

United States Department of Agriculture Natural Resources Conservation Service

Ecological Site Description

Site Type: Rangeland

Site Name: Shallow Porous Clay

Site ID: R060AY043SD

Major Land Resource Area: 60A – Pierre Shale Plains



Physiographic Features

This site occurs on gently to moderately rolling uplands.

Landform: hill, ridge

Aspect: N/A

	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	2500	4300
Slope (percent):	3	60
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:	High	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, WY) to about 22° F (Belle Fourche, 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 annually, ranging from about 13 miles per hour during the spring to about 10 miles per hour 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 miles per hour.

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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. Green up 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 shallow (less than 20" to bedrock), well drained, and are moderately permeable. The soils are formed from acid material weathered from shale and contain many small shale fragments. 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: alluvial and residuum
Parent Material Origin: acid shale,
Surface Texture: clay loam
Surface Texture Modifier: none
Subsurface Texture Group: shaly clay
Surface Fragments \leq 3" (% Cover): 0
Surface Fragments $>$ 3" (%Cover): 0
Subsurface Fragments \leq 3" (% Volume): 40
Subsurface Fragments $>$ 3" (% Volume): 0

	<u>Minimum</u>	<u>Maximum</u>
Drainage Class:	well drained	well drained
Permeability Class:	moderately permeable	moderately permeable
Depth (inches):	10	20
Electrical Conductivity (mmhos/cm)*:	0	2
Sodium Absorption Ratio*:	0	1
Soil Reaction (1:1 Water)*:	3.5	5.5
Soil Reaction (0.1M CaCl₂)*:	NA	NA
Available Water Capacity (inches)*:	3	5
Calcium Carbonate Equivalent (percent)*:	0	0

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

Plant Communities

Ecological Dynamics of the Site:

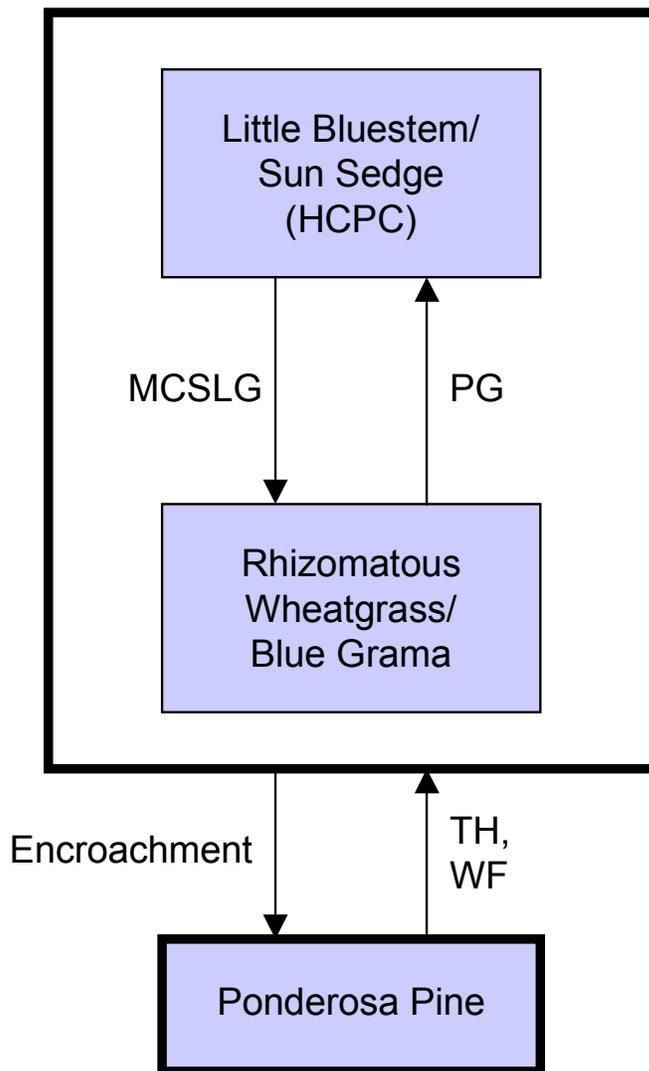
This site developed under Northern Great Plains climatic conditions, natural influences of large herbivores, occasional fire, and other biotic and abiotic factors that typically influence soil/site development. Changes will occur in the plant communities due to short-term weather variations, impacts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



Encroachment - Encroachment of trees from adjacent sites;
HCPC - Historic Climax Plant Community; **MCSLG** - Moderate, continuous season-long grazing; **PG** - Prescribed grazing (proper stocking rates with adequate recovery periods during the growing season); **TH** - Timber harvest; **WF** - Wildfire, including crown fires.

