

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

Ecological Site Description

Site Type: Rangeland

Site Name: Loamy Overflow

Site ID: R060AY020SD

Major Land Resource Area: 60A – Pierre Shale Plains



Physiographic Features

This site occurs on nearly level to gently sloping 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	9
Water Table Depth (inches):	42	80
Flooding:		
Frequency:	Rare	Frequent
Duration:	Very brief	Brief
Ponding:		
Depth (inches):	None	None
Frequency:	None	None
Duration:	None	None
Runoff Class:	Very low	High

Climatic Features

The climate in this MLRA is typical of the drier portions of the Northern Great Plains where sagebrush steppes to the west yield to grassland steppes to the east. Annual precipitation ranges from 13 to 18 inches per year, with most occurring during the growing season. Temperatures show a wide range between summer and winter and between daily maximums and minimums, due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Cold air masses from Canada in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Chinook winds may occur in winter and bring rapid rises in temperature. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring. The normal average annual temperature is about 46° F. January is the coldest month with average temperatures ranging from about 19° F (Moorcroft CAA, WY) to about 22° F (Belle Fourche, SD). July is the warmest month with temperatures averaging from about 70° F (Moorcroft CAA, WY) to about 72° F (Belle Fourche, SD). The range of normal average monthly temperatures between the coldest and warmest months is about 51° F. Hourly winds are estimated to average about 11 miles per hour annually, ranging from about 13 miles per hour during the spring to about 10 miles per hour during the summer. Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 50 miles per hour.

RANGELAND INTERPRETATIONS

Page 2

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 clay loam to fine sandy loam surface layer is 5 to 20 inches thick. The soils have a moderately slow to moderately rapid 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, loam, fine sandy loam
Surface Texture Modifier: none
Subsurface Texture Group: loamy
Surface Fragments ≤ 3" (% Cover): 0
Surface Fragments > 3" (%Cover): 0
Subsurface Fragments ≤ 3" (% Volume): 0-10
Subsurface Fragments > 3" (% Volume): 0-5

	<u>Minimum</u>	<u>Maximum</u>
Drainage Class:	moderately well	well
Permeability Class:	moderately slow	rapid
Depth (inches):	80	80
Electrical Conductivity (mmhos/cm)*:	0	8
Sodium Absorption Ratio*:	0	10
Soil Reaction (1:1 Water)*:	6.6	9.0
Soil Reaction (0.1M CaCl₂)*:	NA	NA
Available Water Capacity (inches)*:	4	7
Calcium Carbonate Equivalent (percent)*:	0	25

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

Plant Communities

Ecological Dynamics of the Site:

