

United States Department of Agriculture Natural Resources Conservation Service

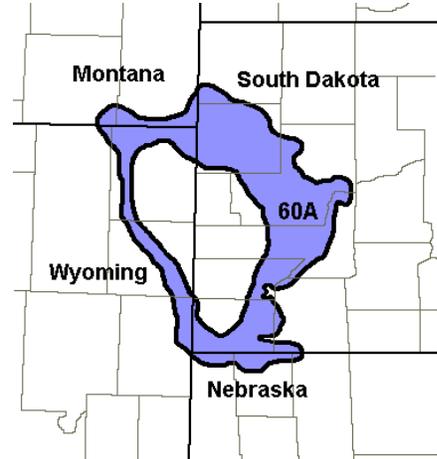
Ecological Site Description

Site Type: Rangeland

Site Name: Lowland

Site ID: R060AY042SD

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



Physiographic Features

This site is located on nearly level river valleys.

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

	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	2,500	4,300
Slope (percent):	0	4
Water Table Depth (inches):	60	80
Flooding:		
Frequency:	Rare	Occasional
Duration:	Very brief	Brief
Ponding:		
Depth (inches):	0	0
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 masses from Canada in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Chinook winds may occur in winter and bring rapid rises in temperature. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring. The normal average annual temperature is about 46°F. January is the coldest month with average temperatures ranging from about 19°F (Moorcroft CAA, Wyoming (WY)), to about 22°F (Belle Fourche, South Dakota (SD)). July is the warmest month with temperatures averaging from about 70°F (Moorcroft CAA, WY), to about 72°F (Belle Fourche, SD). The range of normal average monthly temperatures between the coldest and warmest months is about 51°F. Hourly winds are estimated to average about 11 miles per hour (mph) annually, ranging from about 13 mph during the spring to about 10 mph during the summer. Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 50 mph.

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

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

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

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

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

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

Influencing Water Features

Stream Type: B6, C6 (Rosgen System)

Representative Soil Features

The soils of this site are deep and very deep well-drained soils formed in mixed alluvium. These soils have moderate permeability. The surface soil will be highly variable and vary from two to eight inches in thickness. The surface soil will be one or more of the following textures: very fine sandy loam, fine sandy loam, sandy loam, loam, silt loam, clay loam, clay, or silty clay. A fluctuating water table occurs in these areas and ranges from one to five feet but is usually deeper than three feet. 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: loam, clay loam, clay, fine sandy loam, sandy loam, loamy sand

Surface Texture Modifier: none is most common, but gravelly or cobbly may occur

Subsurface Texture Group: loamy

Surface Fragments ≤3" (% Cover): 0-10

Surface Fragments >3" (%Cover): 0-10

Subsurface Fragments ≤3" (% Volume): 0-10

Subsurface Fragments >3" (% Volume): 0-10

	<u>Minimum</u>	<u>Maximum</u>
Drainage Class:	well	well
Permeability Class:	moderately slow	rapid
Depth (inches):	20	80
Electrical Conductivity (mmhos/cm)*:	0	4
Sodium Absorption Ratio*:	0	5
Soil Reaction (1:1 Water)*:	6.1	8.4
Soil Reaction (0.1M CaCl₂)*:	NA	NA
Available Water Capacity (inches)*:	3	6
Calcium Carbonate Equivalent (percent)*:	0	10

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

Plant Communities

Ecological Dynamics of the Site:

