

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

Ecological Site Description

Site Type: Rangeland

Site Name: Clayey Overflow

Site ID: R060AXY021SD

Major Land Resource Area: 60A – Pierre Shale Plains



Physiographic Features

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

Landform: alluvial fan, flood plain, stream terrace **Aspect:** N/A

	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	2500	4300
Slope (percent):	0	3
Water Table Depth (inches):	80	80
Flooding:		
Frequency:	Rare	Frequent
Duration:	Very brief	Brief
Ponding:		
Depth (inches):	None	None
Frequency:	None	None
Duration:	None	None
Runoff Class:	Low	Medium

Climatic Features

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.

RANGELAND INTERPRETATIONS

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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

Stream Type: B6, C6
(Rosgen System)

Representative Soil Features

The soils in this site are moderately well to well drained and formed in alluvium. The silty clay loam to clay surface layer is 3 to 11 inches thick. The soils have a very slow to moderately slow infiltration rate. 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.

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

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: mixed
Surface Texture: silty clay loam, clay, silty clay
Surface Texture Modifier: none
Subsurface Texture Group: clayey
Surface Fragments \leq 3" (% Cover): 0
Surface Fragments $>$ 3" (%Cover): 0
Subsurface Fragments \leq 3" (% Volume): 0-10
Subsurface Fragments $>$ 3" (% Volume): 0-5

	<u>Minimum</u>	<u>Maximum</u>
Drainage Class:	moderately well	well
Permeability Class:	very slow	moderately slow
Depth (inches):	80	80
Electrical Conductivity (mmhos/cm)*:	0	8
Sodium Absorption Ratio*:	0	5
Soil Reaction (1:1 Water)*:	6.6	8.4
Soil Reaction (0.1M CaCl₂)*:	NA	NA
Available Water Capacity (inches)*:	5	8
Calcium Carbonate Equivalent (percent)*:	0	15

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

Plant Communities

Ecological Dynamics of the Site:

This site developed under Northern Great Plains climatic conditions, 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 blue grama and sagebrush will increase, and introduced species such as Kentucky bluegrass and Canada thistle will invade the site. Grasses such as slender wheatgrass, green needlegrass, big bluestem, rhizomatous wheatgrasses, prairie cordgrass and switchgrass will decrease in frequency and production.

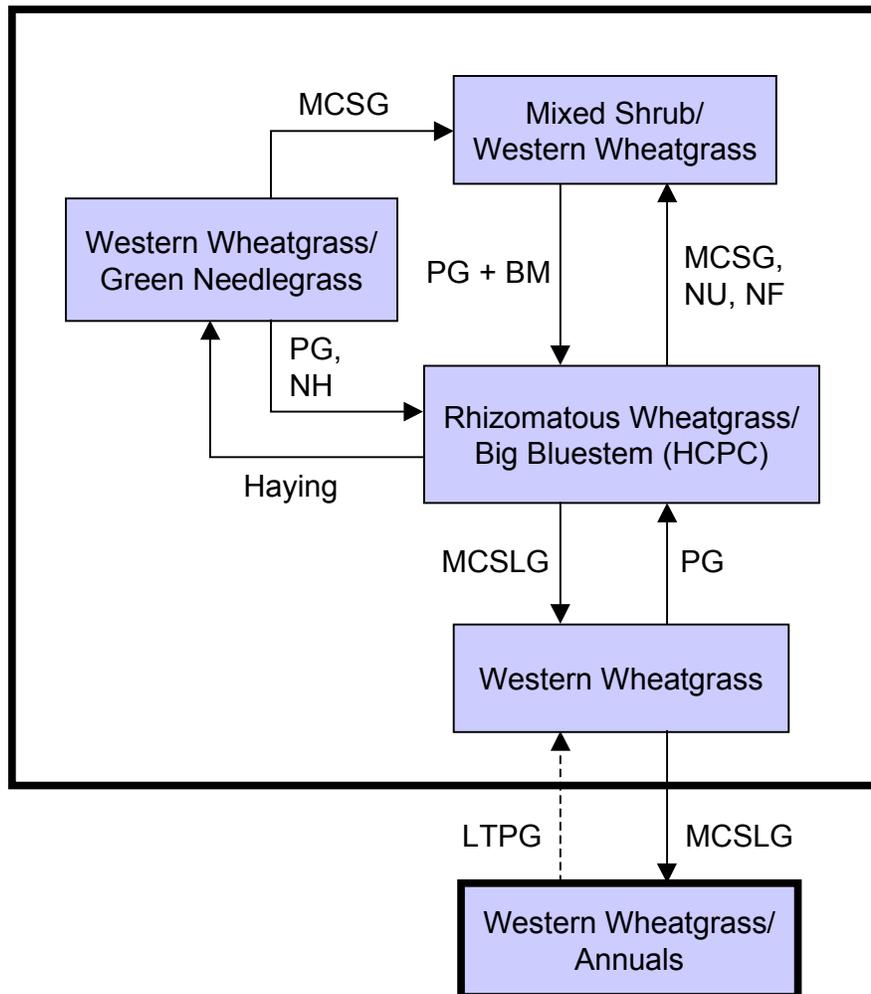
Clayey Overflow sites that are in association with Dense Clay and Thin Claypan sites with slickspots tend to create inclusions of a transitional plant community. The higher salt levels in the soils create a plant community that combines characteristics of both the Saline Lowland and Clayey Overflow sites. Species that are generally not common on a Saline Lowland site, but more closely associated with the Mixed Shrub/Western Wheatgrass Plant Community of the Clayey Overflow occupy this transitional plant community. Saltgrass and western wheatgrass dominate, but species such as Canada wildrye, bluegrass and sagebrush will also be present.