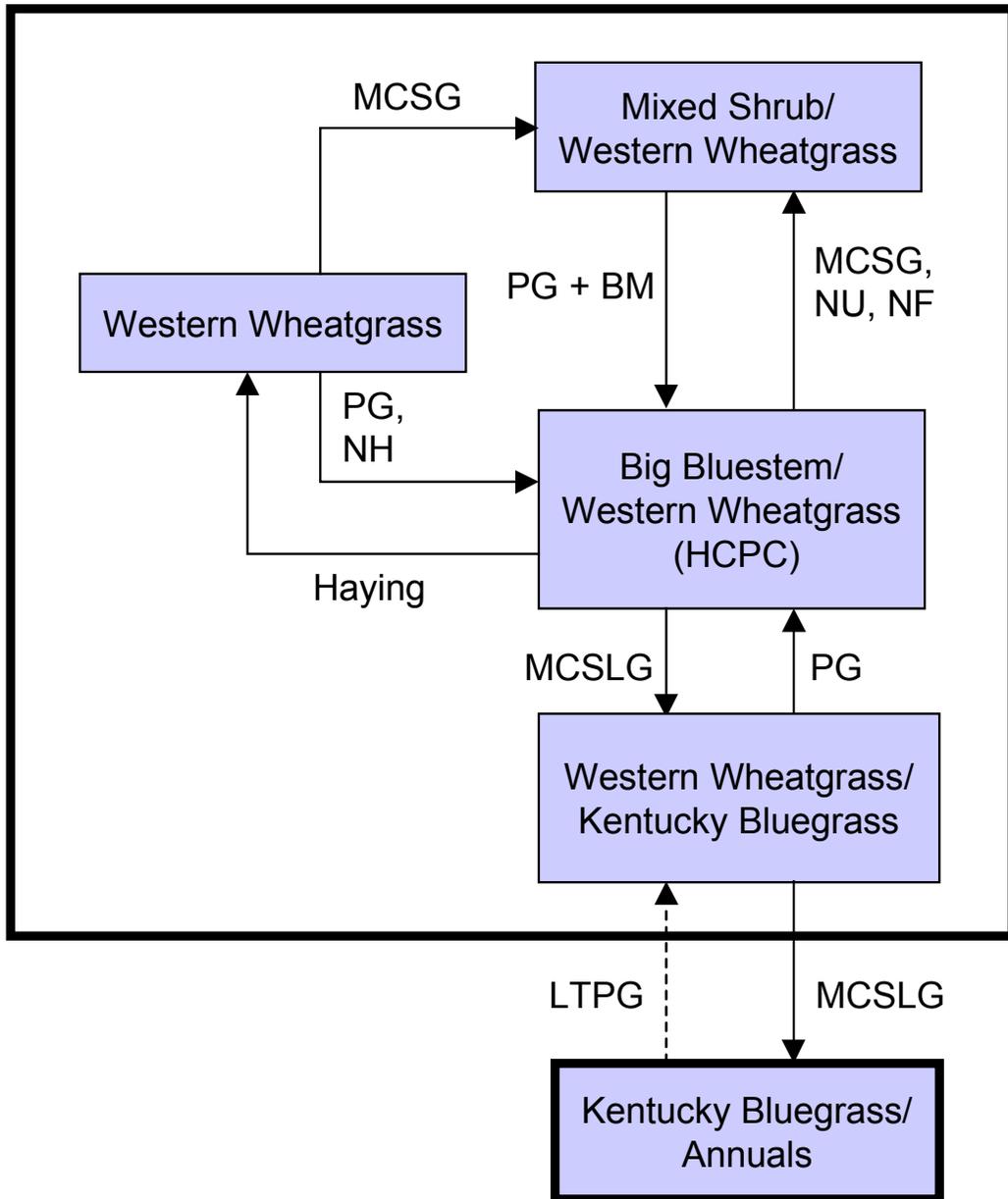
This site developed under Northern Great Plains climatic conditions, natural influences of large herbivores, occasional fire, and other biotic and abiotic factors that typically influence soil/site development. Changes will occur in the plant communities due to short-term weather variations, impacts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

Continuous grazing without adequate recovery periods following each grazing occurrence over several years causes this site to depart from the HCPC. Species such as western wheatgrass and blue grama will initially increase. Big bluestem, green needlegrass and switchgrass will decrease in frequency and production. Heavy continuous grazing causes Kentucky bluegrass to increase and eventually develops into a sod condition. Under extended periods of non-use and no fire will result in a plant community having high litter levels, which favors an increase in Kentucky bluegrass and annual bromes. In time, shrubs such as western snowberry and chokecherry will also increase.

