

**United States Department of Agriculture
Natural Resources Conservation Service**

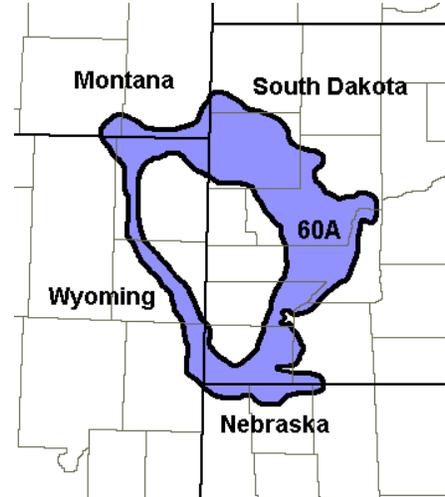
Ecological Site Description

Site Type: Rangeland

Site Name: Sandy

Site ID: R060AY009SD

Major Land Resource Area: 60A – Pierre Shale Plains



Physiographic Features

This site occurs mainly on nearly level to undulating slopes on uplands and river valleys.

Landform: valley, interdune, terrace **Aspect:** N/A

	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	2500	4300
Slope (percent):	0	15
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:	Very Low	Medium

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 outbreaks from Canada in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Chinook winds may occur in winter and bring rapid rises in temperature. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring. The 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 in this site are well to somewhat excessively drained and formed in eolian sand or alluvium. The surface layer is 4 to 14 inches thick. The texture of the subsurface ranges from sand to very fine sandy loam. Slopes range from 0 to 15 percent. This site should show slight to no evidence of rills, wind scoured areas or pedestalled plants. Water flow paths are broken, irregular in appearance or discontinuous with numerous debris dams or vegetative barriers. The soil surface is stable and intact.

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: eolian deposits, alluvium
Parent Material Origin: mixed
Surface Texture: sandy loam, fine sandy loam, loamy fine sand
Surface Texture Modifier: none
Subsurface Texture Group: sandy
Surface Fragments $\leq 3''$ (% Cover): 0
Surface Fragments $> 3''$ (%Cover): 0
Subsurface Fragments $\leq 3''$ (% Volume): 0
Subsurface Fragments $> 3''$ (% Volume): 0

	<u>Minimum</u>	<u>Maximum</u>
Drainage Class:	well	somewhat excessively
Permeability Class:	moderate	moderately rapid
Depth (inches):	20	80
Electrical Conductivity (mmhos/cm)*:	0	4
Sodium Absorption Ratio*:	0	0
Soil Reaction (1:1 Water)*:	5.6	8.4
Soil Reaction (0.1M CaCl₂)*:	NA	NA
Available Water Capacity (inches)*:	4	5
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:

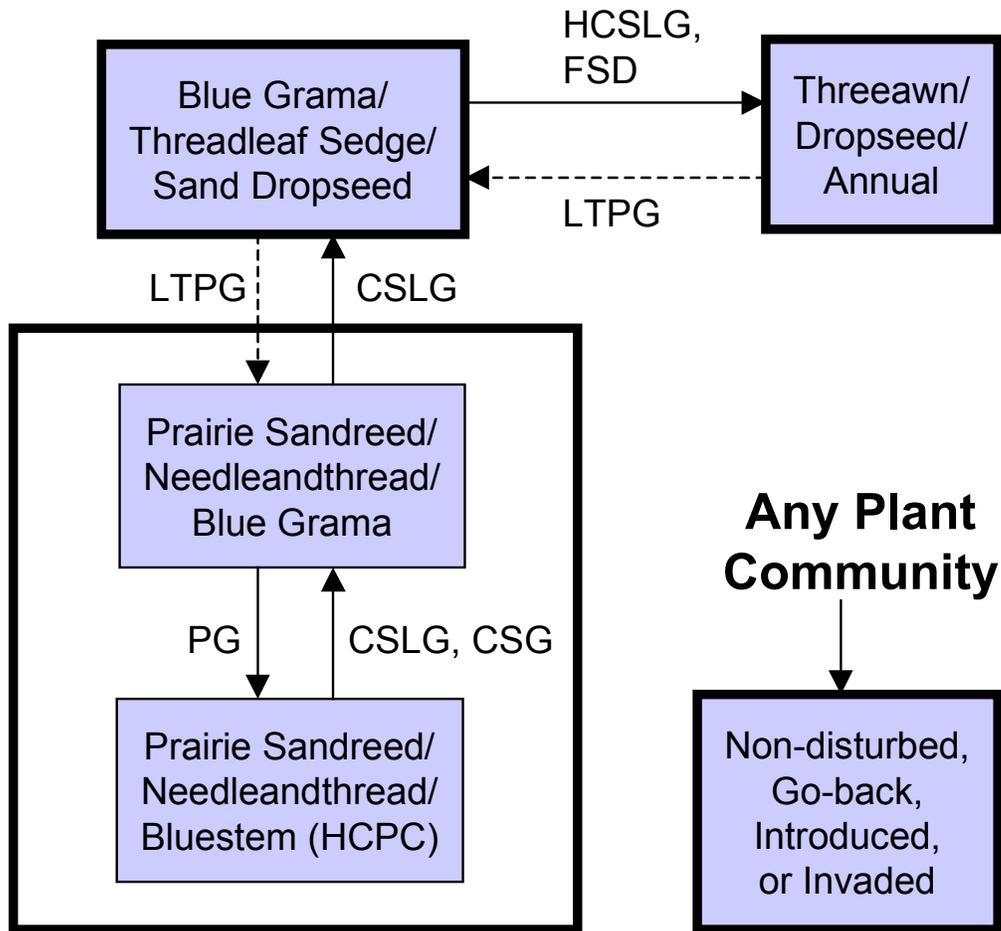
This site developed under Northern Great Plains climatic conditions, natural influences of large herbivores, occasional fire, and other biotic and abiotic factors that typically influence soil/site development. Changes will occur in the plant communities due to short-term weather variations, impacts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

Sand dropseed, blue grama and needleandthread increase as this site deteriorates from improper management. Species such as sand bluestem, prairie sandreed and little bluestem will decrease in frequency and production.

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 transitions between communities. The ecological processes are discussed in more detail in the plant community narratives following the diagram.

Plant Communities and Transitional Pathways



CSG - Continuous seasonal grazing; **CSLG** - Continuous season-long grazing; **FSD** - Frequent and severe defoliation; **HCSLG** - Heavy, continuous season-long grazing; **LTPG** - Long-term prescribed grazing; **PG** - Prescribed grazing.

Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SCIENTIFIC NAME	SYMBOL	Prairie Sandreed/Needleandthread/ Bluestem (HCPC)		
			Group	lbs./acre	% Comp
GRASSES & GRASS-LIKES				1530 - 1710	85 - 95
prairie sandreed	Calamovilfa longifolia	CALO	1	270 - 630	15 - 35
sand bluestem	Andropogon hallii	ANHA	2	180 - 270	10 - 15
little bluestem	Schizachyrium scoparium	SCSC	3	180 - 270	10 - 15
needleandthread	Hesperostipa comata ssp. comata	HECOC8	4	180 - 360	10 - 20
NATIVE GRASSES & GRASS-LIKES			5	180 - 450	10 - 25
blue grama	Bouteloua gracilis	BOGR2	5	90 - 270	5 - 15
western wheatgrass	Pascopyrum smithii	PASM	5	18 - 90	1 - 5
sand dropseed	Sporobolus cryptandrus	SPCR	5	0 - 90	0 - 5
sand lovegrass	Eragrostis trichodes	ERTR3	5	0 - 90	0 - 5
switchgrass	Panicum virgatum	PAVI2	5	0 - 90	0 - 5
Indian ricegrass	Achnatherum hymenoides	ACHY	5	0 - 36	0 - 2
prairie junegrass	Koeleria macrantha	KOMA	5	0 - 36	0 - 2
sand paspalum	Paspalum setaceum	PASE5	5	0 - 18	0 - 1
Scribner panicum	Dichanthelium oligosanthes var. scribnerianum	DIOLS	5	0 - 18	0 - 1
threadleaf sedge	Carex filifolia	CAFI	5	18 - 180	1 - 10
Sandberg bluegrass	Poa secunda	POSE	5	0 - 18	0 - 1
sedge	Carex spp.	CAREX	5	0 - 90	0 - 5
bottlebrush squirreltail	Elymus elymoides	ELEL5	5	0 - 18	0 - 1
other perennial grasses		2GP	5	0 - 54	0 - 3
FORBS			7	90 - 180	5 - 10
annual eriogonum	Eriogonum annuum	ERAN4	7	0 - 54	0 - 3
bush morningglory	Ipomoea leptophylla	IPLE	7	0 - 36	0 - 2
cudweed sagewort	Artemisia ludoviciana	ARLU	7	0 - 18	0 - 1
cutleaf ironplant	Machaeranthera pinnatifida	MAPI	7	0 - 36	0 - 2
dotted gayfeather	Liatris punctata	LIPU	7	0 - 36	0 - 2
false boneset	Brickellia eupatorioides	BREU	7	0 - 36	0 - 2
green sagewort	Artemisia dracuncululus	ARDR4	7	0 - 18	0 - 1
hairy goldaster	Heterotheca villosa	HEVI4	7	0 - 36	0 - 2
heath aster	Symphotrichum ericoides	SYER	7	0 - 36	0 - 2
larkspur	Delphinium spp.	DELPH	7	0 - 36	0 - 2
Missouri goldenrod	Solidago missouriensis	SOMI2	7	0 - 36	0 - 2
penstemon	Penstemon spp.	PENST	7	0 - 36	0 - 2
prairie coneflower	Ratibida columnifera	RACO3	7	0 - 36	0 - 2
rush skeletonweed	Lygodesmia juncea	LYJU	7	0 - 36	0 - 2
scarlet gaura	Gaura coccinea	GACO5	7	0 - 36	0 - 2
scarlet globemallow	Sphaeralcea coccinea	SPCO	7	0 - 36	0 - 2
scurfpea	Psoralegium spp.	PSORA2	7	0 - 36	0 - 2
serrate eveningprimrose	Calylophus serrulatus	CASE12	7	0 - 36	0 - 2
spiderwort	Tradescantia spp.	TRADE	7	0 - 36	0 - 2
tenpetal mentzelia	Mentzelia decapetala	MEDE2	7	0 - 18	0 - 1
verbena	Verbena spp.	VERBE	7	0 - 18	0 - 1
western ragweed	Ambrosia psilostachya	AMPS	7	0 - 36	0 - 2
SHRUBS			8	0 - 90	0 - 5
broom snakeweed	Gutierrezia sarothrae	GUSA2	8	0 - 18	0 - 1
cactus	Opuntia spp.	OPUNT	8	0 - 18	0 - 1
fringed sagewort	Artemisia frigida	ARFR4	8	0 - 18	0 - 1
leadplant	Amorpha canescens	AMCA6	8	0 - 54	0 - 3
rose	Rosa spp.	ROSA5	8	0 - 90	0 - 5
sand sagebrush	Artemisia filifolia	ARFI2	8	0 - 18	0 - 1
small soapweed	Yucca glauca	YUGL	8	0 - 18	0 - 1
western sandcherry	Prunus pumila var. besseyi	PRPUB	8	0 - 36	0 - 2

Annual Production lbs./acre	LOW	RV	HIGH
GRASSES & GRASS-LIKES	1115 -	1620	-2120
FORBS	85 -	135	-185
SHRUBS	0 -	45	-95
TOTAL	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.

Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SYMBOL	Prairie Sandreed/Needleand-thread/Bluestem (HPCP)			Prairie Sandreed/Needleand-thread/Blue Grama			Blue Grama/Threadleaf Sedge/Sand Dropseed			Threawn/Dropseed/Annual			
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	
GRASSES & GRASS-LIKES			1530 - 1710	85 - 95		1020 - 1140	85 - 95		720 - 810	80 - 90		200 - 350	40 - 70	
prairie sandreed	CALO	1	270 - 630	15 - 35	1	180 - 360	15 - 30	1	9 - 45	1 - 5	1	0 - 5	0 - 1	
sand bluestem	ANHA	2	180 - 270	10 - 15	2	12 - 120	1 - 10	2	0 - 18	0 - 2	2			
little bluestem	SCSC	3	180 - 270	10 - 15	3	60 - 120	5 - 10	3	0 - 45	0 - 5	3	0 - 10	0 - 2	
needleandthread	HECOC8	4	180 - 360	10 - 20	4	180 - 300	15 - 25	4	45 - 90	5 - 10	4	0 - 25	0 - 5	
NATIVE GRASSES & GRASS-LIKES		5	180 - 450	10 - 25	5	120 - 420	10 - 35	5	180 - 450	20 - 50	5	150 - 250	30 - 50	
blue grama	BOGR2	5	90 - 270	5 - 15	5	120 - 240	10 - 20	5	135 - 270	15 - 30	5	25 - 75	5 - 15	
western wheatgrass	PASM	5	18 - 90	1 - 5	5	12 - 96	1 - 8	5	9 - 90	1 - 10	5	0 - 25	0 - 5	
sand dropseed	SPCR	5	0 - 90	0 - 5	5	12 - 60	1 - 5	5	45 - 180	5 - 20	5	25 - 100	5 - 20	
sand lovegrass	ERTR3	5	0 - 90	0 - 5	5	0 - 36	0 - 3	5	0 - 9	0 - 1				
switchgrass	PAV12	5	0 - 90	0 - 5	5	0 - 36	0 - 3	5	0 - 9	0 - 1				
Indian ricegrass	ACHY	5	0 - 36	0 - 2	5	0 - 24	0 - 2	5	0 - 9	0 - 1				
prairie junegrass	KOMA	5	0 - 36	0 - 2	5	0 - 60	0 - 5	5	0 - 45	0 - 5	5	0 - 5	0 - 1	
sand paspalum	PASE5	5	0 - 18	0 - 1	5	0 - 12	0 - 1	5	0 - 27	0 - 3				
Scribner panicum	DIOLS	5	0 - 18	0 - 1	5	12 - 24	1 - 2	5	18 - 45	2 - 5	5	0 - 25	0 - 5	
threadleaf sedge	CAFI	5	18 - 180	1 - 10	5	60 - 180	5 - 15	5	90 - 180	10 - 20	5	25 - 50	5 - 10	
threawn	ARIST					0 - 24	0 - 2		0 - 90	0 - 10		100 - 150	20 - 30	
Sandberg bluegrass	POSE	5	0 - 18	0 - 1	5	0 - 12	0 - 1	5	0 - 9	0 - 1	5	0 - 5	0 - 1	
sedge	CAREX	5	0 - 90	0 - 5	5	0 - 60	0 - 5	5	0 - 45	0 - 5	5	0 - 25	0 - 5	
bottlebrush squirreltail	ELEL5	5	0 - 18	0 - 1	5	0 - 12	0 - 1	5	0 - 27	0 - 3	5	0 - 5	0 - 1	
other perennial grasses	ZGP	5	0 - 54	0 - 3	5	0 - 36	0 - 3	5	0 - 18	0 - 2	5	0 - 10	0 - 2	
NON-NATIVE GRASSES		6			6	0 - 60	0 - 5	6	9 - 135	1 - 15	6	10 - 50	2 - 10	
cheatgrass	BRTE				6	0 - 60	0 - 5	6	9 - 135	1 - 15	6	10 - 25	2 - 5	
Kentucky bluegrass	POPR				6	12 - 36	1 - 3	6	9 - 18	1 - 2	6	0 - 25	0 - 5	
FORBS		7	90 - 180	5 - 10	7	60 - 120	5 - 10	7	45 - 135	5 - 15	7	50 - 150	10 - 30	
annual eriogonum	ERAN4	7	0 - 54	0 - 3	7	0 - 60	0 - 5	7	9 - 45	1 - 5	7	10 - 50	2 - 10	
bush morningglory	IPLE	7	0 - 36	0 - 2	7	0 - 24	0 - 2	7	0 - 9	0 - 1				
cudweed sagewort	ARLU	7	0 - 18	0 - 1	7	0 - 24	0 - 2	7	9 - 45	1 - 5	7	0 - 15	0 - 3	
curlycup gumweed	GRSQ	7			7	0 - 24	0 - 2	7	9 - 27	1 - 3	7	5 - 50	1 - 10	
