or community pathways leading to other plant communities are as follows:

- Continuous season-long grazing will convert this plant community to the *Rhizomatous Wheatgrass/Blue Grama Plant Community*. Heavy continuous seasonal grazing will also cause this shift to occur.

Rhizomatous Wheatgrass/Blue Grama Plant Community

This plant community develops under moderate, season-long grazing by livestock. The plant community is about 70-80 percent grasses or grass-likes, 10-20 percent forbs, and 5-10 percent shrubs. Dominant grasses include rhizomatous wheatgrasses, blue grama, and sun sedge. Grasses of secondary importance include needleandthread, threadleaf sedge, Junegrass, and Sandberg bluegrass. Prairie sandreed and little bluestem are present in low amounts. Forbs commonly occurring include cudweed sagewort, hairy goldaster, goldenpea, biscuitroot, wild onion, scarlet

globemallow and pussytoes. Fringed sagewort, plains pricklypear, and fragile cactus can also occur. Leadplant and rose generally have declined in abundance.

When compared to the HCPC, rhizomatous wheatgrasses and blue grama have increased. Prairie sandreed, sand or big bluestem, and little bluestem have decreased. Rhizomatous wheatgrasses exhibit lower vigor. Nonnative annual grasses and forbs may invade the plant community and bare ground also increases.

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

Growth curve number: SD6003

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

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

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

Transitional pathways and/or community pathways leading to other plant communities are as follows:

- Prescribed grazing will convert this plant community to the *Prairie Sandreed/Little Bluestem Plant Community*.
- Frequent and severe grazing will convert this plant community to the *Sedge, Bare Ground Plant Community*.

Sedge, Bare Ground Plant Community

Typically, this plant community is the result of frequent and severe grazing. However, this plant community is also found in areas that exhibit increased bare ground due to natural geologic erosion. These areas often occur adjacent to shale outcrops or in association with the Shallow Porous Clay Ecological Site. Short grass and grass-like plants such as sun sedge, prairie Junegrass, Dudley’s rush, and bluegrass dominate this plant community. Annual grasses such as annual brome and annual forbs such as mustards may be common. Fragile cactus and plains pricklypear may also occur. The plant community is about 75-85 percent grass and grass-likes, 10-15 percent forbs, and 1-5 percent shrubs.

When compared to the HCPC, the perennial tall and mid-grasses have greatly decreased. Short grasses and sedges dominate the plant community. The dominant forbs are cudweed sagewort, mustards, yarrow, pussytoes, cactus, and golden pea. Bare ground has greatly increased and large areas of no vegetation may be present.

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

Growth curve number: SD6001

Growth curve name: Pierre Shale Plains, cool-season dominant.

Growth curve description: Cool-season dominant.

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

Transitional pathways and/or community pathways leading to other plant communities are as follows:

- With long-term prescribed grazing, this plant community will be converted to the *Rhizomatous Wheatgrass/Blue Grama Plant Community*.

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

The MLRA 60A lies within the drier portion of the northern mixed-grass prairie ecosystem where sagebrush steppes to the west yield to grassland steppes to the east. Prior to European settlement, this area consisted of diverse grass/shrub land habitats interspersed with varying densities of depressional, in-stream wetlands, and woody riparian corridors. These habitats provided critical life cycle components for many of its users. Many species of grassland birds, small mammals, reptiles, amphibians, and herds of roaming bison, elk, and pronghorn were among the inhabitants adapted to this semi-arid region. Roaming herbivores, as well as, several small mammal and insect species, were the primary consumers linking the grassland resources to predators such as the wolf, mountain lion, and grizzly bear, as well as, smaller carnivores such as the coyote, bobcat, fox, and raptors. The prairie dog was once abundant; however, the species remains a keystone species within its range. The black-footed ferret, burrowing owl, ferruginous hawk, mountain plover, and swift fox were associated with prairie dog complexes.

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

Prairie Sandreed/Little Bluestem Plant Community: The predominance of grasses in this plant community favors grazers and mixed-feeders, such as bison, elk, and antelope. Suitable thermal and escape cover for deer may be limited due to the low quantities of woody plants. However, topographical variations could provide some escape cover. When found adjacent to sagebrush dominated states, this plant community may provide brood rearing/foraging areas for greater sage-grouse, as well as, lek sites. Other birds that would frequent this plant community include western meadowlarks, horned larks, and golden eagles. Many grassland obligate small mammals would occur here.

Rhizomatous Wheatgrass/Blue grama: This plant community may be useful for the same large grazers that would use the HCPC. However, the plant community composition is less diverse, and thus, less apt to meet the seasonal needs of these animals. It may provide some foraging opportunities for greater sage-grouse when it occurs proximal to woody cover. Good grasshopper habitat equals good foraging for birds.

Sedge, Bare Ground: This plant community has a low level of diversity. Due to the dominance of annual grasses feed for large mammals is limited. Cheatgrass does provide some early spring

grazing. Areas of bare ground may provide leks for birds such as greater sage-grouse. Trees on this state may provide thermal protection and escape cover for deer and other mammals.

