

# United States Department of Agriculture Natural Resources Conservation Service

## Ecological Site Description

**Site Type:** Rangeland

**Site Name:** Sandy Terrace

**Site ID:** R058DY031SD

**Major Land Resource Area (MLRA):** 58D – Northern Rolling High Plains, Eastern Part



### Physiographic Features

This site occurs on nearly level stream terraces.

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

	<u>Minimum</u>	<u>Maximum</u>
<b>Elevation (feet):</b>	2,300	4,000
<b>Slope (percent):</b>	1	4
<b>Water Table Depth (inches):</b>	80	80
<b>Flooding:</b>		
<b>Frequency:</b>	None	Rare
<b>Duration:</b>	None	Very brief
<b>Ponding:</b>		
<b>Depth (inches):</b>	None	None
<b>Frequency:</b>	None	None
<b>Duration:</b>	None	None
<b>Runoff Class:</b>	Very low	Low

### 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 to the east. Annual precipitation ranges from 14 to 16 inches. Most of the rainfall occurs as frontal storms early in the growing season. Some high intensity, convective thunderstorms occur in the summer. Precipitation in winter occurs as snow. 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. Outbreaks of cold air from Canada in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. 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 44°F. January is the coldest month with average temperatures ranging from about 12°F (Marmarth, North Dakota (ND)), to about 20°F (Baker, Montana (MT)). July is the warmest month with temperatures averaging from about 70°F (Marmarth, ND), to about 76°F (Baker, MT). The range of normal average monthly temperatures between the coldest and warmest months is about 55°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 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>
<b>Frost-free period (days):</b>	110	123
<b>Freeze-free period (days):</b>	130	140
<b>Mean Annual Precipitation (inches):</b>	14	16

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

	Precip. Min.	Precip. Max	Temp. Min.	Temp. Max.
January	0.39	0.46	-0.8	31.0
February	0.34	0.54	5.7	34.4
March	0.73	0.82	15.7	43.8
April	1.23	1.73	29.1	60.4
May	2.29	2.71	39.6	67.7
June	2.79	3.00	49.3	76.7
July	1.91	2.10	54.5	90.7
August	1.35	1.46	50.2	88.2
September	1.16	1.25	40.1	76.5
October	0.85	1.07	28.9	59.5
November	0.43	0.57	15.9	44.6
December	0.31	0.50	6.1	33.7

Climate Stations		Period	
Station ID	Location or Name	From	To
MT0412	Baker	1948	2005
SD1294	Camp Crook	1896	2006
SD3560	Harding 3 SE	1951	2006
ND5575	Marmarth	1950	2006
SD7062	Redig 11 NE	1948	2006

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

**Influencing Water Features**

No significant water features influence this site.

**Representative Soil Features**

The soils on this site range from fine sandy loam to loamy fine sand surface textures and have slopes of one to four percent. These soils are well drained and formed in alluvium derived from sandstone. The surface layer is five to nine inches thick. The texture of the subsurface layers range from loamy fine sand to fine sandy loam. This site should show no evidence of rills, wind scoured areas, or pedestalled plants. Water flow paths are broken, irregular in appearance, or discontinuous. The soil surface is stable and intact.

These soils are susceptible mainly to water erosion typically as a result of flooding events. Erosion may occur with a loss of vegetative cover. Loss of 50 percent or more of the surface layer of the soils on this site can result in a shift in species composition and/or production.

Access Web Soil Survey (<http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>) for specific local soils information.

**Parent Material Kind:** alluvium  
**Parent Material Origin:** sandstone  
**Surface Texture:** fine sandy loam, loamy fine sand  
**Surface Texture Modifier:** none  
**Subsurface Texture Group:** sandy  
**Surface Fragments ≤3" (% Cover):** 0  
**Surface Fragments >3" (%Cover):** 0  
**Subsurface Fragments ≤3" (% Volume):** 0  
**Subsurface Fragments >3" (% Volume):** 0

	<u>Minimum</u>	<u>Maximum</u>
<b>Drainage Class:</b>	well	well
<b>Permeability Class:</b>	moderate	moderately rapid
<b>Depth to Bedrock (inches):</b>	80	80
<b>Electrical Conductivity (mmhos/cm)*:</b>	0	2
<b>Sodium Absorption Ratio*:</b>	0	0
<b>Soil Reaction (1:1 Water)*:</b>	5.6	8.4
<b>Soil Reaction (0.1M CaCl2)*:</b>	NA	NA
<b>Available Water Capacity (inches)*:</b>	4	4
<b>Calcium Carbonate Equivalent (percent)*:</b>	0	15