Plant Community Composition and Group Annual Production

			Little Bluestem/Sun Sedge (HCPC)		
COMMON/GROUP NAME	SCIENTIFIC NAME	SYMBOL	Group	lbs./acre	% Comp
GRASSES & GRASS-LIKES				700 - 800	70 - 80
RHIZOMATOUS WHEATGRASS			1	50 - 150	5 - 15
western wheatgrass	Pascopyrum smithii	PASM	1	50 - 150	5 - 15
thickspike wheatgrass	Elymus lanceolatus ssp. lanceolatus	ELLAL	1	50 - 150	5 - 15
little bluestem	Schizachyrium scoparium	SCSC	2	200 - 400	20 - 40
sun sedge	Carex inops ssp. heliophila	CAINH2	3	150 - 300	15 - 30
big bluestem	Andropogon gerardii	ANGE	4	50 - 150	5 - 15
NATIVE GRASSES & GRASS-LIKES			5	50 - 150	5 - 15
sideoats grama	Bouteloua curtipendula	BOCU	5	0 - 50	0 - 5
blue grama	Bouteloua gracilis	BOGR2	5	0 - 50	0 - 5
threadleaf sedge	Carex filifolia	CAFI	5	0 - 50	0 - 5
needleleaf sedge	Carex duriuscula	CADU6	5	0 - 50	0 - 5
prairie sandreed	Calamovilfa longifolia	CALO	5	0 - 50	0 - 5
Dudley's rush	Juncus dudleyi	JUDU2	5	0 - 50	0 - 5
other perennial grasses		2GP	5	0 - 50	0 - 5
FORBS			7	100 - 200	10 - 20
American vetch	Vicia americana	VIAM	7	0 - 50	0 - 5
aster	Aster spp.	ASTER	7	0 - 50	0 - 5
biscuitroot	Lomatium spp.	LOMAT	7	0 - 50	0 - 5
bluebells	Mertensia spp.	MERTE	7	0 - 50	0 - 5
goldenpea	Thermopsis rhombifolia	THRH	7	0 - 50	0 - 5
Indian breadroot	Pediomelum esculentum	PEES	7	0 - 50	0 - 5
milkvetch	Astragalus spp.	ASTRA	7	0 - 50	0 - 5
prairie coneflower	Ratibida columnifera	RACO3	7	0 - 50	0 - 5
purple prairie clover	Dalea purpurea	DAPU5	7	0 - 50	0 - 5
rose pussytoes	Antennaria rosea	ANRO2	7	0 - 50	0 - 5
scarlet gaura	Gaura coccinea	GACO5	7	0 - 50	0 - 5
stemless goldenweed	Stenotus acaulis	STAC	7	0 - 50	0 - 5
tapertip hawksbeard	Crepis acuminata	CRAC2	7	0 - 50	0 - 5
twogrooved milkvetch	Astragalus bisulcatus	ASBI2	7	0 - 50	0 - 5
western yarrow	Achillea millefolium	ACMI2	7	0 - 50	0 - 5
white prairie clover	Dalea candida	DACA7	7	0 - 50	0 - 5
wild onion	Allium spp.	ALLIU	7	0 - 50	0 - 5
yellow wild buckwheat	Eriogonum flavum var. flavum	ERFLF	7	0 - 50	0 - 5
other perennial forbs		2FP	7	0 - 50	0 - 5
SHRUBS			8	0 - 50	0 - 5
leadplant	Amorpha canescens	AMCA6	8	0 - 50	0 - 5
other shrubs		2SHRUB	8	0 - 50	0 - 5
TREES			9	0 - 50	0 - 5
bur oak	Quercus macrocarpa	QUMA2	9	0 - 50	0 - 5
juniper	Juniperus spp.	JUNIP	9	0 - 50	0 - 5
ponderosa pine	Pinus ponderosa	PIPO	9	0 - 50	0 - 5

Annual Production lbs./acre	LOW	RV	HIGH
GRASSES & GRASS-LIKES	605 -	800	-885
FORBS	95 -	150	-205
SHRUBS	0 -	25	-55
TREES	0 -	25	-55
TOTAL	700 -	1000	-1200