cutleaf ironplant	MAPI	7	0 - 36	0 - 2	7	0 - 36	0 - 3	7	0 - 45	0 - 5				
dotted gayfeather	LIPU	7	0 - 36	0 - 2	7	0 - 24	0 - 2	7	0 - 18	0 - 2	7	0 - 5	0 - 1	
false bonaset	BREU	7	0 - 36	0 - 2	7	0 - 24	0 - 2							
fetid marigold	DYPA				7	0 - 12	0 - 1	7	0 - 9	0 - 1	7	10 - 50	2 - 10	
green sagewort	ARDR4	7	0 - 18	0 - 1	7	0 - 60	0 - 5	7	0 - 45	0 - 5	7	5 - 25	1 - 5	
hairy goldaster	HEV14	7	0 - 36	0 - 2	7	0 - 24	0 - 2	7	0 - 18	0 - 2				
heath aster	SYER	7	0 - 36	0 - 2	7	12 - 24	1 - 2	7	9 - 27	1 - 3	7	0 - 5	0 - 1	
larkspur	DELPH	7	0 - 36	0 - 2	7	0 - 36	0 - 3	7	0 - 18	0 - 2				
Missouri goldenrod	SOM12	7	0 - 36	0 - 2	7	0 - 36	0 - 3	7	0 - 18	0 - 2				
penstemon	PENST	7	0 - 36	0 - 2	7	0 - 36	0 - 3	7	0 - 9	0 - 1				
prairie coneflower	RACO3	7	0 - 36	0 - 2	7	12 - 24	1 - 2	7	9 - 18	1 - 2				
Rocky Mountain beeplant	CLSE	7						7	0 - 9	0 - 1	7	0 - 10	0 - 2	
rush skeletonweed	LYJU	7	0 - 36	0 - 2	7	12 - 24	1 - 2	7	9 - 27	1 - 3	7	0 - 5	0 - 1	
scarlet gaura	GACO5	7	0 - 36	0 - 2	7	0 - 24	0 - 2	7	0 - 9	0 - 1				
scarlet globemallow	SPCO	7	0 - 36	0 - 2	7	12 - 24	1 - 2	7	9 - 18	1 - 2	7	0 - 5	0 - 1	
scurfpea	PSORA2	7	0 - 36	0 - 2	7	0 - 36	0 - 3	7	9 - 27	1 - 3	7	0 - 5	0 - 1	
serrate eveningprimrose	CASE12	7	0 - 36	0 - 2	7	0 - 24	0 - 2	7	0 - 18	0 - 2				
spiderwort	TRADE	7	0 - 36	0 - 2	7	0 - 24	0 - 2	7	0 - 9	0 - 1				
tenpetal mentzelia	MEDE2	7	0 - 18	0 - 1	7	0 - 24	0 - 2	7	0 - 27	0 - 3				
verbena	VERBE	7	0 - 18	0 - 1	7	0 - 36	0 - 3	7	0 - 45	0 - 5	7	5 - 25	1 - 5	
western ragweed	AMPS	7	0 - 36	0 - 2	7	12 - 36	1 - 3	7	9 - 45	1 - 5	7	5 - 25	1 - 5	
other annual forbs	2FA				7	0 - 36	0 - 3	7	0 - 45	0 - 5	7	10 - 75	2 - 15	
SHRUBS		8	0 - 90	0 - 5	8	12 - 120	1 - 10	8	45 - 135	5 - 15	8	10 - 75	2 - 15	
broom snakeweed	GUSA2	8	0 - 18	0 - 1	8	0 - 24	0 - 2	8	0 - 45	0 - 5	8	5 - 40	1 - 8	
cactus	OPUNT	8	0 - 18	0 - 1	8	0 - 36	0 - 3	8	0 - 72	0 - 8	8	0 - 10	0 - 2	
fringed sagewort	ARFR4	8	0 - 18	0 - 1	8	0 - 36	0 - 3	8	0 - 45	0 - 5	8	5 - 25	1 - 5	
leadplant	AMCA6	8	0 - 54	0 - 3	8	0 - 24	0 - 2	8	0 - 9	0 - 1				
rose	ROSA5	8	0 - 90	0 - 5	8	0 - 60	0 - 5	8	0 - 18	0 - 2	8	0 - 5	0 - 1	
sand sagebrush	ARFI2	8	0 - 18	0 - 1	8	0 - 60	0 - 5	8	0 - 45	0 - 5	8	0 - 10	0 - 2	
small soapweed	YUGL	8	0 - 18	0 - 1	8	0 - 24	0 - 2	8	0 - 36	0 - 4	8	0 - 10	0 - 2	
western sandcherry	PRPU	8	0 - 36	0 - 2	8	0 - 12	0 - 1							
Annual Production lbs./acre			LOW	RV	HIGH	LOW	RV	HIGH	LOW	RV	HIGH	LOW	RV	HIGH
GRASSES & GRASS-LIKES			1115	1620	2120	635	1044	1550	470	720	920	200	358	565
FORBS			85	135	185	55	90	125	40	90	140	45	100	155
SHRUBS			0	45	95	10	66	125	40	90	140	5	43	80
TOTAL			1200	1800	2400	700	1200	1800	550	900	1200	250	500	800