Due to the amount and pattern of the precipitation, the big sagebrush component typically is not resilient once it has been removed if a healthy and vigorous stand of grass exists and is maintained. The exception to this is where the herbaceous component is severely degraded at the time of brush removal, growing conditions are unfavorable after treatment, and/or recovery periods are inadequate. Big sagebrush occurs mainly in the western portions of this MLRA, while silver sagebrush is found throughout the MLRA.

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



BM - Brush management (fire, chemical, mechanical); **HCPC** - Historic Climax Plant Community; **LTPG** - Long-term prescribed grazing; **MCSG** - Moderate, continuous seasonal grazing; **MCSLG** - Moderate, continuous season-long grazing; **NF** - No fire; **NH** - No haying; **NU** - Non-use; **PG** - Prescribed grazing (proper stocking rates with adequate recovery periods during the growing season).

Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SCIENTIFIC NAME	SYMBOL	Rhizomatous Wheatgrass/ Big Bluestem (HCPC)		
			Group	lbs./acre	% Comp
GRASSES & GRASS-LIKES				1875 - 2375	75 - 95
WHEATGRASS			1	750 - 1000	30 - 40
western wheatgrass	Pascopyrum smithii	PASM	1	750 - 1000	30 - 40
thickspike wheatgrass	Elymus lanceolatus ssp. lanceolatus	ELLAL	1	250 - 500	10 - 20
Montana wheatgrass	Elymus albicans	ELAL7	1	125 - 375	5 - 15
slender wheatgrass	Elymus trachycaulus ssp. trachycaulus	ELTRT	1	250 - 500	10 - 20
bearded wheatgrass	Elymus trachycaulus ssp. subsecundus	ELTRS	1	0 - 125	0 - 5
TALL WARM-SEASON GRASSES			2	250 - 750	10 - 30
big bluestem	Andropogon gerardii	ANGE	2	250 - 500	10 - 20
switchgrass	Panicum virgatum	PAVI2	2	125 - 375	5 - 15
NEEDLEGRASS			3	375 - 750	15 - 30
green needlegrass	Nassella viridula	NAVI4	3	375 - 750	15 - 30
NATIVE GRASSES & GRASS-LIKES			4	125 - 250	5 - 10
mat muhly	Muhlenbergia richardsonis	MURI	4	0 - 50	0 - 2
blue grama	Bouteloua gracilis	BOGR2	4	25 - 125	1 - 5
buffalograss	Buchloe dactyloides	BUDA	4	25 - 125	1 - 5
bottlebrush squirreltail	Elymus elymoides	ELEL5	4	0 - 125	0 - 5
Canada wildrye	Elymus canadensis	ELCA4	4	125 - 250	5 - 10
sedge	Carex spp.	CAREX	4	125 - 250	5 - 10
prairie junegrass	Koeleria macrantha	KOMA	4	25 - 125	1 - 5
green muhly	Muhlenbergia racemosa	MURA	4	0 - 100	0 - 4
Sandberg bluegrass	Poa secunda	POSE	4	0 - 75	0 - 3
tall dropseed	Sporobolus compositus var. compositus	SPCOC2	4	25 - 125	1 - 5
spikerush	Eleocharis spp.	ELEOC	4	0 - 125	0 - 5
rush	Juncus spp.	JUNCU	4	0 - 125	0 - 5
inland saltgrass	Distichlis spicata	DISP	4	0 - 25	0 - 1
foxtail barley	Hordeum jubatum	HOJU	4	0 - 50	0 - 2
other perennial grasses		2GP	4	0 - 75	0 - 3
FORBS			6	125 - 250	5 - 10
American licorice	Glycyrrhiza lepidota	GLLE3	6	0 - 75	0 - 3
American vetch	Vicia americana	VIAM	6	0 - 75	0 - 3
cudweed sagewort	Artemisia ludoviciana	ARLU	6	0 - 75	0 - 3
false boneset	Brickellia eupatorioides	BREU	6	0 - 75	0 - 3
false Solomon's-seal	Maianthemum stellatum	MAST4	6	0 - 75	0 - 3
goldenrod	Solidago spp.	SOLID	6	0 - 75	0 - 3
hairy goldaster	Heterotheca villosa	HEVI4	6	0 - 75	0 - 3
heath aster	Symphotrichum ericoides	SYER	6	0 - 75	0 - 3
Maximilian sunflower	Helianthus maximiliani	HEMA2	6	0 - 50	0 - 2
mint	Mentha spp.	MENTH	6	0 - 50	0 - 2
prairie coneflower	Ratibida columnifera	RACO3	6	0 - 75	0 - 3
purple prairie clover	Dalea purpurea	DAPU5	6	0 - 75	0 - 3
scarlet gaura	Gaura coccinea	GACO5	6	0 - 75	0 - 3
scurfpea	Psoraleum spp.	PSORA2	6	0 - 75	0 - 3
thistle	Cirsium spp.	CIRSI	6	0 - 25	0 - 1
western yarrow	Achillea millefolium	ACMI2	6	0 - 75	0 - 3
other annual forbs		2FA	6	0 - 75	0 - 3
other perennial forbs		2FP	6	0 - 75	0 - 3
SHRUBS			7	25 - 250	1 - 10
big sagebrush	Artemisia tridentata	ARTR2	7	0 - 125	0 - 5
chokecherry	Prunus virginiana	PRVI	7	0 - 125	0 - 5
fourwing saltbush	Atriplex canescens	ATCA2	7	0 - 75	0 - 3
fringed sagewort	Artemisia frigida	ARFR4	7	0 - 50	0 - 2
leadplant	Amorpha canescens	AMCA6	7	0 - 75	0 - 3
rose	Rosa spp.	ROSA6	7	25 - 125	1 - 5
silver sagebrush	Artemisia cana	ARCA13	7	0 - 125	0 - 5
western snowberry	Symphoricarpos occidentalis	SYOC	7	0 - 75	0 - 3
willow	Salix spp.	SALIX	7	0 - 50	0 - 2
other shrubs		2SHRUB	7	0 - 75	0 - 3
TREES			8	0 - 75	0 - 3
American elm	Ulmus americana	ULAM	8	0 - 75	0 - 3
boxelder	Acer negundo	ACNE2	8	0 - 50	0 - 2
green ash	Fraxinus pennsylvanica	FRPE	8	0 - 75	0 - 3
hackberry	Celtis occidentalis	CEOC	8	0 - 50	0 - 2
hawthorn	Crataegus spp.	CRATA	8	0 - 25	0 - 1
plains cottonwood	Populus deltoides ssp. monilifera	PODEM	8	0 - 75	0 - 3

Annual Production lbs./acre		LOW	RV	HIGH
GRASSES & GRASS-LIKES		1760 -	2138	-2470
FORBS		120 -	188	-275
SHRUBS		20 -	138	-275
TREES		0 -	38	-80
TOTAL		1900 -	2500	-3100