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	Big Bluestem/ Western Wheatgrass (HCPC)			
			Group	lbs./acre	% Comp	
GRASSES & GRASS-LIKES				1960 - 2380	70 - 85	
TALL WARM-SEASON GRASSES			1	700 - 1260	25 - 45	
big bluestem	Andropogon gerardii	ANGE	1	560 - 1120	20 - 40	
switchgrass	Panicum virgatum	PAV2	1	140 - 560	5 - 20	
WHEATGRASSES			2	560 - 840	20 - 30	
western wheatgrass	Pascopyrum smithii	PASM	2	560 - 840	20 - 30	
slender wheatgrass	Elymus trachycaulus ssp. trachycaulus	ELTRT	2	140 - 280	5 - 10	
thickspike wheatgrass	Elymus lanceolatus ssp. lanceolatus	ELLAL	2	140 - 280	5 - 10	
NEEDLEGRASSES			3	140 - 280	5 - 10	
green needlegrass	Nassella viridula	NAV4	3	140 - 280	5 - 10	
needleandthread	Hesperostipa comata ssp. comata	HECOC8	3	56 - 140	2 - 5	
NATIVE GRASSES & GRASS-LIKES			4	140 - 420	5 - 15	
blue grama	Bouteloua gracilis	BOGR2	4	28 - 140	1 - 5	
buffalograss	Buchloe dactyloides	BUDA	4	0 - 84	0 - 3	
Canada wildrye	Elymus canadensis	ELCA4	4	56 - 224	2 - 8	
dropseed	Sporobolus spp.	SPORO	4	0 - 84	0 - 3	
inland saltgrass	Distichlis spicata	DISP	4	0 - 28	0 - 1	
little bluestem	Schizachyrium scoparium	SCSC	4	0 - 56	0 - 2	
prairie junegrass	Koeleria macrantha	KOMA	4	28 - 56	1 - 2	
prairie sandreed	Calamovilfa longifolia	CALO	4	0 - 84	0 - 3	
Sandberg bluegrass	Poa secunda	POSE	4	0 - 28	0 - 1	
sedge	Carex spp.	CAREX	4	56 - 224	2 - 8	
sideoats grama	Bouteloua curtipendula	BOCU	4	0 - 140	0 - 5	
foxtail barley	Hordeum jubatum	HOJU	4	0 - 56	0 - 2	
spikerush	Eleocharis spp.	ELEOC	4	0 - 56	0 - 2	
other perennial grasses		2GP	4	0 - 140	0 - 5	
FORBS			6	140 - 420	5 - 15	
American licorice	Glycyrrhiza lepidota	GLLE3	6	28 - 112	1 - 4	
American vetch	Vicia americana	VIAM	6	0 - 56	0 - 2	
blue-eyed grass	Sisyrinchium spp.	SISYR	6	0 - 28	0 - 1	
cudweed sagewort	Artemisia ludoviciana	ARLU	6	28 - 56	1 - 2	
false boneset	Brickellia eupatorioides	BREU	6	0 - 28	0 - 1	
gayfeather	Liatris spp.	LIATR	6	0 - 56	0 - 2	
goldenrod	Solidago spp.	SOLID	6	28 - 140	1 - 5	
heath aster	Symphotrichum ericoides	SYER	6	28 - 56	1 - 2	
Maximilian sunflower	Helianthus maximiliani	HEMA2	6	28 - 84	1 - 3	
meadow anemone	Anemone canadensis	ANCA8	6	0 - 56	0 - 2	
milkvetch	Astragalus spp.	ASTRA	6	0 - 28	0 - 1	
mint	Mentha spp.	MENTH	6	0 - 56	0 - 2	
prairie coneflower	Ratibida columnifera	RACO3	6	0 - 28	0 - 1	
purple prairie clover	Dalea purpurea	DAPU5	6	28 - 56	1 - 2	
scurfpea	Psoraleum spp.	PSORA2	6	0 - 28	0 - 1	
thistle	Cirsium spp.	CIRSI	6	0 - 28	0 - 1	
western ragweed	Ambrosia psilostachya	AMPS	6	0 - 28	0 - 1	
western yarrow	Achillea millefolium	ACMI2	6	28 - 56	1 - 2	
other perennial forbs		2FP	6	0 - 84	0 - 3	
SHRUBS			7	140 - 280	5 - 10	
big sagebrush	Artemisia tridentata	ARTR2	7	0 - 140	0 - 5	
chokecherry	Prunus virginiana	PRVI	7	0 - 140	0 - 5	
currant	Ribes spp.	RIBES	7	0 - 84	0 - 3	
fringed sagewort	Artemisia frigida	ARFR4	7	0 - 56	0 - 2	
leadplant	Amorpha canescens	AMCA8	7	28 - 112	1 - 4	
rose	Rosa spp.	ROSA5	7	28 - 84	1 - 3	
silver buffaloberry	Shepherdia argentea	SHAR	7	0 - 140	0 - 5	
silver sagebrush	Artemisia cana	ARCA13	7	0 - 140	0 - 5	
snowberry	Symphoricarpos spp.	SYMPH	7	28 - 140	1 - 5	
wild plum	Prunus americana	PRAM	7	0 - 140	0 - 5	
willow	Salix spp.	SALIX	7	0 - 84	0 - 3	
other shrubs		2SHRUB	7	0 - 140	0 - 5	
TREES			8	0 - 84	0 - 3	
American elm	Ulmus americana	ULAM	8	0 - 84	0 - 3	
boxelder	Acer negundo	ACNE2	8	0 - 84	0 - 3	
green ash	Fraxinus pennsylvanica	FRPE	8	0 - 84	0 - 3	
hackberry	Celtis occidentalis	CEOC	8	0 - 84	0 - 3	
plains cottonwood	Populus deltoides ssp. monilifera	PODEM	8	0 - 84	0 - 3	
other trees		2TREE	8	0 - 84	0 - 3	
Annual Production lbs./acre				LOW	RV	HIGH
GRASSES & GRASS-LIKES				1730 -	2268	-2765
FORBS				135 -	280	-450
SHRUBS				135 -	210	-300
TREES				0 -	42	-85
TOTAL				2000 -	2800	-3600

