

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

Ecological Site Description

Site Type: Rangeland

Site Name: Wet Land

Site ID: R060AY002SD

Major Land Resource Area: 60A – Pierre Shale Plains

Physiographic Features

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

Landform: depression, oxbow, slough, basin **Aspect:** N/A



	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	2500	4300
Slope (percent):	0	3
Water Table Depth (inches):	0	18
Flooding:		
Frequency:	None	Frequent
Duration:	None	Long
Ponding:		
Depth (inches):	0	12
Frequency:	Frequent	Frequent
Duration:	Brief	Very long
Runoff Class:	Negligible	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 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

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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.

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

Wetland Description:	<u>System</u>	<u>Subsystem</u>	<u>Class</u>	<u>Sub-class</u>
Cowardin, et. al., 1979	Palustrine	N/A	Emergent	Persistent

Stream Type: None
(Rosgen System)

Representative Soil Features

The soils in this site are very poorly or poorly drained and formed in clayey or silty alluvium. The surface layer is 5 to 6 inches thick. The texture of the subsurface ranges from silty clay loam to silty clay. This site should show 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: alluvium

Parent Material Origin: sedimentary, unspecified

Surface Texture: silty clay, silty clay loam

Surface Texture Modifier: none

Subsurface Texture Group: clayey

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:	very poorly	poorly
Permeability Class:	very slow	moderate
Depth (inches):	80	80
Electrical Conductivity (mmhos/cm)*:	0	8
Sodium Absorption Ratio*:	0	13
Soil Reaction (1:1 Water)*:	6.1	9.0
Soil Reaction (0.1M CaCl₂)*:	NA	NA
Available Water Capacity (inches)*:	6	7
Calcium Carbonate Equivalent (percent)*:	0	30

* - 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. This site occurs in seep/spring areas, scoured areas along streams or in drainageways, oxbows and wet drainageways.

Changes will occur in the plant communities primarily due to periodic fluctuations in hydrologic cycles. As this site deteriorates, such as when excessive litter accumulates and plants become decadent, species such as spikerush and Baltic rush increase. Grasses and grass-likes such as Nebraska sedge, northern reedgrass and bluejoint reedgrass will decrease in frequency and production. When this occurs, the plant composition will be similar to the Spikerush/Bulrush/Cattail Plant Community, but the total production will be significantly reduced.

This site can be significantly impacted when used as primary watering sources by livestock and to a lesser degree, wildlife. Compaction can occur, which can lead to pedastalling and increased bare ground. This does not significantly affect composition, but can lead to reduced production.

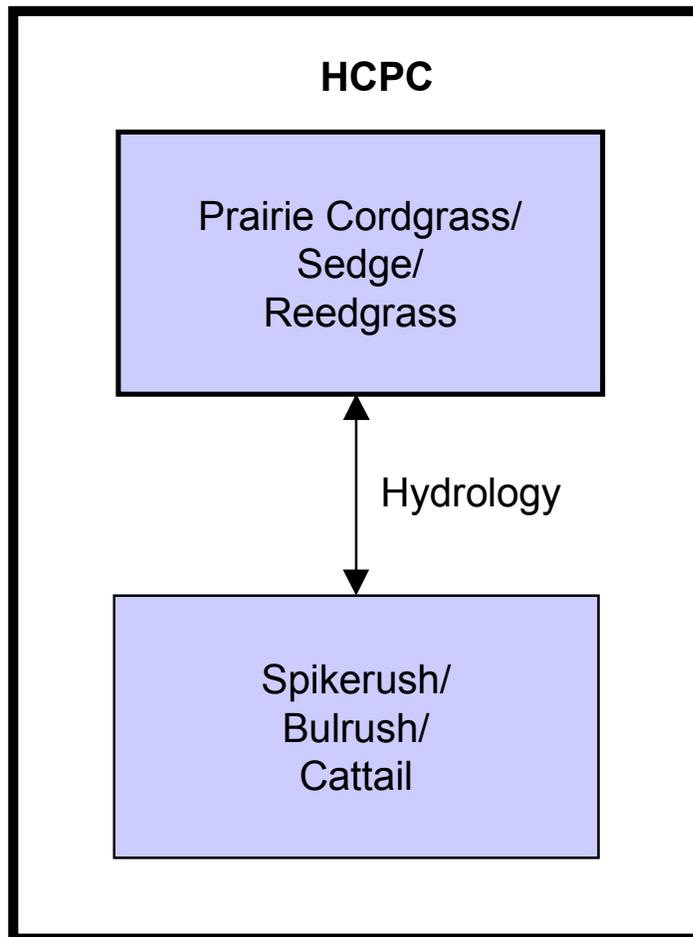
RANGELAND INTERPRETATIONS

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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