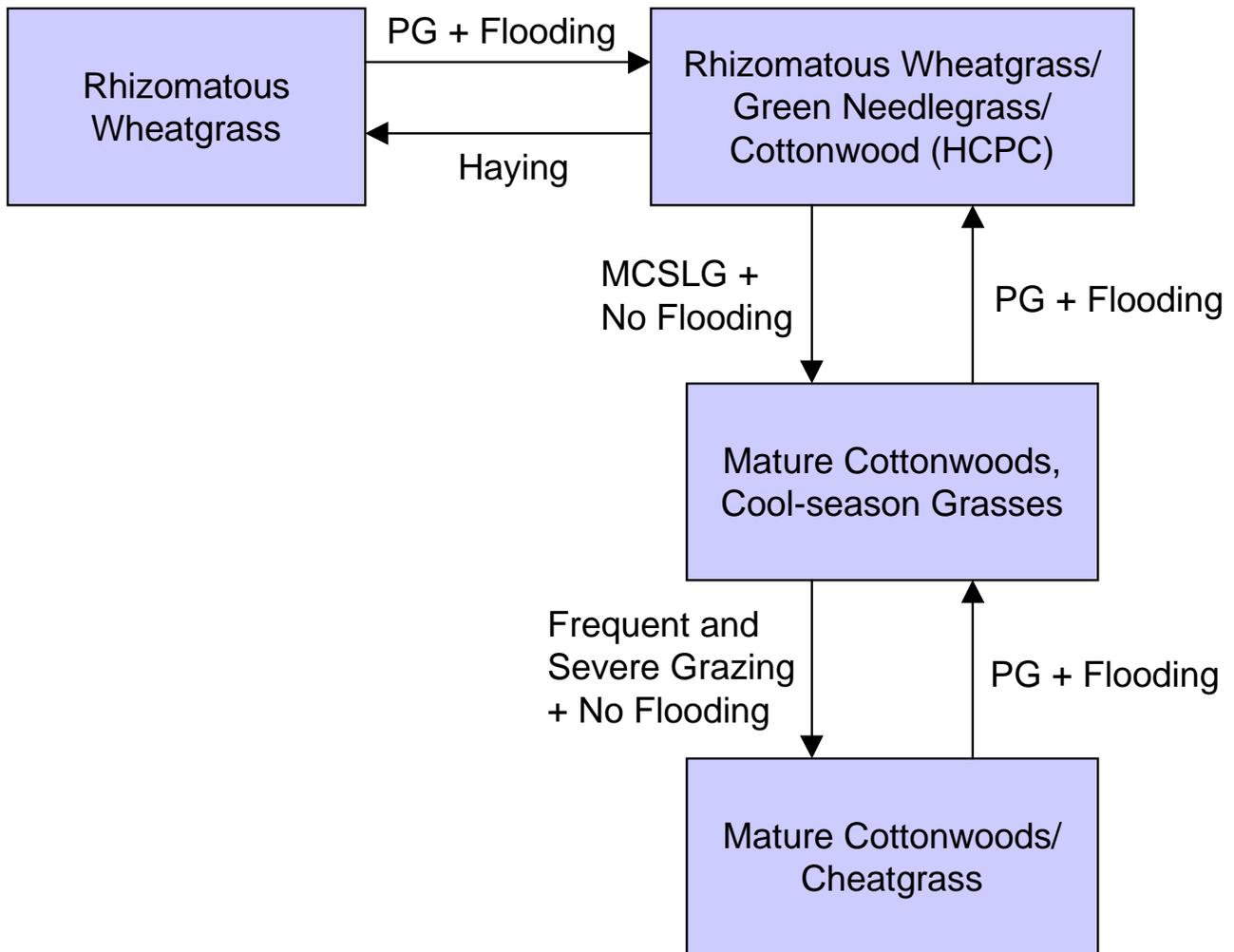
This site developed under Northern Great Plains climatic conditions, natural influences of large herbivores, occasional fire, and other biotic and abiotic factors that typically influence soil/site development. Changes will occur in the plant communities due to short-term weather variations, impacts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

As this site deteriorates, species such as blue grama, snowberry, and silver sagebrush will increase. Cool-season grasses such as green needlegrass and rhizomatous wheatgrasses will decrease in frequency and production. Mature cottonwoods do not reproduce.