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	Big Bluestem/ Western Wheatgrass (HCPG)			Western Wheatgrass/ Kentucky Bluegrass			Mixed Shrub/ Western Wheatgrass			Kentucky Bluegrass/ Annals			
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	
GRASSES & GRASS-LIKES			1960 - 2380	70 - 85		1120 - 1360	70 - 85		1430 - 1650	65 - 75		700 - 850	70 - 85	
TALL WARM-SEASON GRASSES		1	700 - 1260	25 - 45	1	80 - 240	5 - 15	1	44 - 220	2 - 10	1	0 - 50	0 - 5	
big bluestem	ANGE	1	560 - 1120	20 - 40	1	80 - 240	5 - 15	1	22 - 176	1 - 8	1	0 - 50	0 - 5	
switchgrass	PAV2	1	140 - 560	5 - 20	1	16 - 80	1 - 5	1	22 - 110	1 - 5	1	0 - 20	0 - 2	
WHEATGRASSES		2	560 - 840	20 - 30	2	400 - 560	25 - 35	2	220 - 440	10 - 20	2	50 - 100	5 - 10	
western wheatgrass	PASM	2	560 - 840	20 - 30	2	320 - 560	20 - 35	2	220 - 440	10 - 20	2	50 - 100	5 - 10	
slender wheatgrass	ELTRT	2	140 - 280	5 - 10	2	32 - 80	2 - 5	2	0 - 66	0 - 3				
thickspike wheatgrass	ELLAL	2	140 - 280	5 - 10	2	32 - 80	2 - 5	2	0 - 110	0 - 5				
NEEDLEGRASSES		3	140 - 280	5 - 10	3	16 - 80	1 - 5	3	22 - 110	1 - 5	3	0 - 50	0 - 5	
green needlegrass	NAV4	3	140 - 280	5 - 10	3	16 - 80	1 - 5	3	22 - 110	1 - 5	3	0 - 50	0 - 5	
needleandthread	HECOC8	3	56 - 140	2 - 5	3	0 - 48	0 - 3	3	0 - 66	0 - 3	3	0 - 30	0 - 3	
NATIVE GRASSES/GRASS-LIKES		4	140 - 420	5 - 15	4	80 - 160	5 - 10	4	110 - 330	5 - 15	4	50 - 150	5 - 15	
blue grama	BOGR2	4	28 - 140	1 - 5	4	16 - 48	1 - 3	4	22 - 110	1 - 5				
buffalograss	BUDA	4	0 - 84	0 - 3	4	0 - 32	0 - 2	4	0 - 44	0 - 2				
Canada wildrye	ELCA4	4	56 - 224	2 - 8	4	16 - 80	1 - 5	4	22 - 110	1 - 5				
dropseed	SPORO	4	0 - 84	0 - 3	4	16 - 80	1 - 5	4	44 - 176	2 - 8	4	20 - 100	2 - 10	
inland saltgrass	DISP	4	0 - 28	0 - 1	4	16 - 48	1 - 3	4	0 - 22	0 - 1	4	10 - 50	1 - 5	
little bluestem	SCSC	4	0 - 56	0 - 2	4	0 - 16	0 - 1	4	0 - 44	0 - 2				
prairie junegrass	KOMA	4	28 - 56	1 - 2	4	0 - 32	0 - 2	4	0 - 44	0 - 2	4	0 - 20	0 - 2	
prairie sandreed	CALO	4	0 - 84	0 - 3	4	16 - 48	1 - 3	4	22 - 110	1 - 5	4	10 - 30	1 - 3	
Sandberg bluegrass	POSE	4	0 - 28	0 - 1	4	0 - 32	0 - 2	4	0 - 44	0 - 2	4	0 - 20	0 - 2	
sedge	CAREX	4	56 - 224	2 - 8	4	16 - 80	1 - 5	4	44 - 110	2 - 5	4	10 - 50	1 - 5	