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

## Plant Communities

### Ecological Dynamics of the Site

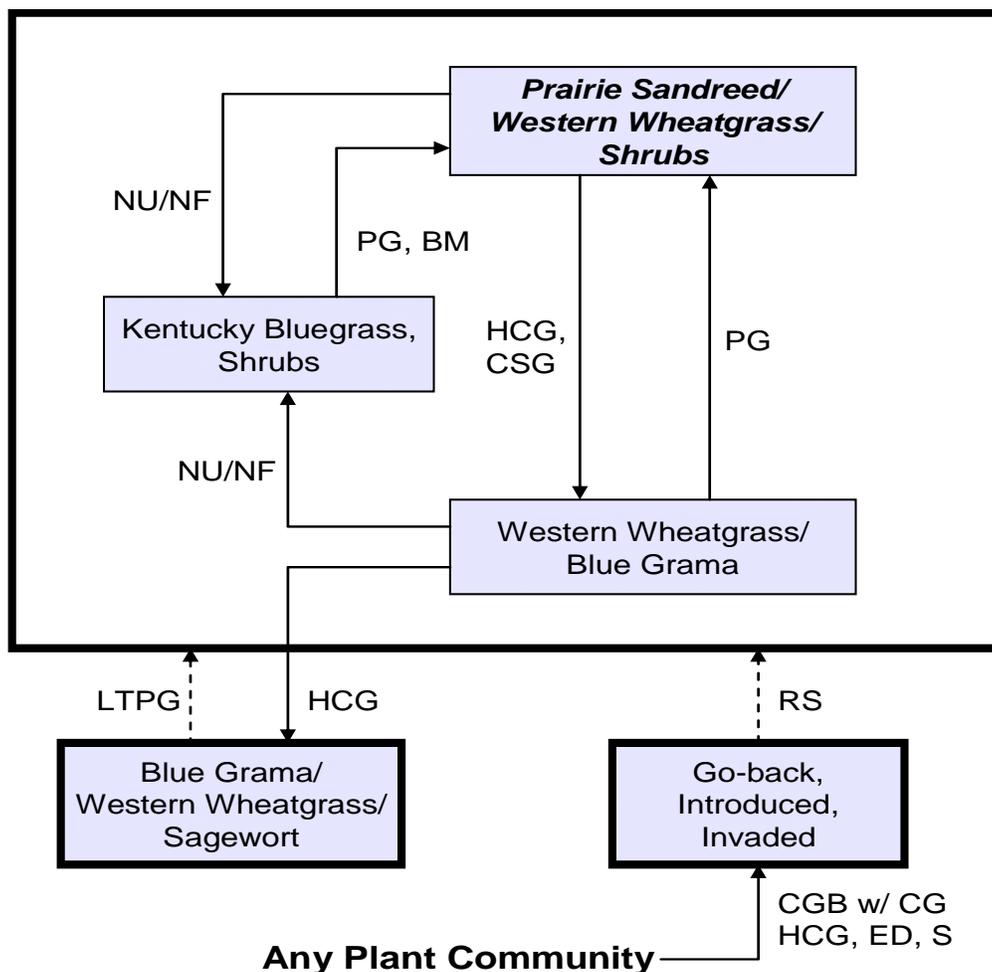
This site developed under Northern Great Plains climatic conditions, natural influences of large herbivores, occasional fire, and other biotic and abiotic factors that typically influence soil/site development. Changes will occur in the plant communities due to short-term weather variations, impacts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

A high percentage of these areas have been tilled in the past and have been planted to alfalfa for haying or are in a winter wheat/fallow rotation. Also, many of these areas are located in good winter livestock areas and are used as calving/feeding areas. Very few areas exist that have not had severe soil disturbance. Many areas that have not been tilled have been continuously hayed resulting in a mono-culture of western wheatgrass. Continuous grazing without adequate recovery periods following each grazing occurrence over several years causes this site to depart from the Prairie Sandreed/Western Wheatgrass/Shrubs Plant Community. Species such as blue grama will initially increase. Western wheatgrass, green needlegrass, and prairie sandreed will decrease in frequency and production. Extended periods of nonuse and/or lack of fire will result in a plant community having high litter levels, which favors an increase in Kentucky bluegrass and/or annual brome grass and in time, shrubs and trees such as western snowberry, chokecherry, and green ash.

The plant community upon which interpretations are primarily based is the Prairie Sandreed/Western Wheatgrass/Shrubs Plant Community. This plant community 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; **CGB w/ CG** – Cropped go-back with continuous grazing; **CSG** – Continuous seasonal grazing; **ED** – Excessive defoliation; **HCG** – Heavy continuous grazing; **LTPG** – Long-term prescribed grazing; **NU/NF** – Extended period of non-use & no fire; **PB** – Prescribed burning; **PG** – Prescribed grazing; **RS** – Range seeding; **S** – Seeding with introduced species.

Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SCIENTIFIC NAME	SYMBOL	Prairie Sandreed/Western Wheatgrass/Shrubs		
			Group	lbs./acre	% Comp
<b>GRASSES &amp; GRASS-LIKES</b>				1875 - 2250	75 - 90
<b>TALL WARM-SEASON GRASSES</b>			<b>1</b>	<b>500 - 875</b>	<b>20 - 35</b>
prairie sandreed	Calamovilfa longifolia	CALO	1	375 - 750	15 - 30
big bluestem	Andropogon gerardii	ANGE	1	50 - 250	2 - 10
switchgrass	Panicum virgatum	PAVI2	1	0 - 175	0 - 7
tall dropseed	Sporobolus compositus var. compositus	SPCOC2	1	0 - 125	0 - 5
<b>WHEATGRASSES</b>			<b>2</b>	<b>250 - 625</b>	<b>10 - 25</b>
western wheatgrass	Pascopyrum smithii	PASM	2	250 - 625	10 - 25
slender wheatgrass	Elymus trachycaulus	ELTR7	2	50 - 250	2 - 10
<b>COOL-SEASON BUNCHGRASSES</b>			<b>3</b>	<b>250 - 500</b>	<b>10 - 20</b>
needleandthread	Hesperostipa comata ssp. comata	HECOC8	3	125 - 375	5 - 15
green needlegrass	Nassella viridula	NAVI4	3	50 - 200	2 - 8
Canada wildrye	Elymus canadensis	ELCA4	3	25 - 125	1 - 5
porcupine grass	Hesperostipa spartea	HESP11	3	0 - 125	0 - 5
<b>WARM-SEASON BUNCHGRASSES</b>			<b>4</b>	<b>50 - 250</b>	<b>2 - 10</b>
blue grama	Bouteloua gracilis	BOGR2	4	25 - 175	1 - 7
little bluestem	Schizachyrium scoparium	SCSC	4	25 - 150	1 - 6
<b>OTHER NATIVE GRASSES</b>			<b>5</b>	<b>25 - 125</b>	<b>1 - 5</b>
prairie junegrass	Koeleria macrantha	KOMA	5	25 - 75	1 - 3
plains reedgrass	Calamagrostis montanensis	CAMO	5	0 - 75	0 - 3
other grasses		2GRAM	5	0 - 100	0 - 4
<b>GRASS-LIKES</b>			<b>6</b>	<b>25 - 125</b>	<b>1 - 5</b>
sedge	Carex spp.	CAREX	6	25 - 125	1 - 5
other grass-likes		2GL	6	0 - 75	0 - 3
<b>FORBS</b>			<b>8</b>	<b>50 - 200</b>	<b>2 - 8</b>
American vetch	Vicia americana	VIAM	8	25 - 50	1 - 2
bracted spiderwort	Tradescantia bracteata	TRBR	8	25 - 50	1 - 2
cudweed sagewort	Artemisia ludoviciana	ARLU	8	25 - 50	1 - 2
dotted gayfeather	Liatris punctata	LIPU	8	25 - 50	1 - 2
false gromwell	Onosmodium molle	ONMO	8	0 - 50	0 - 2
goldenrod	Solidago spp.	SOLID	8	0 - 50	0 - 2
green sagewort	Artemisia campestris	ARCA12	8	25 - 50	1 - 2
hoary puccoon	Lithospermum canescens	LICA12	8	0 - 50	0 - 2
Maximilian sunflower	Helianthus maximiliani	HEMA2	8	0 - 50	0 - 2
mint	Mentha spp.	MENTH	8	0 - 25	0 - 1
prairie coneflower	Ratibida columnifera	RACO3	8	25 - 50	1 - 2
purple prairie clover	Dalea purpurea	DAPU5	8	25 - 50	1 - 2
rush skeletonweed	Lygodesmia juncea	LYJU	8	0 - 25	0 - 1
scarlet gaura	Gaura coccinea	GACO5	8	25 - 50	1 - 2
scurfpea	Psoraleidum spp.	PSORA2	8	25 - 50	1 - 2
wavyleaf thistle	Cirsium undulatum	CIUN	8	25 - 50	1 - 2
western yarrow	Achillea millefolium var. occidentalis	ACMIO	8	0 - 25	0 - 1
white prairie aster	Symphotrichum falcatum	SYFA	8	25 - 50	1 - 2
native forbs		2FN	8	25 - 100	1 - 4
<b>SHRUBS</b>			<b>9</b>	<b>125 - 375</b>	<b>5 - 15</b>
big sagebrush	Artemisia tridentata	ARTR2	9	0 - 75	0 - 3
chokecherry	Prunus virginiana	PRVI	9	25 - 100	1 - 4
fringed sagewort	Artemisia frigida	ARFR4	9	25 - 75	1 - 3
leadplant	Amorpha canescens	AMCA6	9	25 - 100	1 - 4
rose	Rosa spp.	ROSA5	9	25 - 75	1 - 3
silver sagebrush	Artemisia cana	ARCA13	9	50 - 125	2 - 5
western snowberry	Symphoricarpos occidentalis	SYOC	9	25 - 125	1 - 5
wild plum	Prunus americana	PRAM	9	25 - 100	1 - 4
other shrubs		2SHRUB	9	25 - 125	1 - 5
<b>TREES</b>			<b>10</b>	<b>0 - 50</b>	<b>0 - 2</b>
American elm	Ulmus americana	ULAM	10	0 - 50	0 - 2
boxelder	Acer negundo	ACNE2	10	0 - 50	0 - 2
green ash	Fraxinus pennsylvanica	FRPE	10	0 - 50	0 - 2
plains cottonwood	Populus deltoides ssp. monilifera	PODEM	10	0 - 50	0 - 2
other trees		2TREE	10	0 - 50	0 - 2

Annual Production lbs./acre		LOW	RV	HIGH
<b>GRASSES &amp; GRASS-LIKES</b>		1545	2100	2575
<b>FORBS</b>		45	125	225
<b>SHRUBS</b>		110	250	445
<b>TREES</b>		0	25	55
<b>TOTAL</b>		1700	2500	3300