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



Frequent and Severe Grazing - Frequent and severe utilization of the cool-season mid grasses during the growing season; **HCPC** - Historic Climax Plant Community; **MCSLG** - Moderate, continuous season-long grazing; **PG** - Prescribed grazing (proper stocking rates with adequate recovery periods during the growing season).

Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SCIENTIFIC NAME	SYMBOL	Rhizomatous Wheatgrass/Green Needlegrass/Cottonwood (HCPC)		
			Group	lbs./acre	% Comp
GRASSES & GRASS-LIKES				1650 - 2250	55 - 75
RHIZOMATOUS WHEATGRASSES			1	150 - 300	5 - 10
thickspike wheatgrass	Elymus lanceolatus ssp. lanceolatus	ELLAL	1	150 - 300	5 - 10
western wheatgrass	Pascopyrum smithii	PASM	1	150 - 300	5 - 10
slender wheatgrass	Elymus trachycaulus ssp. trachycaulus	ELTRT	2	150 - 300	5 - 10
green needlegrass	Nassella viridula	NAV14	3	300 - 450	10 - 15
bearded wheatgrass	Elymus trachycaulus ssp. subsecundus	ELTRS	4	120 - 300	4 - 10
OTHER NATIVE GRASSES			5	450 - 750	15 - 25
mat muhly	Muhlenbergia richardsonis	MURI	5	0 - 150	0 - 5
Canada wildrye	Elymus canadensis	ELCA4	5	0 - 150	0 - 5
needleandthread	Hesperostipa comata ssp. comata	HECOC8	5	0 - 150	0 - 5
bottlebrush squirreltail	Elymus elymoides	ELEL5	5	0 - 150	0 - 5
blue grama	Bouteloua gracilis	BOGR2	5	0 - 150	0 - 5
prairie junegrass	Koeleria macrantha	KOMA	5	0 - 150	0 - 5
Sandberg bluegrass	Poa secunda	POSE	5	0 - 150	0 - 5
other perennial grasses		2GP	5	0 - 150	0 - 5
FORBS			7	150 - 450	5 - 15
American licorice	Glycyrrhiza lepidota	GLLE3	7	0 - 150	0 - 5
American vetch	Vicia americana	VIAM	7	0 - 150	0 - 5
aster	Aster spp.	ASTER	7	0 - 150	0 - 5
biscuitroot	Lomatium spp.	LOMAT	7	0 - 150	0 - 5
bluebells	Mertensia spp.	MERTE	7	0 - 150	0 - 5
green sagewort	Artemisia dracunculoides	ARDR4	7	0 - 150	0 - 5
Indian breadroot	Pediomelum esculentum	PEES	7	0 - 150	0 - 5
milkvetch	Astragalus spp.	ASTRA	7	0 - 150	0 - 5
prairie coneflower	Ratibida columnifera	RACO3	7	0 - 150	0 - 5
purple prairie clover	Dalea purpurea	DAPU5	7	0 - 150	0 - 5
rose pussytoes	Antennaria rosea	ANRO2	7	0 - 150	0 - 5
scarlet gaura	Gaura coccinea	GACO5	7	0 - 150	0 - 5
stemless goldenweed	Stenotus acaulis	STAC	7	0 - 150	0 - 5
sulphur-flower buckwheat	Eriogonum umbellatum	ERUM	7	0 - 150	0 - 5
tapertip hawksbeard	Crepis acuminata	CRAC2	7	0 - 150	0 - 5
twogrooved milkvetch	Astragalus bisulcatus	ASBI2	7	0 - 150	0 - 5
western yarrow	Achillea millefolium	ACMI2	7	0 - 150	0 - 5
white prairie clover	Dalea candida	DACA7	7	0 - 150	0 - 5
wild onion	Allium spp.	ALLIU	7	0 - 150	0 - 5
other perennial forbs		2FP	7	0 - 150	0 - 5
SHRUBS			8	150 - 600	5 - 20
fringed sagewort	Artemisia frigida	ARFR4	8	0 - 150	0 - 5
rubber rabbitbrush	Ericameria nauseosa	ERNA10	8	0 - 150	0 - 5
silver sagebrush	Artemisia cana	ARCA13	8	0 - 150	0 - 5
silverberry	Elaeagnus commutata	ELCO	8	0 - 150	0 - 5
western snowberry	Symphoricarpos occidentalis	SYOC	8	0 - 150	0 - 5
Woods' rose	Rosa woodsii	ROWO	8	0 - 150	0 - 5
other shrubs		2SHRUB	8	0 - 150	0 - 5
TREES			9	0 - 300	0 - 10
cottonwood	Populus spp.	POPUL	9	0 - 300	0 - 10