sideoats grama	BOCU	4	0 - 140	0 - 5	4	0 - 32	0 - 2	4	0 - 44	0 - 2				
foxtail barley	HOJU	4	0 - 56	0 - 2	4	16 - 80	1 - 5	4	0 - 110	0 - 5	4	20 - 50	2 - 5	
spikerush	ELEOC	4	0 - 56	0 - 2				4	0 - 22	0 - 1				
other perennial grasses	ZOP	4	0 - 140	0 - 5	4	0 - 80	0 - 5	4	0 - 110	0 - 5	4	0 - 100	0 - 10	
NON-NATIVE GRASSES		5			5	240 - 400	15 - 25	5	330 - 440	15 - 20	5	350 - 500	35 - 50	
cheatgrass	BRTE				5	16 - 160	1 - 10	5	22 - 220	1 - 10	5	20 - 100	2 - 10	
Kentucky bluegrass	POPR				5	240 - 400	15 - 25	5	0 - 220	0 - 10	5	350 - 500	35 - 50	
smooth bromegrass	BRIN2				5	0 - 80	0 - 5	5	0 - 220	0 - 10	5	0 - 100	0 - 10	
FORBS		6	140 - 420	5 - 15	6	80 - 240	5 - 15	6	110 - 330	5 - 15	6	100 - 200	10 - 20	
American licorice	GLLE3	6	28 - 112	1 - 4	6	0 - 64	0 - 4	6	22 - 110	1 - 5				
American vetch	VIAM	6	0 - 56	0 - 2	6	0 - 16	0 - 1	6	0 - 44	0 - 2				
blue-eyed grass	SISYR	6	0 - 28	0 - 1	6	0 - 16	0 - 1	6	0 - 22	0 - 1				
cocklebur	XANTH2				6	0 - 80	0 - 5	6	0 - 44	0 - 2	6	0 - 80	0 - 8	
cudweed sagewort	ARLU	6	28 - 56	1 - 2	6	32 - 80	2 - 5	6	22 - 110	1 - 5	6	20 - 50	2 - 5	
curlycup gumweed	GRSQ				6	0 - 16	0 - 1	6	0 - 22	0 - 1	6	0 - 100	0 - 10	
false boneset	BREU	6	0 - 28	0 - 1	6	0 - 16	0 - 1	6	0 - 44	0 - 2				
gayfeather	LIATR	6	0 - 56	0 - 2	6	0 - 32	0 - 2	6	0 - 44	0 - 2	6	0 - 10	0 - 1	
goldenrod	SOLID	6	28 - 140	1 - 5	6	16 - 80	1 - 5	6	44 - 176	2 - 8	6	20 - 50	2 - 5	
heath aster	SYER	6	28 - 56	1 - 2	6	32 - 80	2 - 5	6	22 - 66	1 - 3	6	20 - 50	2 - 5	
Maximilian sunflower	HEMA2	6	28 - 84	1 - 3	6	0 - 16	0 - 1	6	0 - 22	0 - 1				
meadow anemone	ANCA8	6	0 - 56	0 - 2	6	0 - 16	0 - 1	6	0 - 22	0 - 1				
milkvetch	ASTRA	6	0 - 28	0 - 1	6	0 - 32	0 - 2							
mint	MENTH	6	0 - 56	0 - 2	6	0 - 80	0 - 5	6	0 - 110	0 - 5	6	0 - 50	0 - 5	
prairie coneflower	RACO3	6	0 - 28	0 - 1	6	16 - 48	1 - 3	6	0 - 66	0 - 3	6	10 - 30	1 - 3	
purple prairie clover	DAPU5	6	28 - 56	1 - 2	6	16 - 32	1 - 2	6	0 - 22	0 - 1				
scurfpea	PSORA2	6	0 - 28	0 - 1	6	16 - 32	1 - 2	6	22 - 110	1 - 5	6	20 - 50	2 - 5	
thistle	CIRSI	6	0 - 28	0 - 1	6	0 - 80	0 - 5	6	0 - 66	0 - 3	6	0 - 100	0 - 10	
western ragweed	AMPS	6	0 - 28	0 - 1	6	32 - 80	2 - 5	6	44 - 110	2 - 5	6	50 - 150	5 - 15	