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

**Plant Community Composition and Group Annual Production**

COMMON/GROUP NAME	SYMBOL	Prairie Sandreed/Western Wheatgrass/Shrubs			Western Wheatgrass/Blue Grama			Kentucky Bluegrass/Shrubs			Blue Grama/Western Wheatgrass/Sagewort		
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp
<b>GRASSES &amp; GRASS-LIKES</b>													
1875 - 2250 75 - 90 1360 - 1530 80 - 90 1400 - 1700 70 - 85 960 - 1080 80 - 90													
<b>TALL WARM-SEASON GRASSES</b>													
prairie sandreed	CALO	1	375 - 750	15 - 30	1	34 - 170	2 - 10	1	20 - 200	1 - 10	1	0 - 60	0 - 5
big bluestem	ANGE	1	50 - 250	2 - 10	1	0 - 34	0 - 2	1	0 - 40	0 - 2			
switchgrass	PAM2	1	0 - 175	0 - 7	1	0 - 17	0 - 1	1	0 - 20	0 - 1			
tall dropseed	SPCOC2	1	0 - 125	0 - 5	1	0 - 68	0 - 4	1	0 - 60	0 - 3	1	0 - 24	0 - 2
<b>WHEATGRASSES</b>													
western wheatgrass	PASM	2	250 - 625	10 - 25	2	255 - 510	15 - 30	2	100 - 300	5 - 15	2	60 - 180	5 - 15
slender wheatgrass	ELTR7	2	50 - 250	2 - 10	2	0 - 85	0 - 5	2	0 - 100	0 - 5	2	0 - 12	0 - 1
<b>COOL-SEASON BUNCHGRASSES</b>													
needleandthread	HECOC8	3	125 - 375	5 - 15	3	34 - 170	2 - 10	3	40 - 200	2 - 10	3	12 - 84	1 - 7
green needlegrass	NAV4	3	50 - 200	2 - 8	3	0 - 68	0 - 4	3	20 - 120	1 - 6	3	0 - 12	0 - 1
Canada wildrye	ELCA4	3	25 - 125	1 - 5	3	0 - 51	0 - 3	3	0 - 60	0 - 3			
porcupine grass	HESP11	3	0 - 125	0 - 5	3	0 - 34	0 - 2	3	0 - 60	0 - 3			
<b>WARM-SEASON BUNCHGRASSES</b>													
blue grama	BOGR2	4	25 - 175	1 - 7	4	85 - 340	5 - 20	4	20 - 200	1 - 10	4	240 - 480	20 - 40
little bluestem	SCSC	4	25 - 150	1 - 6	4	0 - 51	0 - 3	4	0 - 80	0 - 4	4	0 - 24	0 - 2
<b>OTHER NATIVE GRASSES</b>													
prairie junegrass	KOMA	5	25 - 75	1 - 3	5	17 - 51	1 - 3	5	20 - 40	1 - 2	5	12 - 36	1 - 3
plains reedgrass	CAMO	5	0 - 75	0 - 3	5	0 - 34	0 - 2	5	0 - 60	0 - 3	5	0 - 12	0 - 1
other grasses	2GRAM	5	0 - 100	0 - 4	5	0 - 51	0 - 3	5	0 - 100	0 - 5	5	0 - 36	0 - 3
<b>GRASS-LIKES</b>													
sedge	CAREX	6	25 - 125	1 - 5	6	17 - 170	1 - 10	6	20 - 200	1 - 10		12 - 120	1 - 10
other grass-likes	2GL	6	0 - 75	0 - 3	6	0 - 51	0 - 3	6	0 - 60	0 - 3		0 - 36	0 - 3
<b>NON-NATIVE GRASSES</b>													
bluegrass	POA				7	17 - 153	1 - 9	7	300 - 600	15 - 30	7	24 - 144	2 - 12
cheatgrass	BRTE				7	0 - 85	0 - 5	7	0 - 160	0 - 8	7	12 - 96	1 - 8
<b>FORBS</b>													
American vetch	VIAM	8	25 - 50	1 - 2	8	0 - 17	0 - 1	8	0 - 20	0 - 1			
bracted spiderwort	TRBR	8	25 - 50	1 - 2	8	0 - 17	0 - 1	8	0 - 20	0 - 1			
cudweed sagewort	ARLU	8	25 - 50	1 - 2	8	17 - 51	1 - 3	8	20 - 80	1 - 4	8	12 - 72	1 - 6
dotted gayfeather	LIPU	8	25 - 50	1 - 2	8	0 - 17	0 - 1	8	0 - 20	0 - 1			
false gromwell	ONMO	8	0 - 50	0 - 2				8	0 - 20	0 - 1			
goldenrod	SOLID	8	0 - 50	0 - 2	8	17 - 51	1 - 3	8	20 - 80	1 - 4	8	12 - 36	1 - 3