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	Rhizomatous Wheatgrass/ Big Bluestem (HCPC)			Western Wheatgrass			Mixed Shrub/ Western Wheatgrass			Western Wheatgrass/ Annuals			
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	
GRASSES & GRASS-LIKES			1875 - 2375	75 - 95		1200 - 1425	80 - 95		1575 - 1785	75 - 85		630 - 785	70 - 85	
WHEATGRASS		1	750 - 1000	30 - 40	1	525 - 675	35 - 45	1	735 - 1155	35 - 55	1	90 - 315	10 - 35	
western wheatgrass	PASM	1	750 - 1000	30 - 40	1	525 - 675	35 - 45	1	735 - 1155	35 - 55	1	90 - 315	10 - 35	
thickspike wheatgrass	ELLAL	1	250 - 500	10 - 20	1	15 - 75	1 - 5	1	21 - 105	1 - 5	1	9 - 45	1 - 5	
Montana wheatgrass	ELAL7	1	125 - 375	5 - 15	1	0 - 30	0 - 2	1	0 - 42	0 - 2				
slender wheatgrass	ELTRT	1	250 - 500	10 - 20	1	30 - 75	2 - 5	1	42 - 168	2 - 8	1	0 - 45	0 - 5	
bearded wheatgrass	ELTRS	1	0 - 125	0 - 5	1	0 - 30	0 - 2	1	21 - 147	1 - 7	1	0 - 18	0 - 2	
TALL WARM-SEASON GRASSES		2	250 - 750	10 - 30	2	30 - 150	2 - 10	2	21 - 105	1 - 5	2			
big bluestem	ANGE	2	250 - 500	10 - 20	2	0 - 75	0 - 5	2	0 - 210	0 - 10				
switchgrass	PAV12	2	125 - 375	5 - 15	2	30 - 75	2 - 5	2	21 - 63	1 - 3				
NEEDLEGRASS		3	375 - 750	15 - 30	3	150 - 300	10 - 20	3	42 - 105	2 - 5	3	0 - 45	0 - 5	
green needlegrass	NAVI4	3	375 - 750	15 - 30	3	150 - 300	10 - 20	3	42 - 105	2 - 5	3	0 - 45	0 - 5	
NATIVE GRASSES & GRASS-LIKES		4	125 - 250	5 - 10	4	75 - 150	5 - 10	4	105 - 210	5 - 10	4	45 - 180	5 - 20	
mat muhly	MURI	4	0 - 50	0 - 2	4	0 - 45	0 - 3	4	0 - 42	0 - 2	4	0 - 27	0 - 3	
blue grama	BOGR2	4	25 - 125	1 - 5	4	15 - 75	1 - 5	4	21 - 105	1 - 5	4	9 - 45	1 - 5	
buffalograss	BUDA	4	25 - 125	1 - 5	4	15 - 75	1 - 5	4	21 - 105	1 - 5	4	9 - 45	1 - 5	
bottlebrush squirreltail	ELEL5	4	0 - 125	0 - 5	4	0 - 75	0 - 5	4	0 - 105	0 - 5	4	0 - 45	0 - 5	
Canada wildrye	ELCA4	4	125 - 250	5 - 10	4	15 - 75	1 - 5	4	0 - 63	0 - 3				
sedge	CAREX	4	125 - 250	5 - 10	4	30 - 75	2 - 5	4	21 - 63	1 - 3	4	9 - 45	1 - 5	
prairie junegrass	KOMA	4	25 - 125	1 - 5	4	0 - 30	0 - 2	4	0 - 42	0 - 2	4	0 - 18	0 - 2	
green muhly	MURA	4	0 - 100	0 - 4	4	0 - 30	0 - 2	4	0 - 105	0 - 5				
Sandberg bluegrass	POSE	4	0 - 75	0 - 3	4	0 - 30	0 - 2	4	0 - 42	0 - 2	4	0 - 18	0 - 2	