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	Little Bluestem/Sun Sedge (HCPC)			Rhizomatous Wheatgrass/ Blue Grama			Ponderosa Pine			
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	
GRASSES & GRASS-LIKES			700 - 800	70 - 80		420 - 560	60 - 80		250 - 375	50 - 75	
RHIZOMATOUS WHEATGRASS		1	50 - 150	5 - 15	1	70 - 140	10 - 20	1	10 - 50	2 - 10	
western wheatgrass	PASM	1	50 - 150	5 - 15	1	70 - 140	10 - 20	1	10 - 50	2 - 10	
thickspike wheatgrass	ELLAL	1	50 - 150	5 - 15	1	70 - 140	10 - 20	1	0 - 25	0 - 5	
little bluestem	SCSC	2	200 - 400	20 - 40	2	35 - 105	5 - 15	2	25 - 75	5 - 15	
sun sedge	CAINH2	3	150 - 300	15 - 30	3	105 - 210	15 - 30	3	50 - 100	10 - 20	
big bluestem	ANGE	4	50 - 150	5 - 15	4	0 - 35	0 - 5	4	0 - 25	0 - 5	
NATIVE GRASSES & GRASS-LIKES		5	50 - 150	5 - 15	5	70 - 245	10 - 35	5	50 - 200	10 - 40	
sideoats grama	BOCU	5	0 - 50	0 - 5	5	0 - 35	0 - 5	5	0 - 25	0 - 5	
blue grama	BOGR2	5	0 - 50	0 - 5	5	35 - 105	5 - 15	5	0 - 25	0 - 5	
threadleaf sedge	CAFI	5	0 - 50	0 - 5	5	35 - 70	5 - 10	5	0 - 50	0 - 10	
needleleaf sedge	CADU6	5	0 - 50	0 - 5	5	35 - 70	5 - 10	5	0 - 50	0 - 10	
prairie sandreed	CALO	5	0 - 50	0 - 5	5	0 - 14	0 - 2	5	0 - 50	0 - 10	
Dudley's rush	JUDU2	5	0 - 50	0 - 5	5	14 - 56	2 - 8	5	10 - 50	2 - 10	
threeawn	ARIST				5	0 - 35	0 - 5	5	10 - 25	2 - 5	
other perennial grasses	2GP	5	0 - 50	0 - 5	5	0 - 35	0 - 5	5	0 - 25	0 - 5	
NON-NATIVE GRASSES		6			6	0 - 56	0 - 8	6	10 - 50	2 - 10	
cheatgrass	BRTE				6	0 - 56	0 - 8	6	10 - 50	2 - 10	
FORBS		7	100 - 200	10 - 20	7	70 - 140	10 - 20	7	25 - 100	5 - 20	
American vetch	VIAM	7	0 - 50	0 - 5	7	0 - 21	0 - 3				
aster	ASTER	7	0 - 50	0 - 5	7	0 - 35	0 - 5	7	0 - 25	0 - 5	
biscuitroot	LOMAT	7	0 - 50	0 - 5	7	0 - 21	0 - 3	7	0 - 25	0 - 5	
bluebells	MERTE	7	0 - 50	0 - 5	7	0 - 14	0 - 2	7	0 - 10	0 - 2	
goldenpea	THRH	7	0 - 50	0 - 5	7	0 - 35	0 - 5	7	0 - 25	0 - 5	
Indian breadroot	PEES	7	0 - 50	0 - 5	7	0 - 14	0 - 2				
milkvetch	ASTRA	7	0 - 50	0 - 5	7	0 - 35	0 - 5	7	0 - 25	0 - 5	
prairie coneflower	RACO3	7	0 - 50	0 - 5	7	0 - 35	0 - 5	7	0 - 25	0 - 5	
purple prairie clover	DAPU5	7	0 - 50	0 - 5	7	0 - 21	0 - 3	7	0 - 25	0 - 5	
rose pussytoes	ANRO2	7	0 - 50	0 - 5	7	0 - 21	0 - 3	7	0 - 15	0 - 3	
scarlet gaura	GACO5	7	0 - 50	0 - 5	7	0 - 14	0 - 2	7	0 - 5	0 - 1	
stemless goldenweed	STAC	7	0 - 50	0 - 5	7	0 - 35	0 - 5	7	0 - 25	0 - 5	
sweetclover	MELIL				7	0 - 70	0 - 10	7	0 - 75	0 - 15	
tapertip hawksbeard	CRAC2	7	0 - 50	0 - 5	7	0 - 21	0 - 3				
thistle	CIRSI				7	0 - 35	0 - 5	7	0 - 50	0 - 10	
twogrooved milkvetch	ASBI2	7	0 - 50	0 - 5	7	0 - 35	0 - 5	7	0 - 25	0 - 5	
western yarrow	ACMI2	7	0 - 50	0 - 5	7	0 - 35	0 - 5	7	0 - 25	0 - 5	
white prairie clover	DACA7	7	0 - 50	0 - 5	7	0 - 14	0 - 2				
wild onion	ALLIU	7	0 - 50	0 - 5	7	0 - 21	0 - 3	7	0 - 10	0 - 2	
yellow wild buckwheat	ERFLF	7	0 - 50	0 - 5	7	0 - 35	0 - 5	7	0 - 25	0 - 5	
other perennial forbs	2FP	7	0 - 50	0 - 5	7	0 - 35	0 - 5	7	0 - 25	0 - 5	
other annual forbs	2FA				7	0 - 35	0 - 5	7	0 - 50	0 - 10	
SHRUBS		8	0 - 50	0 - 5	8	0 - 35	0 - 5	8	0 - 25	0 - 5	
leadplant	AMCA6	8	0 - 50	0 - 5	8	0 - 14	0 - 2	8	0 - 5	0 - 1	
other shrubs	2SHRUB	8	0 - 50	0 - 5	8	0 - 35	0 - 5	8	0 - 25	0 - 5	
TREES		9	0 - 50	0 - 5	9	35 - 105	5 - 15	9	25 - 125	5 - 25	
bur oak	QUMA2	9	0 - 50	0 - 5	9	0 - 70	0 - 10	9	0 - 75	0 - 15	
juniper	JUNIP	9	0 - 50	0 - 5	9	0 - 70	0 - 10	9	0 - 75	0 - 15	
ponderosa pine	PIPO	9	0 - 50	0 - 5	9	0 - 70	0 - 10	9	0 - 75	0 - 15	
Annual Production lbs./acre			LOW	RV	HIGH	LOW	RV	HIGH	LOW	RV	HIGH
GRASSES & GRASS-LIKES			605	800	-885	405	508	-605	260	350	-435
FORBS			95	150	-205	65	105	-145	20	63	-105
SHRUBS			0	25	-55	0	18	-40	0	13	-30
TREES			0	25	-55	30	70	-110	20	75	-130
TOTAL			700	1000	-1200	500	700	-900	300	500	-700