green sagewort	ARCA12	8	25 - 50	1 - 2	8	17 - 51	1 - 3	8	20 - 60	1 - 3	8	12 - 60	1 - 5
hoary puccoon	LICA12	8	0 - 50	0 - 2				8	0 - 20	0 - 1			
Maximilian sunflower	HEMA2	8	0 - 50	0 - 2				8	0 - 40	0 - 2			
mint	MENTH	8	0 - 25	0 - 1				8	0 - 20	0 - 1			
prairie coneflower	RACO3	8	25 - 50	1 - 2	8	0 - 34	0 - 2	8	0 - 20	0 - 1			
purple prairie clover	DAPU5	8	25 - 50	1 - 2	8	0 - 17	0 - 1	8	0 - 20	0 - 1			
rush skeletonweed	LVJU	8	0 - 25	0 - 1	8	0 - 17	0 - 1	8	0 - 20	0 - 1	8	0 - 12	0 - 1
scarlet gaura	GACO5	8	25 - 50	1 - 2	8	0 - 17	0 - 1	8	0 - 20	0 - 1			
scurfpea	PSORA2	8	25 - 50	1 - 2	8	17 - 51	1 - 3	8	20 - 80	1 - 4	8	12 - 36	1 - 3
wayleaf thistle	CIUN	8	25 - 50	1 - 2	8	0 - 34	0 - 2	8	0 - 20	0 - 1			
western yarrow	ACMIO	8	0 - 25	0 - 1	8	17 - 34	1 - 2	8	20 - 60	1 - 3	8	12 - 48	1 - 4
white prairie aster	SYFA	8	25 - 50	1 - 2	8	17 - 51	1 - 3	8	20 - 60	1 - 3	8	12 - 36	1 - 3
native forbs	2FN	8	25 - 100	1 - 4	8	17 - 68	1 - 4	8	20 - 80	1 - 4	8	12 - 60	1 - 5
introduced forbs	2FI				8	0 - 85	0 - 5	8	0 - 100	0 - 5	8	0 - 60	0 - 5
<b>SHRUBS</b>													
big sagebrush	ARTR2	9	0 - 75	0 - 3	9	0 - 17	0 - 1	9	0 - 80	0 - 4			
chokecherry	PRVI	9	25 - 100	1 - 4	9	0 - 34	0 - 2	9	20 - 100	1 - 5	9	0 - 12	0 - 1
fringed sagewort	ARFR4	9	25 - 75	1 - 3	9	17 - 85	1 - 5	9	20 - 60	1 - 3	9	24 - 96	2 - 8
leadplant	AMCA6	9	25 - 100	1 - 4	9	0 - 34	0 - 2	9	20 - 100	1 - 5			
rose	ROSA5	9	25 - 75	1 - 3	9	17 - 34	1 - 2	9	20 - 60	1 - 3	9	12 - 24	1 - 2
silver sagebrush	ARCA13	9	50 - 125	2 - 5	9	0 - 51	0 - 3	9	40 - 160	2 - 8	9	0 - 36	0 - 3
western snowberry	SYOC	9	25 - 125	1 - 5	9	17 - 85	1 - 5	9	20 - 160	1 - 8	9	12 - 60	1 - 5
wild plum	PRAM	9	25 - 100	1 - 4	9	0 - 34	0 - 2	9	20 - 100	1 - 5	9	0 - 12	0 - 1
other shrubs	2SHRUB	9	25 - 125	1 - 5	9	0 - 68	0 - 4	9	20 - 100	1 - 5	9	0 - 36	0 - 3
<b>TREES</b>													
American elm	ULAM	10	0 - 50	0 - 2	10	0 - 34	0 - 2	10	0 - 40	0 - 2	10	0 - 24	0 - 2
boxelder	ACNE2	10	0 - 50	0 - 2	10	0 - 34	0 - 2	10	0 - 40	0 - 2	10	0 - 24	0 - 2
green ash	FRPE	10	0 - 50	0 - 2	10	0 - 34	0 - 2	10	0 - 40	0 - 2	10	0 - 24	0 - 2
plains cottonwood	PODEM	10	0 - 50	0 - 2	10	0 - 34	0 - 2	10	0 - 40	0 - 2	10	0 - 24	0 - 2
other trees	2TREE	10	0 - 50	0 - 2	10	0 - 34	0 - 2	10	0 - 40	0 - 2	10	0 - 24	0 - 2
<b>Annual Production lbs./acre</b>													
LOW RV HIGH													
GRASSES & GRASS-LIKES 1545 - 2100 - 2575 1090 - 1471 - 1725 1230 - 1530 - 1755 690 - 1008 - 1315													
FORBS 45 - 125 - 225 30 - 85 - 150 95 - 150 - 225 55 - 90 - 130													
SHRUBS 110 - 250 - 445 80 - 128 - 190 175 - 300 - 475 55 - 90 - 130													
TREES 0 - 25 - 55 0 - 17 - 35 0 - 20 - 45 0 - 12 - 25													
TOTAL 1700 - 2500 - 3300 1200 - 1700 - 2100 1500 - 2000 - 2500 800 - 1200 - 1600													