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.

Prairie Sandreed/Needleandthread/Bluestem Plant Community

The plant community upon which interpretations are primarily based is the Prairie Sandreed/Needleandthread/Bluestem Plant Community. This is also considered the Historic Climax Plant Community (HCPC). This plant community can be found on areas that are properly managed with grazing and/or prescribed burning, and sometimes on areas receiving occasional short periods of deferment. The potential vegetation is about 85-95% grasses or grass-like plants, 5-10% forbs, and 0-5% shrubs. The site is dominated by mid and tall grasses. Major grasses are prairie sandreed, needleandthread and little bluestem. Other grass and grass-like species occurring on the site is sand bluestem, blue grama, western wheatgrass and threadleaf sedge. Significant forbs include dotted gayfeather, penstemon and prairie coneflower. Shrubs in this community are rose, sand sagebrush and fringed sagewort.

This plant community is well adapted to the Northern Great Plains climatic conditions. Individual species can vary greatly in production depending on growing conditions (timing and amount of precipitation and temperature). Community dynamics, nutrient cycle, water cycle and energy flow are functioning properly. Plant litter is properly distributed with little movement off-site and natural plant mortality is very low. The diversity in species allows for high drought tolerance. Run-off from adjacent sites and moderate or high available water capacity provides a favorable soil-water-plant relationship.

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 sub-dominant.

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

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

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

- Continuous season-long grazing or continuous seasonal grazing will convert this plant community to the *Prairie Sandreed/Needleandthread/Blue Grama Plant Community*.

Prairie Sandreed/Needleandthread/Blue Grama Plant Community

This plant community developed under continuous season long grazing. The plant community's mid grass component is reduced and an understory of short sod-forming grasses is increasing. This plant community also develops under continuous seasonal grazing. This occurs when grazed at the same time of the growing season, every year. If grazed early, needleandthread will be reduced; whereas, if grazed later, little bluestem and sand bluestem will be reduced.

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Dominant grasses include needleandthread, blue grama and prairie sandreed. Other grasses and grass-likes include western wheatgrass, sand dropseed and threadleaf sedge. Forbs commonly found in this plant community include gayfeather, penstemon, prairie coneflower, cudweed sagewort, western ragweed and spiderwort. Shrubs in this community include rose, sand sagebrush, fringed sagewort and broom snakeweed. When compared to the HCPC, sand bluestem and little bluestem have decreased. Prairie sandreed is beginning to decline. Needleandthread, blue grama, and sand dropseed are increasing. Plant diversity is high but on a downward trend.

This plant community is not resistant to change. Management changes can easily shift this plant community. Soil erosion is low. The water cycle is functioning, infiltration is high and runoff is low.

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 sub-dominant.