Annual Production lbs./acre	LOW	RV	HIGH
GRASSES & GRASS-LIKES	1910	2175	2325
FORBS	145	300	500
SHRUBS	145	375	650
TREES	0	150	325
TOTAL	2200	3000	3800

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/ Green Needlegrass/Cottonwood			Mature Cottonwoods, Cool-season Grasses			Mature Cottonwoods/ Cheatgrass			Rhizomatous Wheatgrass		
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp
GRASSES & GRASS-LIKES			1650 - 2250	55 - 75		1375 - 1875	55 - 75		825 - 1125	55 - 75		1600 - 1800	80 - 90
RHIZOMATOUS WHEATGRASSES		1	150 - 300	5 - 10	1	125 - 250	5 - 10	1	0 - 150	0 - 10	1	200 - 500	10 - 25
thickspike wheatgrass	ELLAL	1	150 - 300	5 - 10	1	125 - 250	5 - 10	1	0 - 150	0 - 10	1	200 - 500	10 - 25
western wheatgrass	PASM	1	150 - 300	5 - 10	1	125 - 250	5 - 10	1	0 - 150	0 - 10	1	200 - 500	10 - 25
slender wheatgrass	ELTRT	2	150 - 300	5 - 10	2	125 - 250	5 - 10	2	0 - 75	0 - 5	2	100 - 200	5 - 10
green needlegrass	NAVI4	3	300 - 450	10 - 15	3	125 - 250	5 - 10	3	0 - 45	0 - 3	3	200 - 300	10 - 15
bearded wheatgrass	ELTRS	4	120 - 300	4 - 10	4	100 - 250	4 - 10	4	0 - 75	0 - 5	4	100 - 200	5 - 10
OTHER NATIVE GRASSES		5	450 - 750	15 - 25	5	250 - 875	10 - 35	5	375 - 750	25 - 50	5	400 - 700	20 - 35
mat muhly	MURI	5	0 - 150	0 - 5	5	0 - 125	0 - 5	5	0 - 75	0 - 5	5	0 - 100	0 - 5
Canada wildrye	ELCA4	5	0 - 150	0 - 5	5	50 - 200	2 - 8	5	30 - 120	2 - 8	5	0 - 60	0 - 3
needleandthread	HECOC8	5	0 - 150	0 - 5	5	125 - 250	5 - 10	5	75 - 225	5 - 15	5	100 - 200	5 - 10
bottlebrush squirreltail	ELEL5	5	0 - 150	0 - 5	5	50 - 200	2 - 8	5	75 - 225	5 - 15	5	0 - 200	0 - 10
blue grama	BOGR2	5	0 - 150	0 - 5	5	125 - 250	5 - 10	5	150 - 300	10 - 20	5	100 - 200	5 - 10
prairie junegrass	KOMA	5	0 - 150	0 - 5	5	0 - 125	0 - 5	5	0 - 75	0 - 5	5	0 - 100	0 - 5
Sandberg bluegrass	POSE	5	0 - 150	0 - 5	5	50 - 200	2 - 8	5	30 - 120	2 - 8	5	0 - 100	0 - 5