tall dropseed	SPCOC2	4	25 - 125	1 - 5	4	15 - 75	1 - 5	4	21 - 105	1 - 5	4	9 - 45	1 - 5	
spikerush	ELEOC	4	0 - 125	0 - 5	4	0 - 45	0 - 3	4	0 - 63	0 - 3	4	0 - 27	0 - 3	
rush	JUNCU	4	0 - 125	0 - 5	4	0 - 45	0 - 3	4	0 - 63	0 - 3	4	0 - 27	0 - 3	
Inland saltgrass	DISP	4	0 - 25	0 - 1	4	15 - 75	1 - 5	4	21 - 63	1 - 3	4	9 - 90	1 - 10	
foxtail barley	HOJU	4	0 - 50	0 - 2	4	0 - 45	0 - 3	4	0 - 42	0 - 2	4	18 - 45	2 - 5	
other perennial grasses	2GP	4	0 - 75	0 - 3	4	0 - 45	0 - 3	4	0 - 63	0 - 3	4	0 - 45	0 - 5	
NON-NATIVE GRASSES		5			5	30 - 150	2 - 10	5	42 - 210	2 - 10	5	45 - 135	5 - 15	
Kentucky bluegrass	POPR				5	30 - 150	2 - 10	5	21 - 105	1 - 5	5	18 - 135	2 - 15	
cheatgrass	BRTE				5	15 - 75	1 - 5	5	21 - 105	1 - 5	5	18 - 90	2 - 10	
FORBS		6	125 - 250	5 - 10	6	75 - 150	5 - 10	6	105 - 315	5 - 15	6	90 - 180	10 - 20	
American licorice	GLLE3	6	0 - 75	0 - 3	6	0 - 45	0 - 3	6	0 - 63	0 - 3	6	0 - 18	0 - 2	
American vetch	VIAM	6	0 - 75	0 - 3				6	0 - 63	0 - 3				
cocklebur	XANTH2				6	0 - 30	0 - 2	6	0 - 21	0 - 1	6	18 - 90	2 - 10	
cudweed sagewort	ARLU	6	0 - 75	0 - 3	6	15 - 75	1 - 5	6	21 - 105	1 - 5	6	18 - 45	2 - 5	
curlycup gumweed	GRSQ				6	0 - 30	0 - 2	6	0 - 21	0 - 1	6	9 - 36	1 - 4	
false boneset	BREU	6	0 - 75	0 - 3				6	0 - 63	0 - 3				
false Solomon's-seal	MAST4	6	0 - 75	0 - 3	6	0 - 30	0 - 2	6	0 - 105	0 - 5				
goldenrod	SOLID	6	0 - 75	0 - 3	6	0 - 45	0 - 3	6	0 - 63	0 - 3	6	18 - 45	2 - 5	
hairy goldaster	HEV4	6	0 - 75	0 - 3	6	0 - 45	0 - 3	6	0 - 63	0 - 3	6	0 - 18	0 - 2	
heath aster	SYER	6	0 - 75	0 - 3	6	15 - 75	1 - 5	6	21 - 105	1 - 5	6	18 - 45	2 - 5	
Maximilian sunflower	HEMA2	6	0 - 50	0 - 2	6	0 - 15	0 - 1	6	0 - 63	0 - 3				
mint	MENTH	6	0 - 50	0 - 2	6	0 - 15	0 - 1	6	21 - 63	1 - 3				
prairie coneflower	RACO3	6	0 - 75	0 - 3	6	0 - 45	0 - 3	6	0 - 63	0 - 3	6	9 - 27	1 - 3	
purple prairie clover	DAPU5	6	0 - 75	0 - 3	6	0 - 30	0 - 2	6	0 - 63	0 - 3	6	0 - 9	0 - 1	
scarlet gaura	GACO5	6	0 - 75	0 - 3	6	0 - 45	0 - 3	6	0 - 63	0 - 3	6	0 - 18	0 - 2	
scurfphea	PSORA2	6	0 - 75	0 - 3	6	15 - 45	1 - 3	6	21 - 63	1 - 3	6	18 - 45	2 - 5	
thistle	CIRSI	6	0 - 25	0 - 1	6	15 - 45	1 - 3	6	21 - 42	1 - 2	6	18 - 90	2 - 10	