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

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

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

- Prescribed grazing will move this plant community to the *Prairie Sandreed/Needleandthread/Bluestem Plant Community*.
- Continuous season-long grazing will move this plant community to the *Blue Grama/Threadleaf Sedge/Sand Dropseed Plant Community*.

Blue Grama/Threadleaf Sedge/Sand Dropseed Plant Community

This plant community typically develops under continuous season long grazing over a period of several years. It is made up of short, grazing tolerant species. The dominant species are blue grama, sand dropseed, threadleaf sedge and needleandthread. Dominant forbs include western ragweed, scurfpea, cutleaf ironplant, annual eriogonum and cudweed sagewort. Dominant shrubs are broom snakeweed, cactus and fringed sagewort. Compared to the HCPC, blue grama and sand dropseed have increased creating sod bound conditions. Little bluestem and sand bluestem are absent. Prairie sandreed is limited to a few sparse colonies. Fringed sagewort and broom snakeweed may also be increasing.

This plant community is fairly resistant to change. Soil erosion is low. The water cycle is reduced because of the lack of surface litter. Infiltration is moderate due to soil texture, which can help to reduce runoff, but off-site gully erosion can be a concern. Forage production, species diversity and ground cover is declining. Total annual production (air-dry weight) is about 850 pound per acre during an average year, but it can range from about 550 pounds per acre in unfavorable years to about 1100 pounds in above average years.

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

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

- Long-term prescribed grazing will move this plant community to the *Prairie Sandreed/Needleandthread/ Blue Grama Plant Community*. This may take many years depending on the degree to which the sod is formed and the amount of mid-grasses and palatable forbs remaining.
- Heavy, continuous season-long grazing or frequent and severe defoliation will move this plant community to the *Threeawn/Dropseed/Annual Plant Community*.

Threeawn/Dropseed/Annual Plant Community

This plant community develops where the rangeland is grazed year-round, at high stock densities and/or occupation by prairie dogs. The plant composition is made up of annuals with a few species of perennial forbs and grasses that are tolerant to frequent and severe defoliation. Dominant species are threeawn, sand dropseed, blue grama and threadleaf sedge. Most of the mid-grasses have been eliminated. Cheatgrass is invading the site. Dominant forbs include curlycup gumweed, fetid marigold, verbena, annual eriogonum, green sagewort and western ragweed. Broom snakeweed, fringed sagewort and cactus can be abundant.

This plant community is resistant to positive change due to the lack of perennial species present and the amount of annuals and invaders occupying the site. Soil erosion is high compared to the potential plant community for the site due to the increased bare ground. Infiltration is low and runoff is high from the lack of litter and viable plant population.

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

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

- Long-term prescribed grazing will move this plant community back towards the *Blue Grama/Threadleaf Sedge/Sand Dropseed Plant Community*. The rate of this transition can be extremely variable depending on the species present on the site and the availability of a seed source. Typically, this transition will take a long period time. Range or pasture planting and/or brush management (chemical) may be the only option to return this site to a productive condition in a realistic time frame.

Non-Disturbed, Go-back, Introduced, or Invaded

This group includes four separate vegetation states that are highly variable in nature. They are derived through four distinct management scenarios, and are not related successionaly. Infiltration, runoff and soil erosion vary depending on the vegetation present on the site.

The **Non-Disturbed** state develops from extended periods of exclusion by large herbivores, fire suppression and lack of other surface disturbance. Plant litter accumulates in large amounts when this community first develops. Litter buildup reduces mature plant vigor and density, and seedling recruitment declines. Eventually litter levels become high enough that plant density decreases. Interspaces are commonly filled by annual forbs, annual grasses, and cryptogams. Typically rhizomatous grasses form small colonies because of a lack of tiller stimulation.

The **Go-back** state can be reached whenever severe mechanical disturbance (i.e., abandoned farmland) occurs. During the early successional stages, the species that mainly dominate are annual grasses and forbs, later being replaced by both native and introduced perennials. The vegetation on this site varies greatly, sometimes being dominated by sand dropseed, threeawn, annual brome, crested wheatgrass, broom snakeweed, sweetclover and non-native thistles. Other plants that commonly occur on the site include western wheatgrass, prickly lettuce, maretail, kochia, bottlebrush squirreltail, foxtail and annual sunflower. If remnant populations are sufficient, western wheatgrass can sometimes rapidly occupy this state.