western yarrow	ACMI2	6	28 - 56	1 - 2	6	32 - 64	2 - 4	6	44 - 110	2 - 5	6	20 - 50	2 - 5	
other annual forbs	ZFA				6	16 - 80	1 - 5	6	44 - 220	2 - 10	6	20 - 50	2 - 5	
other perennial forbs	ZFP	6	0 - 84	0 - 3	6	0 - 48	0 - 3	6	44 - 110	2 - 5	6	10 - 30	1 - 3	
SHRUBS		7	140 - 280	5 - 10	7	80 - 160	5 - 10	7	220 - 660	10 - 30	7	50 - 100	5 - 10	
big sagebrush	ARTR2	7	0 - 140	0 - 5	7	0 - 80	0 - 5	7	44 - 330	2 - 15	7	0 - 10	0 - 1	
chokecherry	PRVI	7	0 - 140	0 - 5	7	0 - 80	0 - 5	7	22 - 110	1 - 5	7	0 - 10	0 - 1	
currant	RIBES	7	0 - 84	0 - 3	7	0 - 48	0 - 3	7	0 - 66	0 - 3				
fringed sagewort	ARFR4	7	0 - 56	0 - 2	7	0 - 32	0 - 2	7	0 - 110	0 - 5	7	0 - 20	0 - 2	
leadplant	AMCA6	7	28 - 112	1 - 4	7	16 - 48	1 - 3	7	0 - 44	0 - 2				
rose	ROSA5	7	28 - 84	1 - 3	7	16 - 48	1 - 3	7	22 - 66	1 - 3	7	10 - 30	1 - 3	
silver buffaloberry	SHAR	7	0 - 140	0 - 5	7	0 - 80	0 - 5	7	0 - 110	0 - 5	7	0 - 10	0 - 1	
silver sagebrush	ARCA13	7	0 - 140	0 - 5	7	0 - 80	0 - 5	7	44 - 330	2 - 15	7	0 - 50	0 - 5	
snowberry	SYMPH	7	28 - 140	1 - 5	7	16 - 80	1 - 5	7	44 - 330	2 - 15	7	10 - 50	1 - 5	
wild plum	PRAM	7	0 - 140	0 - 5	7	0 - 80	0 - 5	7	22 - 110	1 - 5				
willow	SALIX	7	0 - 84	0 - 3	7	0 - 32	0 - 2	7	22 - 110	1 - 5	7	0 - 10	0 - 1	
other shrubs	ZSHRUB	7	0 - 140	0 - 5	7	0 - 80	0 - 5	7	22 - 110	1 - 5	7	0 - 20	0 - 2	
TREES		8	0 - 84	0 - 3	8	0 - 48	0 - 3	8	0 - 66	0 - 3	8	0 - 30	0 - 3	
American elm	ULAM	8	0 - 84	0 - 3	8	0 - 48	0 - 3	8	0 - 66	0 - 3	8	0 - 30	0 - 3	
boxelder	ACNE2	8	0 - 84	0 - 3	8	0 - 48	0 - 3	8	0 - 66	0 - 3	8	0 - 30	0 - 3	
green ash	FRPE	8	0 - 84	0 - 3	8	0 - 48	0 - 3	8	0 - 66	0 - 3	8	0 - 30	0 - 3	
hackberry	CEOC	8	0 - 84	0 - 3	8	0 - 48	0 - 3	8	0 - 66	0 - 3	8	0 - 30	0 - 3	
plains cottonwood	PODEM	8	0 - 84	0 - 3	8	0 - 48	0 - 3	8	0 - 66	0 - 3	8	0 - 30	0 - 3	
other trees	ZTREE	8	0 - 84	0 - 3	8	0 - 48	0 - 3	8	0 - 66	0 - 3	8	0 - 30	0 - 3	
Annual Production lbs./acre			LOW	RV	HIGH	LOW	RV	HIGH	LOW	RV	HIGH	LOW	RV	HIGH
GRASSES & GRASS-LIKES			1730	2288	2765	850	1296	1735	880	1507	2130	360	760	1155
FORBS			135	280	450	75	160	250	105	220	350	95	150	205
SHRUBS			135	210	300	75	120	165	215	440	650	45	75	105
TREES			0	42	85	0	24	50	0	33	70	0	15	35
TOTAL			2000	2800	3600	1000	1600	2200	1200	2200	3200	500	1000	1500