HCPC - Historic Climax Plant Community;
Hydrology - Natural wet and dry cycles.

Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SCIENTIFIC NAME	SYMBOL	Prairie Cordgrass/Sedge/ Reedgrass			Spikerush/Bulrush/Cattail		
			Group	lbs./acre	% Comp	Group	lbs./acre	% Comp
GRASSES				2750 - 4125	50 - 75		550 - 1925	10 - 35
TALL GRASSES				3025 - 3575	55 - 65	1	275 - 1100	5 - 20
prairie cordgrass	<i>Spartina pectinata</i>	SPPE	1	2200 - 3025	40 - 55	1	275 - 825	5 - 15
bluejoint reedgrass	<i>Calamagrostis canadensis</i>	CACA4	1	550 - 1375	10 - 25	1	0 - 550	0 - 10
northern reedgrass	<i>Calamagrostis stricta</i> ssp. <i>inexpansa</i>	CASTI3	1	110 - 550	2 - 10	1	0 - 275	0 - 5
narrow reedgrass	<i>Calamagrostis stricta</i> ssp. <i>stricta</i>	CASTS5	1	110 - 550	2 - 10	1	0 - 275	0 - 5
rough barnyardgrass	<i>Echinochloa muricata</i>	ECMU2	1	275 - 825	5 - 15	1	0 - 275	0 - 5
OTHER NATIVE GRASSES			2	275 - 550	5 - 10	2	275 - 825	5 - 15
bluegrass	<i>Poa</i> spp.	POA	2	0 - 275	0 - 5	2	0 - 275	0 - 5
foxtail barley	<i>Hordeum jubatum</i>	HOJU	2	0 - 275	0 - 5	2	0 - 275	0 - 5
reed canarygrass	<i>Phalaris arundinacea</i>	PHAR3	2	0 - 275	0 - 5	2	0 - 275	0 - 5
slender wheatgrass	<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>	ELTRT	2	0 - 275	0 - 5	2	0 - 275	0 - 5
switchgrass	<i>Panicum virgatum</i>	PAVI2	2	0 - 275	0 - 5	2	0 - 55	0 - 1
western wheatgrass	<i>Pascopyrum smithii</i>	PASM	2	0 - 165	0 - 3	2	0 - 55	0 - 1
inland saltgrass	<i>Distichlis spicata</i>	DISP	2	0 - 55	0 - 1	2	0 - 55	0 - 1
other perennial grasses		2GP	2	0 - 275	0 - 5	2	0 - 275	0 - 5
GRASS-LIKES			3	1100 - 1925	20 - 35	3	2200 - 3300	40 - 60
Baltic rush	<i>Juncus balticus</i>	JUBA	3	0 - 275	0 - 5	3	275 - 825	5 - 15
bulrush	<i>Schoenoplectus</i> spp.	SCHOE6	3	275 - 550	5 - 10	3	550 - 1100	10 - 20
Nebraska sedge	<i>Carex nebrascensis</i>	CANE2	3	275 - 825	5 - 15	3	275 - 825	5 - 15