western ragweed	AMPS				6	0 - 30	0 - 2	6	0 - 42	0 - 2	6	0 - 27	0 - 3	
western yarrow	ACMI2	6	0 - 75	0 - 3	6	0 - 45	0 - 3	6	0 - 63	0 - 3	6	18 - 45	2 - 5	
other annual forbs	2FA	6	0 - 75	0 - 3	6	15 - 45	1 - 3	6	21 - 63	1 - 3	6	18 - 45	2 - 5	
other perennial forbs	2FP	6	0 - 75	0 - 3	6	15 - 45	1 - 3	6	21 - 63	1 - 3	6	9 - 27	1 - 3	
SHRUBS		7	25 - 250	1 - 10	7	15 - 75	1 - 5	7	105 - 210	5 - 10	7	45 - 90	5 - 10	
big sagebrush	ARTR2	7	0 - 125	0 - 5	7	0 - 75	0 - 5	7	42 - 315	2 - 15	7	0 - 27	0 - 3	
chokecherry	PRV1	7	0 - 125	0 - 5	7	0 - 45	0 - 3	7	21 - 105	1 - 5	7	0 - 9	0 - 1	
fourwing saltbush	ATCA2	7	0 - 75	0 - 3	7	0 - 15	0 - 1	7	0 - 63	0 - 3				
fringed sagewort	ARFR4	7	0 - 50	0 - 2	7	0 - 45	0 - 3	7	0 - 63	0 - 3	7	0 - 18	0 - 2	
leadplant	AMCA6	7	0 - 75	0 - 3	7	0 - 15	0 - 1	7	0 - 63	0 - 3				
rose	ROSA5	7	25 - 125	1 - 5	7	15 - 45	1 - 3	7	21 - 105	1 - 5	7	9 - 27	1 - 3	
silver sagebrush	ARCA13	7	0 - 125	0 - 5	7	0 - 75	0 - 5	7	42 - 315	2 - 15	7	0 - 45	0 - 5	
western snowberry	SYOC	7	0 - 75	0 - 3	7	0 - 45	0 - 3	7	42 - 315	2 - 15	7	9 - 45	1 - 5	
willow	SALIX	7	0 - 50	0 - 2	7	0 - 30	0 - 2	7	21 - 105	1 - 5	7	0 - 9	0 - 1	
other shrubs	2SHRUB	7	0 - 75	0 - 3	7	0 - 45	0 - 3	7	0 - 63	0 - 3	7	0 - 27	0 - 3	
TREES		8	0 - 75	0 - 3	8	0 - 45	0 - 3	8	0 - 63	0 - 3	8	0 - 9	0 - 1	
American elm	ULAM	8	0 - 75	0 - 3	8	0 - 30	0 - 2	8	0 - 63	0 - 3	8	0 - 9	0 - 1	
boxelder	ACNE2	8	0 - 50	0 - 2	8	0 - 30	0 - 2	8	0 - 42	0 - 2	8	0 - 9	0 - 1	
green ash	FRPE	8	0 - 75	0 - 3	8	0 - 45	0 - 3	8	0 - 63	0 - 3	8	0 - 9	0 - 1	
hackberry	CEOC	8	0 - 50	0 - 2	8	0 - 30	0 - 2	8	0 - 42	0 - 2	8	0 - 9	0 - 1	
hawthorn	CRATA	8	0 - 25	0 - 1	8	0 - 15	0 - 1	8	0 - 21	0 - 1	8	0 - 9	0 - 1	
plains cottonwood	PODEM	8	0 - 75	0 - 3	8	0 - 30	0 - 2	8	0 - 63	0 - 3	8	0 - 9	0 - 1	
other trees	2TREE				8	0 - 15	0 - 1	8	0 - 21	0 - 1	8	0 - 9	0 - 1	
Annual Production lbs./acre			LOW	RV	HIGH	LOW	RV	HIGH	LOW	RV	HIGH	LOW	RV	HIGH
GRASSES & GRASS-LIKES			1760	2138	2470	820	1320	1815	900	1701	2270	375	693	1110
FORBS			120	188	275	70	113	155	100	210	350	85	135	185
SHRUBS			20	138	275	10	45	80	100	158	215	40	68	95
TREES			0	38	80	0	23	50	0	32	65	0	5	10
TOTAL			1900	2500	3100	900	1500	2100	1100	2100	2900	500	900	1400