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.

Big Bluestem/Western Wheatgrass Plant Community

The plant community upon which interpretations are primarily based is the Big Bluestem/Western Wheatgrass Plant Community. This is also considered to be the Historic Climax Plant Community (HCPC). This plant community can be found on areas that are properly managed with prescribed grazing that allows for adequate recovery periods following each grazing event.

The potential vegetation is about 70-85% grasses and grass-like plants, 5-15% forbs, 5-10% shrubs, and 0-3% trees. Major grasses include big bluestem, wheatgrasses, green needlegrass and switchgrass. Prairie sandreed may be prevalent on the more sandy textured sites. Other grasses occurring on this community include blue grama, Canada wildrye, needleandthread and prairie junegrass. Major forbs and shrubs include American licorice, goldenrod, purple prairie clover, silver sagebrush, western snowberry and leadplant. Scattered green ash, plains cottonwood and American elm may occur.

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

- Continuous season-long grazing without adequate recovery periods between grazing events will shift this plant community to the *Western Wheatgrass/Kentucky Bluegrass Plant Community*.
- Non-use and no fire or moderate, continuous seasonal grazing will move this plant community to the *Mixed Shrub/Western Wheatgrass Plant Community*.

Western Wheatgrass/Kentucky Bluegrass 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 and Kentucky bluegrass are 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:

- Heavy continuous season-long grazing will move this plant community across the ecological threshold to the *Kentucky Bluegrass/Annuals Plant Community*.
- Prescribed grazing will shift this plant community back to the *Big Bluestem/Western Wheatgrass 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 and miscellaneous forbs. Western wheatgrass is the dominant grass. Grasses of secondary importance include blue grama, prairie junegrass, Sandberg bluegrass, green needlegrass and needleandthread. Woody plants such as big sagebrush, silver sagebrush, and snowberry increase with canopy cover up to 20%. Forbs commonly found in this plant community include cudweed sagewort, goldenrod, hairy goldaster and scurfpea.

This plant community is resistant to change without prescribed grazing and/or fire. The combination of both grazing and fire or other means to reduce shrub cover is most effective in moving this plant community toward the HCPC. Soil erosion is low. Runoff is similar to the HCPC. Once the advanced stage of this plant community is reached, time and external resources will be needed to see recovery in the diversity of the 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: 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:

- Prescribed grazing will move this plant community toward the *HCPC*. Brush management (reduction, not removal of shrubs) or prescribed burning followed by prescribed grazing will also move this plant community toward the *HCPC*. Either would require long-term management with prescribed grazing and/or prescribed burning under controlled conditions.