rush	<i>Juncus</i> spp.	JUNCU	3	0 - 275	0 - 5	3	275 - 825	5 - 15
sedge	<i>Carex</i> spp.	CAREX	3	275 - 550	5 - 10	3	275 - 550	5 - 10
slough sedge	<i>Carex atherodes</i>	CAAT2	3	275 - 825	5 - 15	3	275 - 825	5 - 15
spikerush	<i>Eleocharis</i> spp.	ELEOC	3	275 - 550	5 - 10	3	550 - 1375	10 - 25
other grass-likes		2GL	3	0 - 275	0 - 5	3	0 - 550	0 - 10
FORBS			4	275 - 550	5 - 10	4	825 - 1925	15 - 35
American licorice	<i>Glycyrrhiza lepidota</i>	GLLE3	4	0 - 110	0 - 2	4	0 - 275	0 - 5
arrowgrass	<i>Triglochin palustre</i>	TRPA6	4	0 - 110	0 - 2	4	0 - 275	0 - 5
aster	<i>Symphotrichum</i> spp.	SYMPH4	4	0 - 110	0 - 2	4	0 - 110	0 - 2
cattail	<i>Typha</i> spp.	TYPHA	4	0 - 110	0 - 2	4	550 - 1100	10 - 20
cinquefoil	<i>Potentilla</i> spp.	POTEN	4	0 - 110	0 - 2	4	0 - 165	0 - 3
dock	<i>Rumex</i> spp.	RUMEX	4	0 - 275	0 - 5	4	0 - 275	0 - 5
horsetail	<i>Equisetum laevigatum</i>	EQLA	4	0 - 110	0 - 2	4	110 - 550	2 - 10
pale dock	<i>Rumex altissimus</i>	RUAL4	4	0 - 110	0 - 2	4	0 - 165	0 - 3
Pennsylvania smartweed	<i>Polygonum pennsylvanicum</i>	POPE2	4	0 - 110	0 - 2	4	0 - 275	0 - 5
spotted water hemlock	<i>Cicuta maculata</i>	CIMA2	4	0 - 110	0 - 2	4	0 - 165	0 - 3
stinging nettle	<i>Urtica dioica</i>	URDI	4	0 - 165	0 - 3	4	0 - 275	0 - 5
swamp milkweed	<i>Asclepias incarnata</i>	ASIN	4	0 - 110	0 - 2	4	0 - 165	0 - 3
swamp smartweed	<i>Polygonum hydropiperoides</i>	POHY2	4	0 - 110	0 - 2	4	0 - 275	0 - 5
whitewater crowfoot	<i>Ranunculus longirostris</i>	RALO2	4	0 - 110	0 - 2	4	0 - 110	0 - 2
wild mint	<i>Mentha arvensis</i>	MEAR4	4	0 - 165	0 - 3	4	0 - 165	0 - 3
other annual forbs		2FA	4	0 - 275	0 - 5	4	0 - 275	0 - 5
other perennial forbs		2FP	4	55 - 275	1 - 5	4	0 - 275	0 - 5
SHRUBS/TREES			5	0 - 275	0 - 5	5	0 - 275	0 - 5
cottonwood	<i>Populus</i> spp.	POPUL	5	0 - 55	0 - 1	5	0 - 55	0 - 1
false indigo	<i>Amorpha fruticosa</i>	AMFR	5	0 - 55	0 - 1	5	0 - 55	0 - 1
willow	<i>Salix</i> spp.	SALIX	5	0 - 165	0 - 3	5	0 - 165	0 - 3