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.

Rhizomatous Wheatgrass/Big Bluestem Plant Community

The plant community upon which interpretations are primarily based is the Rhizomatous Wheatgrass/Big Bluestem Plant Community. This is also considered the Historic Climax Plant Community (HCPC). Potential vegetation is about 75-95% grasses or grass-like plants, 5-10% forbs, 1-10% shrubs and 0-3% trees. A mix of cool and warm season grasses dominates the plant community. The major grasses and grass-likes include slender wheatgrass, rhizomatous wheatgrasses, big bluestem, green needlegrass, prairie cordgrass, switchgrass, sedges and rushes. Other grasses in the plant community include bluebunch wheatgrass, mat muhly, Sandberg bluegrass, Canada wildrye, needleleaf sedge, blue grama, and prairie junegrass. Shrubs such as silver sagebrush, leadplant, chokecherry, big sagebrush, rose and snowberry are present. Forbs such as aster, American vetch, prairie coneflower, prairie clover, American licorice, cudweed sagewort and goldenrod are common. Trees occurring on the site include scattered green ash, cottonwood, boxelder and elm.

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 very little movement off-site and natural plant mortality is very low. The diversity in plant 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 is an estimate of the 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 leading to other plant communities are as follows.

- Haying will convert this plant community to the *Western Wheatgrass/Green Needlegrass Plant Community*.
- Moderate, continuous seasonal grazing or non-use and no fire will convert this plant community to the *Mixed Shrub/Western Wheatgrass Plant Community*.