Western Wheatgrass 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. The total annual production (air-dry weight) is about 2200 lbs./acre, but it can range from about 1700 lbs./acre in unfavorable years to about 2900 lbs./acre in favorable years. This plant community is productive but lacks the diversity of the Historic Climax Plant Community. 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 *Big Bluestem/Western Wheatgrass Plant Community (HCPC)*.
- Moderate, continuous seasonal grazing will convert this plant community to the *Mixed Shrub/Western Wheatgrass Plant Community*.

Kentucky Bluegrass/Annuals Plant Community

This plant community developed with heavy continuous season-long grazing. Kentucky bluegrass dominates the community and can develop into a "sodbound" appearance. Low vigor western wheatgrass can be found scattered throughout the community. Green needlegrass has been greatly reduced. Big bluestem may persist in minor amounts, greatly reduced in vigor and not readily seen. 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 due to grazing tolerance of Kentucky bluegrass. A significant amount of production and diversity has been lost when compared to the *HCPC*. The dominance of Kentucky bluegrass and loss of other desirable species has negatively impacted energy flow and nutrient cycling. Water infiltration is reduced significantly. Soil loss may be accelerated where concentrated flows occur.

RANGELAND INTERPRETATIONS

Page 10

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/Kentucky Bluegrass 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

-- Under Development --

Big Bluestem/Western Wheatgrass Plant Community:

Western Wheatgrass/Kentucky Bluegrass Plant Community:

Mixed Shrub/Western Wheatgrass Plant Community:

Kentucky Bluegrass/Annuals Plant Community:

Western Wheatgrass Plant Community:

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

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
Grasses & Grass-likes							
big bluestem	U D P D	U U D U	U D P D	U D U U	U D U U	U D P D	U D P D
blue grama	U D P D	D P P D	U D P U	D P P D	D P P D	U D P U	U D P U
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
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
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 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
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
little bluestem	U D D U	U U D U	U D D U	N D N N	N D N N	U D D U	U D D U
needleandthread	U D U D	N D N U	U D U D	N D N U	N D N U	U D U D	U D U D
prairie junegrass	U D U D	N D N U	U D U D	N D N U	N D N U	U D U D	U D U D
prairie sandreed	U D D U	U D U U	U D D U	U U D U	U U D U	U D D U	U D D U
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
sideoats grama	U D P D	U P D D	U D P U	U P D U	U P D U	U D P U	U D P U
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
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
blue-eyed grass	U U U U	U U P U	U U U U	U U P U	U U P U	U U U U	U U 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
gayfeather	U U D U	U P P U	U U D U	U P P U	U P P U	U U D U	U P P U
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
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
meadow anemone	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 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
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
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 ragweed	U U U U	U U U U	U U U U	N N N N	N N N N	U U U U	N N N N
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
currant	D U U D	D U U D	D U U D	D U U D	U U U U	D U U D	D U U D
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 U
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 buffaloberry	D U U U	D U U U	D U U U	P U D P	U U U U	D U U U	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
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
wild plum	D U U D	D U U D	D U U D	P 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
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
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)
Big Bluestem/Western Wheatgrass	2800	0.89
Western Wheatgrass/Kentucky Bluegrass	1600	0.50
Mixed Shrub/Western Wheatgrass	2200	0.63**
Kentucky Bluegrass/Annuals	1000	0.32**

* 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 B and C. Infiltration and runoff potential for this site varies from moderate to high 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 shortgrasses form a dense sod and dominate the site. Normally areas where ground cover is less than 50% have the greatest potential to have reduced infiltration and higher runoff (refer to Section 4, NRCS National Engineering Handbook for runoff quantities and hydrologic curves).

Recreational Uses

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

Wood Products

Other Products

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

Supporting Information

Associated Sites

(060AY010SD) – Loamy 13-16" P.Z.
(060AY041SD) – Loamy 16-18" P.Z.

(060AY022SD) – Loamy Terrace
(060AY003SD) – Subirrigated

Similar Sites

(060AY003SD) – Subirrigated [more big bluestem and prairie cordgrass, less green needlegrass; higher production]

(060AY010SD or 060AY041SD) – Loamy 13-16" P.Z. or Loamy 16-18" P.Z. [less big bluestem, more green needlegrass; lower production]

Inventory Data References

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

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

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
--	---------------	--	---------------