Annual Production lbs./acre	LOW	RV	HIGH	LOW	RV	HIGH
GRASSES & GRASS-LIKES	3180 -	3438	-3600	500 -	738	-1400
FORBS	1100 -	1513	-2000	1800 -	2250	-2700
SHRUBS	220 -	413	-600	700 -	1375	-1600
TREES	0 -	138	-300	0 -	138	-300
TOTAL	4500 -	5500	-6500	3000 -	4500	-6000

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.

Historic Climax Plant Community

The plant community upon which interpretations are primarily based is the Historic Climax Plant Community (HCPC). The HCPC is actually made up of two distinct plant communities, which are described further below. Potential vegetation is about 10-75% grasses, 20-60% grass-likes, 5-35% forbs, and 0-5% shrubs and/or trees. Major grasses and grass-likes include prairie cordgrass, sedge, bluejoint reedgrass, spikerush, cattail and bulrush. Grasses and grass-likes of lesser importance are bluegrass, slender wheatgrass, Baltic rush and low-growing, unpalatable sedges, rushes and other grass-likes.

The plant community is well adapted to the Northern Great Plains climatic conditions. It is a critical plant community providing water and habitat for the surrounding area. The diversity in plant species provides a variety of habitats for wildlife. It is resistant to drought due to a dependable water supply. Community dynamics, nutrient cycle, water cycle and energy flow are functioning properly. Plant litter is properly distributed with very little movement off-site and natural plant mortality is very 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: SD6008

Growth curve name: Pierre Shale Plains, lowland cool-season/warm-season co-dominant.

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

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	4	11	19	23	20	12	6	5	0	0

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

- Hydrology cycles will shift the HCPC between the *Prairie Cordgrass/Sedge/Reedgrass Plant Community* and the *Spikerush/Bulrush/Cattail Plant Community*.

Prairie Cordgrass/Sedge/Reedgrass Plant Community: This plant community occurs during the more normal to drier precipitation/hydrology cycles. During these periods, grasses become more dominant in the plant community. Grasses will make up about 50-75%, with grass-likes at 20-35%, forbs 5-10% and shrubs and/or trees at 0-5%. Dominant species are prairie cordgrass, bluejoint reedgrass, rough banyardgrass, sedge and dock.

Spikerush/Bulrush/Cattail Plant Community: This plant community occurs during the wetter precipitation/hydrology cycles that naturally occur on this site. During these periods, the species composition shifts to being more dominated by the grass-like species. The plant community is made

up of about 10-35% grasses, 40-60% grass-likes, 15-35% forbs, and 0-5% shrubs and/or trees.
Dominant species include bulrush, Baltic rush, spikerush and cattail.

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

-- Under Development --

Prairie Cordgrass/Sedge/Reedgrass Plant Community:

Spikerush/Bulrush/Cattail Plant Community:

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

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
Grasses & Grass-like							
Baltic 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
bluegrass	U D U U	D P U D	U D U U	U P N D	U P N D	U D U U	U D U U
bluejoint reedgrass	U P D U	N D U N	U P D U	N D U N	N D U N	U P D U	U P D U
bulrush	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	U U U U
foxtail barley	U D N N	N P N N	U D N N	N P N N	N P N N	U D N N	U D N N
inland saltgrass	N U U N	N N N N	N U U N	N N N N	N N N N	N U U N	N U U N
narrow reedgrass	U P U D	N D U N	U P U D	N D U N	N D U N	U P U D	U P U D
Nebraska sedge	U P U D	U P N D	U P U D	U D U D	U D U D	U P U D	U P U D
northern reedgrass	U P U D	N D N U	U P U D	N D N U	N D N U	U P U D	U P U D
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
reed canarygrass	U D U U	N N N N	U D U U	N N N N	N N N N	U D U U	U D U U
rough barnyardgrass	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
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
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
slender wheatgrass	U P U U	U D U U	U P U U	N D U N	N D U N	U P U U	U P U U
slough 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
spikerush	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
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
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 licorice	U U D U	N U U N	U U D U	N U U N	N U U N	U U D U	N U U N
arrowgrass	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
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
cattail	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
cinquefoil	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
dock	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
horsetail	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
pale dock	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
Pennsylvania smartweed	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
spotted water hemlock	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
stinging nettle	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
swamp milkweed	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
swamp smartweed	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
whitewater crowfoot	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
Shrubs/Trees							
false indigo	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 U N
plains cottonwood	D U U D	D U U D	D U U D	D U D D	D U U D	D U U D	D U U D
willow	P U D P	P U D P	P U D P	P U D P	U U U U	P U D P	P U D 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 Cordgrass/Sedge/Reedgrass	5500	1.70
Spikerush/Bulrush/Cattail	4500	1.42

* 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 groups C and D. Infiltration and runoff potential for this site varies from negligible to high depending on soil hydrologic group, slope and water table. Runoff will be high on this site since the soil may be saturated (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

- (060AY021SD) – Clayey Overflow
- (060AY020SD) – Loamy Overflow
- (060AY042SD) – Lowland
- (060AY003SD) – Subirrigated

Similar Sites

(060AY003SD) – Subirrigated
[lower production; less frequent ponding and lower water table]

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; 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				

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