threeawn	ARIST				5	0 - 75	0 - 3	5	0 - 75	0 - 5	5	0 - 60	0 - 3
other perennial grasses	2GP	5	0 - 150	0 - 5	5	0 - 125	0 - 5	5	0 - 75	0 - 5	5	0 - 100	0 - 5
NON-NATIVE GRASSES		6			6	50 - 250	2 - 10	6	150 - 300	10 - 20	6	100 - 300	5 - 15
Kentucky bluegrass	POPR				6	50 - 250	2 - 10	6	75 - 225	5 - 15	6	100 - 200	5 - 10
cheatgrass	BRTE				6	0 - 75	0 - 3	6	75 - 150	5 - 10	6	0 - 100	0 - 5
FORBS		7	150 - 450	5 - 15	7	125 - 375	5 - 15	7	75 - 300	5 - 20	7	100 - 200	5 - 10
American licorice	GLLE3	7	0 - 150	0 - 5	7	0 - 125	0 - 5	7	0 - 75	0 - 5			
American vetch	VIAM	7	0 - 150	0 - 5	7	0 - 50	0 - 2						
aster	ASTER	7	0 - 150	0 - 5	7	0 - 125	0 - 5	7	0 - 75	0 - 5	7	0 - 60	0 - 3
biscuitroot	LOMAT	7	0 - 150	0 - 5	7	0 - 75	0 - 3	7	0 - 30	0 - 2	7	0 - 40	0 - 2
bluebells	MERTE	7	0 - 150	0 - 5	7	0 - 25	0 - 1						
curlycup gumweed	GRSQ				7	0 - 75	0 - 3	7	0 - 120	0 - 8	7	0 - 80	0 - 4
green sagewort	ARDR4	7	0 - 150	0 - 5	7	25 - 150	1 - 6	7	30 - 150	2 - 10	7	0 - 100	0 - 5
Indian breadroot	PEES	7	0 - 150	0 - 5	7	0 - 50	0 - 2						
milkvetch	ASTRA	7	0 - 150	0 - 5	7	0 - 125	0 - 5	7	0 - 45	0 - 3	7	0 - 60	0 - 3
prairie coneflower	RAGO3	7	0 - 150	0 - 5	7	0 - 125	0 - 5	7	0 - 75	0 - 5	7	0 - 60	0 - 3
purple prairie clover	DAPU5	7	0 - 150	0 - 5	7	0 - 75	0 - 3	7	0 - 75	0 - 5			
rose pussytoes	ANRO2	7	0 - 150	0 - 5	7	0 - 50	0 - 2	7	0 - 30	0 - 2	7	0 - 60	0 - 3
salsify	TRAGO				7	0 - 125	0 - 5	7	30 - 120	2 - 8	7	0 - 60	0 - 3
scarlet gaura	GAC05	7	0 - 150	0 - 5									
stemless goldenweed	STAC	7	0 - 150	0 - 5	7	0 - 125	0 - 5	7	0 - 75	0 - 5	7	0 - 60	0 - 3
sulphur-flower buckwheat	ERUM	7	0 - 150	0 - 5	7	0 - 75	0 - 3	7	0 - 45	0 - 3	7	0 - 40	0 - 2
tapertip hawksbeard	CRAC2	7	0 - 150	0 - 5	7	0 - 50	0 - 2						
thistle	CIRSI				7	0 - 125	0 - 5	7	0 - 150	0 - 10	7	0 - 80	0 - 4