The **Introduced** state are normally those areas seeded to crested wheatgrass, pubescent or intermediate wheatgrass and alfalfa. They require considerable investment to establish and have a variable life expectancy. They do produce up to 50% more than native range, but their value as forage is somewhat limited due to the single species usually seeded.

The **Invaded** state includes areas that have been invaded by species such as smooth brome, Kentucky bluegrass, crested wheatgrass, non-native thistles, field bindweed, knapweeds, leafy spurge, hoary cress and other introduced species.

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

-- Under Development --

Prairie Sandreed/Needleandthread/Bluestem Plant Community:

Prairie Sandreed/Needleandthread/Blue Grama Plant Community:

Blue Grama/Threadleaf Sedge/Sand Dropseed Plant Community:

Threeawn/Dropseed/Annual Plant Community:

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

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
Grasses & Grass-likes							
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
bottlebrush squirreltail	U D U U	N D U N	U D U U	N D U N	N D U N	U D U U	U D U U
Indian ricegrass	D P U D	N P N D	D P U D	N P N D	N P N D	D P U D	D P U D
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
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
sand dropseed	N U N N	N U N N	N U N N	N U N N	N U N N	N U N N	N U N N
sand lovegrass	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
sand paspalum	N U U N	N U N N	N U U N	N U N N	N U N N	N U U N	N U U N
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
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 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
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							
annual eriogonum	U D U U	N U U N	U D U U	N U U N	N U U N	U D U U	N U U N
bush morningglory	U D P U	U D D U	U D P U	U D D U	U D D U	U D P U	U D D 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
cutleaf ironplant	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
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
green sagewort	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U
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
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
larkspur	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
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
penstemon	U U U U	U P P U	U U U U	U P P U	U P P U	U U U U	U P P U
prairie 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
rush skeletonweed	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N
scarlet 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
scarlet globemallow	U U D U	U D D U	U U D U	U D D U	U D D U	U U D U	U D D U
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
serrate eveningprimrose	U U D U	U D P U	U U D U	U D P U	U D P U	U U D U	U D P U
spiderwort	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
tenpetal mentzelia	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
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
western ragweed	U U U U	U U U U	U U U U	N N N N	N N N N	U U U U	N N N N
Shrubs							
broom snakeweed	N N N N	U U U U	N N N N	U U U U	U U U U	N N N N	U U U U
cactus	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
fringed sagewort	U U U U	U U U U	U U U U	U D D U	U P P D	U U U U	U U U D
leadplant	U P D U	U P D U	U P D U	U P D U	U P D U	U P D U	U P D U
rose	U D D U	U D D U	U D D U	U D D U	U D D U	U D D U	U D D U
sand sagebrush	U N N U	U N N U	U N N U	U N N U	U N N U	U N N U	U N N U
small soapweed	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
western sandcherry	D P P D	D U U D	D P P D	P U D P	D U U D	D P P D	P U U P

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/Needleandthread/Bluestem	1800	0.57
Prairie Sandreed/Needleandthread/Blue Grama	1200	0.38
Blue Grama/Threadleaf Sedge/Sand Dropseed	900	0.28
Threeawn/Dropseed/Annual	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).

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 group A. Infiltration ranges from high to very high. Runoff potential for this site varies from very low to low depending on soil hydrologic group, slope and ground cover. In many cases, areas with greater than 75% 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% 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

(060AY008SD) – Sands

(060AY012SD) – Thin Upland

(060AY044SD) – Shallow Sandy

Similar Sites

- (060AY008SD) – Sands
[more sand bluestem; less western wheatgrass; steeper slopes]
(060AY044SD) – Shallow Sandy
[more sideoats grama; steeper slopes; 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 was also used. Those involved in developing this site description include: Stan Boltz, Range Management Specialist, NRCS; Darrel DuVall, Range Management Specialist, NRCS; Jill Epley, 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	1	1981	SD	Meade

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