Western Wheatgrass/Green Needlegrass Plant Community

This plant community is the result of haying. Western wheatgrass and green needlegrass dominate. These grasses form a sod, which is very productive and is often used for dryland hay. This plant community is productive but lacks the diversity of the HCPC. The soil of this plant community is protected. The watershed is functioning but may produce slightly increased runoff.

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

Growth curve number: SD6006

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

Growth curve description: Cool-season dominant, lowland.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	6	15	20	26	17	9	4	3	0	0

Transitional pathways leading to other plant communities are as follows.

- Prescribed grazing will eventually return this plant community to the *Rhizomatous Wheatgrass/Big Bluestem Plant Community*.
- Moderate, continuous seasonal grazing will convert this plant community to the *Mixed Shrub/Western Wheatgrass Plant Community*.

Western Wheatgrass Plant Community

This plant community results from continuous season-long grazing without adequate recovery periods between each grazing event during the growing season. Recognition of this plant community will enable the land user to implement key management decisions before a significant ecological threshold is crossed. Western wheatgrass is the dominant species. Big bluestem, green needlegrass and switchgrass are greatly reduced. Forb species include western yarrow, asters, prairie coneflower and western ragweed. Leadplant is greatly reduced while other shrub species would tend to be heavily browsed. This plant community is relatively stable and less productive than the HCPC. Reduction of litter and short plant heights result in higher soil temperatures, poor water infiltration rates and increased runoff. This plant community can occur throughout the site, on spot grazed areas, and around water sources where season-long grazing patterns occur. Soil erosion will be minimal due to the sod forming habit of Kentucky bluegrass.

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

Growth curve number: SD6007

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

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

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	5	13	20	25	18	11	5	3	0	0

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

- Moderate, continuous season-long grazing will move this plant community across the ecological threshold to the *Western Wheatgrass/Annuals Plant Community*.
- Prescribed grazing will shift this plant community back to the *Rhizomatous Wheatgrass/Big Bluestem Plant Community (HCPC)*.

Mixed Shrub/Western Wheatgrass Plant Community

This plant community develops after an extended period of non-use and exclusion of fire. This plant community will also develop with moderate or heavy continuous seasonal grazing. In either case, shrubs increase and can sometimes dominate the plant community.

Cool-season grasses make up the majority of the understory with the balance made up of short warm-season grasses, annual cool-season grasses, and miscellaneous forbs. Western wheatgrass is the dominant grass. Grasses of secondary importance include blue grama, prairie junegrass, Sandberg bluegrass, green needlegrass and slender wheatgrass. Woody plants such as big sagebrush, silver sagebrush, and snowberry have increased with canopy cover up to 20%. Forbs commonly found in this plant community include cudweed sagewort, goldenrod, hairy goldaster and scurfpea. When compared to the HCPC, western wheatgrass has increased, while green needlegrass and big bluestem have decreased. Production of cool-season grasses has also been reduced. This plant community is stable and protected from excessive erosion. The biotic integrity is usually intact, but it can be at risk if dominated by short grasses or shrubs, and if invaded by introduced species.

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

Growth curve number: 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:

- Brush control followed by prescribed grazing, will result in a plant community very similar to the *Rhizomatous Wheatgrass/Big Bluestem Plant Community*.

Western Wheatgrass/Annuals Plant Community

This plant community developed with heavy continuous season-long grazing. Western wheatgrass and Kentucky bluegrass dominate the community. Green needlegrass has been greatly reduced. Big bluestem has been removed. Western yarrow, scurfpea, ragweed and goldenrod have increased. Non-native grasses and forbs such as annual bromes, curlycup gumweed, thistle and cocklebur will invade this plant community.

This plant community is resistant to change to a higher successional plant community due to low plant diversity and competition of the invaded species. A significant amount of production and diversity has been lost when compared to the HCPC. The loss of desirable species has negatively impacted energy flow and nutrient cycling. Water infiltration is reduced significantly. Soil loss may be accelerated where concentrated flows occur. It will take a very long time to restore this plant community back to the HCPC with improved management. Renovation would be very costly.

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

Growth curve number: SD6006

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

Growth curve description: Cool-season dominant, lowland.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	6	15	20	26	17	9	4	3	0	0

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

- Long-term prescribed grazing may move this plant community toward the *Western Wheatgrass Plant Community*. It may eventually return to the *HCPC* or associated successional plant community stages assuming an adequate seed/vegetative source is available.