twogrooved milkvetch	ASB12	7	0 - 150	0 - 5	7	0 - 75	0 - 3	7	0 - 45	0 - 3			
western yarrow	ACMI2	7	0 - 150	0 - 5	7	0 - 125	0 - 5	7	0 - 120	0 - 8	7	0 - 60	0 - 3
white prairie clover	DACA7	7	0 - 150	0 - 5	7	0 - 50	0 - 2						
wild onion	ALLIU	7	0 - 150	0 - 5	7	0 - 50	0 - 2	7	0 - 30	0 - 2	7	0 - 40	0 - 2
other perennial forbs	2FP	7	0 - 150	0 - 5	7	0 - 125	0 - 5	7	0 - 75	0 - 5	7	0 - 100	0 - 5
other annual forbs	2FA				7	0 - 125	0 - 5	7	0 - 150	0 - 10	7	0 - 100	0 - 5
SHRUBS		8	150 - 600	5 - 20	8	125 - 500	5 - 20	8	75 - 375	5 - 25	8	0 - 100	0 - 5
fringed sagewort	ARFR4	8	0 - 150	0 - 5	8	0 - 125	0 - 5	8	0 - 75	0 - 5	8	0 - 100	0 - 5
rubber rabbitbrush	ERNA10	8	0 - 150	0 - 5	8	0 - 200	0 - 8	8	30 - 150	2 - 10	8	0 - 60	0 - 3
silver sagebrush	ARCA13	8	0 - 150	0 - 5	8	0 - 200	0 - 8	8	30 - 150	2 - 10	8	0 - 40	0 - 2
silverberry	ELCO	8	0 - 150	0 - 5	8	0 - 125	0 - 5	8	0 - 75	0 - 5			
western snowberry	SYOC	8	0 - 150	0 - 5	8	0 - 125	0 - 5	8	0 - 75	0 - 5	8	0 - 60	0 - 3
Woods' rose	ROWO	8	0 - 150	0 - 5	8	0 - 125	0 - 5	8	0 - 75	0 - 5	8	0 - 40	0 - 2
other shrubs	2SHRUB	8	0 - 150	0 - 5	8	0 - 125	0 - 5	8	0 - 75	0 - 5	8	0 - 40	0 - 2
TREES		9	0 - 300	0 - 10	9	0 - 250	0 - 10	9	0 - 150	0 - 10	9	0 - 100	0 - 5
cottonwood	POPUL	9	0 - 300	0 - 10	9	0 - 250	0 - 10	9	0 - 150	0 - 10	9	0 - 100	0 - 5
Annual Production lbs./acre			LOW RV HIGH		LOW RV HIGH		LOW RV HIGH		LOW RV HIGH		LOW RV HIGH		LOW RV HIGH
GRASSES & GRASS-LIKES			1910 - 2175 - 2325		1560 - 1813 - 1975		660 - 1013 - 1120		1405 - 1750 - 2085				
FORBS			145 - 300 - 500		120 - 250 - 400		70 - 188 - 325		95 - 150 - 205				
SHRUBS			145 - 375 - 650		120 - 313 - 550		70 - 225 - 400		0 - 50 - 105				
TREES			0 - 150 - 325		0 - 125 - 275		0 - 75 - 155		0 - 50 - 105				
TOTAL			2200 - 3000 - 3800		1800 - 2500 - 3200		800 - 1500 - 2000		1500 - 2000 - 2500				