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". According to the USDA NRCS National Range and Pasture Handbook, Desired Plant Communities (DPC's) 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.

Little Bluestem/Sun Sedge Plant Community

The plant community upon which interpretations are primarily based is the Little Bluestem/Sun Sedge Plant Community. This is also considered the Historic Climax Plant Community (HCPC). Potential vegetation is about 70-80% grasses or grass-like plants, and 10-20% forbs and 0-10% woody plants. A mix of warm and cool season midgrasses dominates. Major grasses include sun sedge, rhizomatous wheatgrasses, big bluestem, and little bluestem. Other grasses occurring include threadleaf sedge, blue grama, sideoats grama, and prairie sandreed. Forbs occurring in this plant community are cudweed sagewort, fringed sagewort, goldenpea, scurfpeas, and western yarrow. Lead plant, bur oak, ponderosa pine, and juniper may occur in this plant community.

This plant community is stable and well adapted to the Northern Great Plains climatic conditions. The diversity in plant species allows for high drought resistance. This is a sustainable plant community (site/soil stability, watershed function, and biologic integrity). Occasionally this plant community will have areas influenced by natural geologic erosion, and will exhibit considerable bare ground.

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 co-dominant.

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

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:

- Moderate, continuous season-long grazing will convert the plant community to the *Rhizomatous Wheatgrass/Blue Grama Vegetation State*.
- Encroachment of ponderosa pine from adjacent sites will shift this plant community to the *Ponderosa Pine Plant Community*.

Rhizomatous Wheatgrass/Blue Grama Plant Community

This plant community develops under moderate, season-long grazing by livestock. Vegetation is about 60-80% grasses and grass-like plants, 10-20% forbs, and 5-20% woody plants. Dominant grasses include rhizomatous wheatgrasses, blue grama, sun sedge, and cheatgrass. Grasses and grass-likes of secondary importance include sideoats grama and threadleaf sedge. Forbs commonly found in this plant community include cudweed sagewort, western yarrow, hairy goldaster, goldenpea, biscuitroot, wild onion, and scarlet globemallow. Fringed sagewort is commonly found. Plains

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pricklypear and winterfat can also occur. Lead plant, bur oak, ponderosa pine, and juniper may occur in this plant community.