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

Rhizomatous Wheatgrass/Big Bluestem 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.

Western Wheatgrass/Green Needlegrass Plant Community: The predominance of grasses in this plant community favors grazers and mixed-feeders, such as bison, elk, and antelope. Suitable thermal and escape cover for deer may be limited due to the low quantities of woody plants. However, topographical variations could provide some escape cover. When found adjacent to sagebrush dominated states, this plant community may provide brood rearing/foraging areas for 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.

Mixed Shrub/Western Wheatgrass Plant Community: The combination of an overstory of sagebrush and an understory of grasses and forbs provide a very diverse plant community for wildlife. The crowns of sagebrush tend to break up hard crusted snow on winter ranges, so mule deer and antelope may use this state for foraging and cover year-round, as would cottontail and jack rabbits. It provides important winter, nesting, brood-rearing, and foraging habitat for sage grouse. Brewer's sparrows' nest in big sagebrush plants, and hosts of other nesting birds utilize stands in the 20-30% cover range. The overstory of big sagebrush and understory of grass and forbs provide a diverse plant community that will support domestic livestock and wildlife such as mule deer and antelope.

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

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
Grasses & Grass-likes							
bearded wheatgrass	U P U U	N D U N	U P U U	N D U N	N D U N	U P U U	U P U U
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
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
buffalograss	U U P D	U U P D	U U D U	N U D U	N U D U	U U D U	U U D U
Canada wildrye	U D U U	N U N N	U D U U	N U N N	N U N N	U D U U	U D U U
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
green muhly	U D D U	N U N N	U D D U	N U N N	N U N N	U D D U	U D D U
green needgrass	U P U D	N P N P	U P U D	N P N P	N P N P	U P U D	U P U D
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
mat muhly	N U U N	U U D U	N U U N	U U U U	U U U U	N U U N	N U U N
Montana wheatgrass	U P D U	N D N N	U P D U	N D N N	N D N N	U P D U	U P D U
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
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
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
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
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
tall 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
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
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
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
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
false boneset	U U D U	N D U N	U U D U	N D U N	N D U N	U U D U	N D U N
false Solomon's-seal	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
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
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
Maximilian sunflower	U D P U	U D P U	U D P U	U D P U	U D P U	U D P U	U D P U
mint	N N U N	N U U N	N N U N	N U U N	N U U N	N N U N	N N U N
prairie coneflower	U U D U	U P P U	U U D U	U P P U	U P P U	U U D U	U P P U
purple prairie clover	U D P U	U P P U	U D P U	U P P U	U P P U	U D P U	U P P U
scarlet gaura	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
scurfpea	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
thistle	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N
western yarrow	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
Shrubs							
big sagebrush	U U U U	D U U D	U N U U	P U D P	P P P P	U N U U	D U U U
chokecherry	D T T D	D T T D	D T T D	P U D P	D U U D	D T T D	P U U P
fourwing saltbush	P D D P	P D D P	P D D P	P D D P	P D D P	P D D P	P D D P
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
silver sagebrush	D U U D	D U U D	D U U D	P D D P	P P P P	D U U D	D U U D
western snowberry	U U U U	U U U U	U U U U	D U D D	U U U U	U U U U	D U U U
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
Trees							
American elm	N N N N	N N N N	N N N N	N U D N	N N N N	N N N N	N N N N
boxelder	N N N U	N N U U	N N N U	N N U U	N N U U	N N N U	N N U U
green ash	N U D U	N D D U	N U D U	N D D U	N U D U	N U D U	N D D U
hackberry	N U D U	N D D U	N U D U	N D D U	N U D U	N U D U	N D D U
hawthorn	N U U U	N D D U	N U U U	N D D U	N U D U	N U U U	N D D U
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

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)
Rhizomatous Wheatgrass/Big Bluestem	2500	0.75 – 0.85
Western Wheatgrass/Green Needlegrass	2200	0.65 – 0.75
Western Wheatgrass	1500	0.45 – 0.50
Mixed Shrub/Western Wheatgrass	2100	0.55 – 0.60
Western Wheatgrass/Annuals	900	0.25 – 0.35**

* 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 herbage production on this site. The site is dominated by soils in hydrologic groups C and D. Infiltration ranges from very slow to moderately slow, and runoff potential for this site varies from low to medium 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 exception would be where short grasses form a dense sod. 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.

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