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

Plant Community and Vegetation State Narratives

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

Rhizomatous Wheatgrasses/Green Needlegrass/Cottonwood Plant Community

The plant community upon which interpretations are primarily based is the Rhizomatous Wheatgrasses/Green Needlegrass/Cottonwood Plant Community. This is also considered the HCPC. Potential vegetation is about 55-75 percent grasses or grass-like plants, 5-15 percent forbs, and 5-30 percent woody plants. The understory is dominated by cool-season midgrasses. Major grasses include rhizomatous wheatgrasses, needleandthread, green needlegrass, and slender wheatgrass. Other grasses occurring include Sandberg bluegrass, Canada wildrye, and prairie Junegrass. Cottonwoods of various age classes are a conspicuous part of the overstory.

This plant community is extremely stable and well adapted to the Northern Great Plains climatic conditions. Plant litter is properly distributed with very little movement offsite and natural plant mortality is very low. The diversity in plant species allows for high drought tolerance. This is a sustainable plant community (site/soil stability, watershed function, and biologic integrity).

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:

- Moderate, continuous season-long grazing and lack of flooding will convert this plant community to the *Mature Cottonwoods, Cool-Season Grass Vegetation State*.
- Frequent and severe grazing and lack of flooding will convert this plant community to the *Mature Cottonwoods/Cheatgrass Vegetation State*.
- Haying will convert this state to the *Rhizomatous Wheatgrass Vegetation State*.

Mature Cottonwoods, Cool-Season Grasses Plant Community

This plant community evolved under moderate grazing by domestic livestock. Cool-season grasses make up the majority of the understory with the balance made up of short warm-season grasses, annual cool-season grass, and miscellaneous forbs. Mature cottonwoods make up the overstory. Dominant grasses include rhizomatous wheatgrasses, Kentucky bluegrass, needleandthread, and green needlegrass. Other grasses include prairie Junegrass, Sandberg bluegrass, and slender

wheatgrass. Forbs commonly occurring include Louisiana sagewort (cudweed), plains wallflower, hairy goldaster, slimflower scurfspea, and scarlet globemallow. Silver sagebrush, wild rose, and snowberry canopy cover may be 20-40 percent.

When compared to the HCPC, western wheatgrass and green needlegrass have decreased. Needleandthread and Sandberg bluegrass have increased. Silver sagebrush has increased. Reproduction of cottonwoods is limited. The overstory of cottonwoods and understory of grass and forbs provide a diverse plant community that will support domestic livestock and wildlife such as birds, mule deer, and antelope. The plant community is stable and protected from excessive erosion. The biotic integrity of this plant community is usually intact. However, the lack of cottonwood reproduction will reduce the wildlife habitat. The watershed is usually functioning.

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:

- Prescribed grazing and flooding will result in a plant community very similar to the *Historic Climax Plant Community*.
- Frequent and severe grazing and lack of flooding will convert this plant community to the *Mature Cottonwoods/Cheatgrass Vegetation State*.

Mature Cottonwoods/Cheatgrass Plant Community

This plant community is the result of long-term improper grazing use. Rhizomatous wheatgrasses, cheatgrass, and blue grama dominate this state. Silver sagebrush and snowberry have increased. Mature cottonwoods make up the overstory. Noxious weeds such as Canada thistle and leafy spurge may invade it.

When compared to the HCPC rhizomatous wheatgrasses and green needlegrass have decreased. Silver sagebrush has increased. Cottonwoods have not reproduced. The soil of this state is protected. The watershed is functioning but may produce excessive runoff. The biotic integrity is threatened by invasive 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 codominant.

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

- Prescribed grazing and flooding over the long-term will return this state to near *Historic Climax Plant Community*, except that silver sagebrush and mature cottonwoods will persist.

Rhizomatous Wheatgrass Plant Community

This plant community is the result of haying. The state is dominated by western wheatgrass with some green needlegrass. The overstory is mature cottonwoods.

When compared to the HCPC, this state has lost much of its diversity. Woody vegetation is mainly mature cottonwoods. There are few forbs. The soil is protected by western wheatgrass sod.

The soil of this state is protected from erosion. The biotic community is restricted by the lack of diversity. Watershed values are protected due to the lack of steep slopes on this site.

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:

- Prescribed grazing and flooding may return this state to the *Historic Climax Plant Community* over the long-term.

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

Rhizomatous Wheatgrass/Green Needlegrass/Cottonwood 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 greater sage-grouse, as well as, lek sites. Other birds that would frequent this plant community include Western meadowlarks, horned larks, and golden eagles. Many grassland obligate small mammals would occur here.

Mature Cottonwoods, Cool-season Grasses Plant Community: This plant community may be useful for the same large grazers that would use the HCPC. However, the plant community composition is less diverse, and thus, less apt to meet the seasonal needs of these animals. It may provide some foraging opportunities for greater sage-grouse when it occurs proximal to woody cover. Good grasshopper habitat equals good foraging for birds. The overstory of large cottonwoods provides habitat for a variety of birds ranging from raptors to neo-tropical migrants.