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. Refer to PLANTS database for scientific names and codes: <http://plants.usda.gov>

### 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 (DPC).” According to the United States Department of Agriculture (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.

#### Prairie Sandreed/Western Wheatgrass/Shrubs Plant Community

The plant community upon which interpretations are primarily based is the Prairie Sandreed/Western Wheatgrass/Shrubs Plant Community. This is also considered to be climax. This plant community can be found on areas that are properly managed with prescribed grazing. The potential vegetation is about 75 to 90 percent grasses and grass-like plants, 2 to 8 percent forbs, 5 to 15 percent shrubs, and 0 to 2 percent trees. Major grasses include prairie sandreed, western wheatgrass, and needleandthread. Major forbs and shrubs include cudweed sagewort, Maximilian sunflower, mint, white prairie aster, silver sagebrush, and western snowberry. Scattered green ash, plains cottonwood, boxelder, 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 offsite 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: SD5803

Growth curve name: Northern Rolling High Plains, cool-season/warm-season codominant.

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

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	10	20	28	21	10	5	3	0	0

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

- Nonuse and lack of fire for extended periods of time will convert this plant community to the *Kentucky Bluegrass/Shrubs Plant Community*.
- Heavy, continuous grazing will convert the plant community to the *Western Wheatgrass/Blue Grama Plant Community*.
- Continuous seasonal (i.e., spring) grazing will convert the plant community to the *Western Wheatgrass/Blue Grama Plant Community*.

### Western Wheatgrass/Blue Grama Plant Community

This plant community can slowly develop from the adverse effects of continuous 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. Blue grama and western wheatgrass are the dominant species. Prairie sandreed has been greatly reduced. Forb species include cudweed sagewort, white prairie aster, goldenrod, green sagewort, scurfpea, and western yarrow. The dominant shrubs include fringed sagewort, silver sagebrush, and western snowberry.

This plant community is relatively stable and less productive than the Prairie Sandreed/Western Wheatgrass/Shrubs Plant Community. Reduction of litter and short plant heights result in higher soil temperatures, poor water infiltration rates, increased runoff and high evapotranspiration rates. 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 blue grama.

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: SD5803

Growth curve name: Northern Rolling High Plains, cool-season/warm-season codominant.

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

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	10	20	28	21	10	5	3	0	0

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

- Prescribed grazing with adequate recovery periods following each grazing event and proper stocking will shift this plant community back to the *Prairie Sandreed/Western Wheatgrass/Shrubs Plant Community*.
- Heavy continuous grazing for extended periods will shift this plant community across a threshold to the *Blue Grama/Western Wheatgrass/Sagewort Plant Community*.
- Non-use and no fire for extended periods of time will convert this plant community to the *Kentucky Bluegrass/Shrubs Plant Community*.

### Kentucky Bluegrass/Shrub Plant Community

This plant community develops after an extended period of nonuse and exclusion of fire. Eventually litter levels become high enough to reduce native grass vigor, diversity, and density. Kentucky bluegrass dominates this plant community. Common forbs include sweetclover, cudweed sagewort, and goldenrod species. Shrubs such as western snowberry and/or silver sagebrush, buffaloberry, and chokecherry will increase in density and cover and eventually tree species such as green ash.

This plant community is resistant to change without prescribed grazing and/or fire. The combination of both grazing and fire is most effective in moving this plant community toward the Prairie Sandreed/Western Wheatgrass/Shrubs Plant Community. Soil erosion is low, but runoff will be increased. Once the advanced stage of this plant community is reached, time and external resources will be needed to see a 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: SD5801

Growth curve name: Northern Rolling High Plains, cool-season dominant.

Growth curve description: Cool-season dominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	4	12	25	36	10	5	4	4	0	0

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

- Prescribed grazing combined with brush management will move this plant community to the *Prairie Sandreed/Western Wheatgrass/Shrubs Plant Community*.

### **Blue Grama/Western Wheatgrass/Sagewort Plant Community**

This plant community developed with heavy continuous grazing without adequate recovery periods between grazing events. Blue grama with an evenly scattered overstory of western wheatgrass, cudweed sagewort and fringed sagewort dominates the community. The western wheatgrass is low in vigor. Green needlegrass has been mostly removed. Cudweed sagewort, goldenrod, green sagewort, scurfpea, and western yarrow have increased. Key shrubs have been severely reduced in vigor or removed completely. Where silver sagebrush is the dominant shrub, remnants will remain scattered throughout the site which protects some of the remaining decreaseers such as green needlegrass. Remnant trees remain but regeneration is not occurring.

This plant community is resistant to change due to grazing tolerance of blue grama. A significant amount of production and diversity has been lost when compared to the *Prairie Sandreed/Western Wheatgrass/Shrubs Plant Community*. Loss of cool-season grasses, tall warm-season grasses, shrub component, and nitrogen fixing forbs has negatively impacted energy flow and nutrient cycling. Water infiltration is reduced significantly due to the massive shallow root system characteristic of overgrazed plant communities. Soil loss may be accelerated where concentrated flows occur.

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: SD5804

Growth curve name: Northern Rolling High Plains, warm-season dominant, cool-season subdominant

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

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

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

- Long-term prescribed grazing with adequate recovery periods following each grazing event and proper stocking over long periods of time can move this plant community toward the *Prairie Sandreed/Western Wheatgrass/Shrubs Plant Community*. It may eventually return to this plant community or associated plant community stages assuming an adequate seed/vegetative source is available.