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

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
Grasses & Grass-like							
big bluestem	U D P D	U U D 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 D	D P P D	U D P U	D P P D	D P P D	U D P U	U D P U
Dudley's rush	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
little bluestem	U D D U	U U D U	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
needleleaf sedge	U P U D	U P U D	U D U D	U D U D	U D U D	U D U D	U D U D
plains reedgrass	U D U U	N D N N	U D U U	N D N N	N D N N	U D U U	U D U U
prairie cordgrass	U D D U	N N N N	U D D U	N N N N	N N N N	U D D U	U D D U
prairie junegrass	U D U D	N D N U	U D U D	N D N U	N D N U	U D U D	U D U D
prairie sandreed	U D D U	U D U U	U D D U	U U D U	U U D U	U D D U	U D D U
sand bluestem	U D P D	U U D U	U D P D	U D U U	U D U U	U D P D	U D P D
Sandberg bluegrass	U U U U	U D U U	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 D	U P D D	U D P U	U P D U	U P D U	U D P U	U D P U
sun sedge	U P U D	U P U 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
thickspike wheatgrass	U D D U	U D U U	U D D U	N D N N	N D N N	U D D U	U D D U
threadleaf sedge	U P U D	U P U 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 D	U D U U	U P D U	N D N N	N D N N	U P D U	U P D U
Forbs							
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
aster	U U D U	U U D U	U U D U	U U D U	U U D U	U U D U	U U D U
biscuitroot	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
bluebells	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
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
field pussytoes	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U
goldenpea	U U U U	U D U U	U U U U	U D U U	U D U U	U U U U	U D U U
hairy goldaster	U U D U	N N N N	U U D U	N N N N	N N N N	U U D U	N N N N
Indian breadroot	U U U U	U D U U	U U U U	U D U U	U D U U	U U U U	U D U U
milkvetch	U U U U	U D U U	U U U U	U D U U	U D U U	U U U U	U D U U
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
prairie coneflower	U U D U	U P P U	U U D U	U P P U	U P P U	U U D U	U P P U
purple prairie clover	U D P U	U P P U	U D P U	U P P U	U P P U	U D P U	U P P U
rose pussytoes	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U
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
stemless hymenoxys	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
tapertip hawksbeard	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
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 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
wild 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
yellow wild buckwheat	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 N U N
Shrubs							
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
skunkbush sumac	D U U D	D D D D	D U U D	D U U D	D U U D	D U U D	D U U D
yucca	D N N D	D U U D	D N N D	D U U D	D U U D	D N N D	D U U D

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

† 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)
Prairie Sandreed/Little Bluestem	1,500	0.47
Rhizomatous Wheatgrass/Blue Grama	900	0.28
Sedge, Bare Ground	300	0.09

*Based on 790 lbs./acre (air-dry weight) per Animal Unit Month (AUM), and on 25 percent harvest efficiency (refer to USDA NRCS, National Range and Pasture Handbook).

Grazing by domestic livestock is one of the major income-producing industries in the area. Rangeland in this area may provide yearlong forage. During the dormant period, the forage for livestock will likely be lacking protein to meet livestock requirements, and added protein will allow ruminants to better utilize the energy stored in grazed plant materials. A forage quality test (either directly or through fecal sampling) should be used to determine the level of supplementation needed.

Hydrology Functions

Water is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic group B. Infiltration ranges from high to very high. Runoff potential for this site varies from medium to very high depending on 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 short grasses form a strong sod and dominate the site. Normally, areas where ground cover is less than 50 percent have the greatest potential to have reduced infiltration and higher runoff (refer to Section 4, NRCS National Engineering Handbook, for runoff quantities and hydrologic curves).

Recreational Uses

This site provides hunting opportunities for upland game species. The wide varieties of plants which bloom from spring until fall have an esthetic value that appeals to visitors.

Wood Products

Other Products

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

Supporting Information

Associated Sites

- (060AY043SD) – Shallow Porous Clay
- (060AY0??SD) – Ponderosa Pine Woodland

Similar Sites

- (060AY043SD) – Shallow Porous Clay
[less production and prairie sandreed; more tree encroachment; more sun sedge]

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 description include: Everet Bainter, Range Management Specialist (RMS), NRCS; Stan Boltz, RMS, NRCS; Glen Mitchell, RMS, NRCS; and Cheryl Nielsen, RMS, NRCS.

<u>Data Source</u>	<u>Number of Records</u>	<u>Sample Period</u>	<u>State</u>	<u>County</u>
SCS-RANGE-417	3	1985 – 1986	WY	Weston

State Correlation

This site has been correlated between Montana (MT), Nebraska (NE), SD, and WY in MLRA 60A.

Field Offices

Belle Fourche, SD	Custer, SD	Hot Springs, SD	Pine Ridge, SD	Sundance, WY
Broadus, MT	Ekalaka, MT	Lusk, WY	Rapid City, SD	Wall, SD
Buffalo, SD	Faith, SD	Martin, SD	Rushville, NE	
Chadron, NE	Gillette, WY	Newcastle, WY	Sturgis, SD	

Relationship to Other Established Classifications

Level IV Ecoregions of the Conterminous United States: 43e – Sagebrush Steppe, 43g – Semi-arid Pierre Shale Plains, and 43k – Dense Clay Prairie.

Other References

High Plains Regional Climate Center, University of Nebraska, 830728 Chase Hall, Lincoln, NE 68583-0728. (<http://www.hprcc.unl.edu/>)

USDA, NRCS. National Water and Climate Center, 101 SW Main, Suite 1600, Portland, OR 97204-3224. (<http://www.wcc.nrcs.usda.gov/>)

USDA, NRCS. National Range and Pasture Handbook, September 1997.

USDA, NRCS. National Soil Information System, Information Technology Center, 2150 Centre Avenue, Building A, Fort Collins, CO 80526. (<http://soils.usda.gov/technical/nasis>)

USDA, NRCS, 2002. National Soil Survey Handbook, Title 430-VI. (<http://soils.usda.gov/technical/handbook/>)

USDA, NRCS. 2001. The PLANTS Database, Version 3.1 (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

USDA, NRCS, Various Published Soil Surveys.

Site Description Approval

MT, State Range Management Specialist Date

NE, State Range Management Specialist Date

SD, State Range Management Specialist Date

WY, State Range Management Specialist Date