When compared to the Historical Climax Plant Community, rhizomatous wheatgrasses, and blue grama have increased. Prairie sandreed and little bluestem have decreased. Production of cool-season grasses has also been reduced. Cheatgrass (downy brome) has invaded the plant community. Bare ground has also increased.

This plant community is unstable and subject to wind erosion. The biotic integrity of this plant community is usually intact. However, it can be at risk depending on how far a shift has occurred in plant composition toward blue grama, and cheatgrass. The watershed is usually functioning. However, it can become at risk when cheatgrass and bare ground 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: SD6002

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

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

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

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

- Prescribed grazing will result in a plant community very similar to the *Historic Climax Plant Community*.
- Encroachment of ponderosa pine from adjacent sites will shift this plant community to the *Ponderosa Pine Plant Community*.

Ponderosa Pine Plant Community

This plant community is the result of encroachment from adjacent plant communities. Ponderosa pine, juniper and/or bur oak dominate it. Vegetation is about 50-75% grasses and grass-like plants, 5-20% forbs and 5-30% woody plants. The dominant grasses & grass-likes include little bluestem and sedges. Significant forbs include prairie coneflower, purple prairie clover and goldenpea. Leadplant has decreased, but is still present.

Considerable bare ground may be present under the tree canopy. Where severe erosion has created clay dunes they may be dominated by prairie sandreed. This community has lost some of its value for grazing wildlife and livestock. This plant community is susceptible to excessive erosion and excessive runoff due to the bare ground.

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: SD6011

Growth curve name: Pierre Shale Plains, heavy conifer canopy.

Growth curve description: Mature ponderosa pine/juniper overstory.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	3	7	11	24	27	12	5	4	3	2	1

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

- Timber harvest and/or wildfire may shift this plant community back to a plant community resembling the *Historic Climax Plant Community*. The woody overstory will persist until removed by fire.

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

Little Bluestem/Sun Sedge Plant Community (HCPC): 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 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 Plant Community: 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 sage grouse when it occurs proximal to woody cover. Good grasshopper habitat equals good foraging for birds.

Ponderosa Pine, Bare Ground Plant Community: 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 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-likes							
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
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
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
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
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
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
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
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 goldenweed	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
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
twogrooved milkvetch	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T
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
Trees							
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
juniper	U N N U	U N N U	U N N U	D U U D	U N N U	U N N U	U N N U
ponderosa pine	U T T U	U N N U	U N N U	U N N U	U N N U	U T T U	U N N U

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)
Little Bluestem/Sun Sedge	1000	0.32
Rhizomatous Wheatgrass/Blue Grama	700	0.22
Ponderosa Pine, Bare Ground	500	0.16

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

** Highly variable; stocking rate needs to be determined on site.

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 is rapid during the initial stage of a rainfall event. The soil then becomes sealed and runoff becomes excessive. Normally areas where ground cover is less than 50% 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 variety 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

(060AY030SD) – Porous Clay

(060AY0??SD) – Ponderosa Pine Woodland

Similar Sites

(060AY030SD) – Porous Clay [more production; deeper soils; less tree encroachment; less sedge]

Inventory Data References

Information presented here has been derived from NRCS clipping data and other inventory data. Field observations from range trained personnel was also used. Those involved in developing this site description include: Everet Bainter, Range Management Specialist, NRCS; Stan Boltz, Range Management Specialist, NRCS; Glen Mitchell, Range Management Specialist, NRCS; Cheryl Nielsen, Range Management Specialist, NRCS; Rick Peterson, Range Management Specialist, NRCS; Mike Stirling, Range Management Specialist, NRCS.

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

State Correlation

This site has been correlated between Montana, Nebraska, South Dakota & Wyoming 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 – Semiarid 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://hpccsun.unl.edu>)

USDA, NRCS. National Water and Climate Center, 101 SW Main, Suite 1600, Portland, OR 97204-3224. (<http://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, 2002. National Soil Survey Handbook, title 430-VI. (<http://soils.usda.gov/procedures/handbook/main.htm>)

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
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_____ SD, State Range Management Specialist	_____ Date	_____ WY, State Range Management Specialist	_____ Date
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