### **Go-back, Introduced, or Invaded Plant Community**

This plant community develops under severe disturbance and/or excessive defoliation. This can result from heavy livestock or wildlife concentration (i.e., water locations, bedding or loafing grounds,

feeding areas,) cropping abandonment (go-back land), or prairie dog habitation. The dominant vegetation includes pioneer annual grasses and forbs and early successional biennial and perennial species. Grasses may include red threeawn, sixweeks fescue, smooth brome, crested wheatgrass, needleandthread, prairie Junegrass, and western wheatgrass. The dominant forbs include curlycup gumweed, maretail, salsify, kochia, field bindweed, thistles, western ragweed, pussytoes, prostrate verbena, and other early successional species. Shrubs that may be present include prairie rose, fringed sagewort, and broom snakeweed. Plant species from adjacent ecological sites may become minor components of this plant community. The community also is susceptible to invasion of other nonnative species due to severe soil disturbances and relatively high percent of bare ground. Many annual and perennial forbs, including nonnative species, have invaded the site.

This plant community is resistant to change towards the Prairie Sandreed/Western Wheatgrass/Shrubs Plant Community as long as soil disturbance or severe vegetation defoliation persists, thus holding back secondary plant succession. Soil erosion is potentially high in this vegetation state. Reduced surface cover, low plant density, low plant vigor, loss of root biomass, and soil compaction, all contribute to decreased water infiltration, increased runoff, and accelerated erosion rates.

Significant economic inputs and time would be required to move this plant community toward a higher successional stage and a more productive plant community. Secondary succession is highly variable, depending upon availability and diversity of a viable seed bank of higher successional species within the existing plant community and neighboring plant communities. This plant community can be renovated to improve the production capability but management changes would be needed to maintain the new plant community. The total annual production ranges from 500 to 1,100 pounds/acre (air-dry weight) depending upon growing conditions.

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

Growth curve number: SD5803

Growth curve name: Northern Rolling High Plains, cool-season/warm-season codominant.

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

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	10	20	28	21	10	5	3	0	0

## Ecological Site Interpretations

### Animal Community – Wildlife Interpretations

Major Land Resource Area (MLRA) 58D lies within the drier portion of Northern mixed-grass prairie ecosystem where sagebrush steppes to the west yield to grassland steppes to the east. Prior to European settlement, this area consisted of diverse grass/shrub land habitats interspersed with varying densities of depressional, instream wetlands, and woody riparian corridors. These habitats provided critical life cycle components for many of its users. Many species of grassland birds, small mammals, reptiles, amphibians, and herds of roaming bison, elk, and pronghorn were among the inhabitants adapted to this semi-arid region. Roaming herbivores, as well as, several small mammal and insect species, were the primary consumers linking the grassland resources to predators such as the wolf, mountain lion, and grizzly bear, as well as, smaller carnivores such as the coyote, bobcat, fox, and raptors. The black-tailed prairie dog was once abundant; however, the species remains a keystone species within its range. The black-footed ferret, burrowing owl, ferruginous hawk, mountain plover, and swift fox were associated with prairie dog complexes.

Historically, the Northern mixed-grass prairie was a disturbance-driven ecosystem with fire, herbivory and climate functioning as the primary disturbance factors either singly or in combination. Following European settlement, livestock grazing, cropland conversion, elimination of fire, energy development and other anthropogenic factors influenced species composition and abundance. Introduced and invasive species further impacted plant and animal communities. The bison was a historical keystone species but have been extirpated as a free-ranging herbivore. The loss of the bison, reduction of prairie dog colonies, and loss of fire as ecological drivers greatly influenced the character of the remaining native plant communities and altered wildlife habitats. Human development has reduced habitat quality for area-sensitive species.

Within MLRA 58D, the Sandy Terrace Ecological Site (ES) provides upland grassland cover with an associated forb, shrub, and tree component. It was typically part of an expansive grassland landscape that included combinations of Shallow Loamy, Shallow Clayey, Thin Loamy, Thin Claypan, Sandy, Sandy Claypan, Loamy, Loamy Terrace, and Clayey ESs.

This ES can support an abandoned floodplain plant community and may be associated with an adjacent riparian plant community. The abandoned floodplain plant community may be composed of mature cottonwood and various age classes of elm, green ash, and boxelder; with a shrub component of fringed sagewort, chokecherry, wild plum, western snowberry, silver sagebrush, wild rose, etc. The presence or absence of this tree/shrub component is an important factor influencing wildlife species composition.

Rare flooding events deposit silt on the site which may allow the potential sprouting of plains cottonwood. However, due to the droughtiness of this site, cottonwood establishment does not occur. This site is subject to invasion of grass species such as annual bromegrasses and Kentucky bluegrass. Woody species such as Eastern red cedar, Rocky Mountain juniper, and Russian-olive may invade this site.

The Sandy Terrace ES has been subject to conversion to cropland or hayland, some sites being irrigated. Where intact, the site provides important habitat for grassland, woodland, and shrub nesting birds, small rodents, bats, mammalian predators, and a variety of reptiles, amphibians, and insects. Within the MLRA, this site provides the suitable habitat for herptiles and raccoons. These sites also provide forage sites for greater sage-grouse broods. Invasive grass or woody species have impacted the biological integrity of the site, particularly for ground nesting birds.