Mature Cottonwoods/Cheatgrass Plant Community: The plant community composition is less diverse, and thus, less apt to meet the seasonal needs of large herbivores such as deer and antelope. It may provide some foraging opportunities for greater sage-grouse when it occurs proximal to woody

cover. Good grasshopper habitat equals good foraging for birds. The overstory of large cottonwoods provides habitat for a variety of birds ranging from raptors to neo-tropical migrants.

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

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

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
Grasses & Grass-like							
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
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
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
green needlegrass	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
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
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
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
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
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
aster	U U D U	U U D U	U U D U	U U D U	U U D U	U U D U	U U D U
biscuitroot	U D U U	U D D U	U D U U	U D D U	U D D U	U D U U	U D D U
bluebells	U D U U	U P P U	U D U U	U P P U	U P P U	U D U U	U P P U
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
Indian breadroot	U U U U	U D U U	U U U U	U D U U	U D U U	U U U U	U D U U
milkvetch	U U U U	U D U U	U U U U	U D U U	U D U U	U U U U	U D U U
prairie coneflower	U U D U	U P P U	U U D U	U P P U	U P P U	U U D U	U P P U
purple prairie clover	U D P U	U P P U	U D P U	U P P U	U P P U	U D P U	U P P U
rose pussytoes	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U
scarlet gaura	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
stemless goldenweed	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U
sulphur-flower buckwheat	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
tapertip hawksbeard	U U D U	N D U N	U U D U	N D U N	N D U N	U U D U	N D U N
twogrooved milkvetch	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T
western yarrow	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
white prairie clover	U D P U	U P P U	U D P U	U P P U	U P P U	U D P U	U P P U
wild onion	U D U U	U D D U	U D U U	U D D U	U D D U	U D U U	U D D U
Shrubs							
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
rubber rabbitbrush	N N N N	D U U D	N N N N	D U U D	U P P U	N N N N	D U U 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
silverberry	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
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
Woods' 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
Trees							
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/Green Needlegrass/Cottonwood	2,500-3,500	0.70
Mature Cottonwoods, Cool-season Grasses	2,000-3,000	0.60
Mature Cottonwoods/Cheatgrass	800-1,800	0.30
Rhizomatous Wheatgrass	1,500-2,500	0.60

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

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

Hydrology Functions

Water is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic group B. Infiltration ranges from moderately slow to rapid. Runoff potential for this site varies from very low to medium depending on slope and ground cover. In many cases, areas with greater than 75 percent ground cover have the greatest potential for high infiltration and lower runoff. An example of an exception would be where short-grasses form a strong sod and dominate the site. Normally, areas where ground cover is less than 50 percent have the greatest potential to have reduced infiltration and higher runoff (refer to Section 4, NRCS National Engineering Handbook, for runoff quantities and hydrologic curves).

Recreational Uses

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

Wood Products

Other Products

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

Supporting Information

Associated Sites

(060AY020SD) – Loamy Overflow
(060AY003SD) – Subirrigated

(060AY022SD) – Loamy Terrace

Similar Sites

(060AY022SD) – Loamy Terrace [lower production; fewer trees]

Inventory Data References

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

<u>Data Source</u>	<u>Number of Records</u>	<u>Sample Period</u>	<u>State</u>	<u>County</u>
SCS-RANGE-417	12	1971-1994	WY	Campbell and others
Ocular estimate	5	1990-1999	WY	Campbell and others

State Correlation

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

Field Offices

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

Relationship to Other Established Classifications

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

Other References

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

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

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

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

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

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

USDA, NRCS, Various Published Soil Surveys.

Site Description Approval

MT, State Range Management Specialist Date

NE, State Range Management Specialist Date

SD, State Range Management Specialist Date

WY, State Range Management Specialist Date