**Prairie Sandreed/Western Wheatgrass/Shrub:** The predominance of grasses plus high diversity of forbs and shrubs in this community favors grazers and mixed-feeders, such as white-tailed deer. Plant communities associated with woody habitat provide habitat for songbirds such as brown thrasher, redheaded woodpecker, warbling vireo, yellow warbler, gray catbird, Say's phoebe, loggerhead shrike, Lazuli bunting, yellow breasted chat, and black-headed grosbeak; and raptors such as red-tailed hawk, Swainson's hawk, American kestrel, and great-horned owl. Insects, such as pollinators, play a large role in maintaining the forb community and provide a forage base for birds and other species. Diverse prey populations are available for grassland raptors and mammalian predators, especially bobcat.

The diversity of grasses, forbs, and shrubs provide high nutrition levels for small and large herbivores including voles, mice, thirteen-lined ground squirrel, Eastern cottontail rabbit, white-tailed jackrabbit, and deer. This ES provides excellent fawning habitat for white-tailed deer. The relatively high stature of this plant community provides suitable thermal, protective, and escape cover for small and large mammals. This plant community provides habitat for tiger salamander, various frog, and toad

species, and bull and garter snakes. Introduced bird species such as European starling, ring-necked pheasant, and gray partridge will use this site.

**Western Wheatgrass/Blue Grama:** Resulting from heavy continuous grazing or continuous seasonal grazing without adequate recovery periods between grazing events or increased fire frequency, western wheatgrass and blue grama will dominate. Shrub density has decreased but diversity has remained unchanged. The tree component is aging and the tree diversity and density remains largely unchanged. Livestock damage to trees is often noticeable. The decrease in shrub numbers results in reduced habitat for brown thrasher, yellow warbler, gray catbird, loggerhead shrikes, Lazuli bunting, and yellow breasted chat. The tall tree component continues to provide habitat for red-tailed hawk, American kestrel, redheaded woodpecker, warbling vireo, black-headed grosbeak, and Say's phoebe. This plant community provides habitat for tiger salamander, leopard frog, and bull and garter snakes.

**Kentucky Bluegrass/Shrub:** Long periods of nonuse and loss of fire allows the Kentucky bluegrass and shrub component to dominate the shorter vegetative stratum. Increased litter cools the soil surface allowing for shrubs such as western snowberry and silver sagebrush to increase in numbers. The taller vegetative stratum will become dominated by green ash, boxelder, and Rocky Mountain juniper. Wildlife diversity is reduced due to changes in the vegetative community. Prominent species will include meadow vole, common yellowthroat, savannah sparrow, and northern harrier.

Ecological processes on this site have been impacted by increased litter interfering with nutrient and water cycles decreasing forb and graminoid diversity.

**Blue Grama/Western Wheatgrass/Sagewort:** Resulting from heavy, continuous grazing without adequate recovery periods between grazing events, sagewort will infiltrate the blue grama and western wheatgrass community. Taller shrubs such as chokecherry and American plum are greatly decreased, while shorter shrubs such as western snowberry and fringed sagewort are increased. Tree vigor and canopy are reduced through various stressors. The reduction in diversity and numbers of the shrub component results in reduced habitat for brown thrasher, yellow warbler, gray catbird, loggerhead shrikes, Lazuli bunting, and yellow breasted chat. Loss of tree vigor and canopy reduces habitat quality for warbling vireo and black-headed grosbeak. Increased soil temperature reduces habitat quality for most amphibians.

Ecological processes on this site have been impacted by decreased litter interfering with nutrient and water cycles decreasing forb and graminoid diversity. Runoff increases due to bare ground and decreased litter, resulting in sediment loading and warmer water to adjacent streams.

### **Go-Back, Introduced, and/or Invaded States**

This group includes separate vegetation states that are highly variable in nature. They are derived through distinct management scenarios. These plant communities have been or are highly susceptible to invasion of annual brome grasses, bluegrasses, crested wheatgrass, and other nonnative species.

Since secondary succession is highly variable plant and wildlife species will vary. This plant community provides habitat for generalist or early successional species. In addition, these communities may contain prairie dog towns. Prairie dog towns are sites of high plant and wildlife diversity.

The **Go-back** state can be reached whenever severe mechanical disturbance (i.e., abandoned farmland) is eliminated. Early successional plant communities include annual and perennial weedy

type species first to occupy the site. These sites provide diverse foraging, reproductive and escape cover favoring multiple edge species. This pioneer plant community provides abundant opportunity for insect, bird and small mammal foraging due to abundant flowers and seed sources.

The **Introduced** state provides increased forage and therefore a potential for increased herbivore populations such as deer, pronghorn, and various small mammals. These sites provide diverse foraging, reproductive, and escape cover favoring multiple edge species.

The **Invaded** state includes areas that have been invaded and are dominated by species such as smooth brome, Kentucky bluegrass, crested wheatgrass, nonnative thistles, field bindweed, knapweeds, leafy spurge, hoary cress, and other introduced species. These sites greatly reduce foraging, reproductive, and escape cover for grassland nesting bird species.

### Animal Preferences (Quarterly – 1,2,3,4<sup>†</sup>)

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
<b>Grasses and Grass-likes</b>							
big bluestem	U D P D	U D U 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 U	D P P D	U D P U	D P P D	D P P D	U D P U	U D P 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
little bluestem	U D D U	N D N N	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
plains reedgrass	U D U U	N D N N	U D U U	N D N N	N D N N	U D U U	U D U U
porcupine grass	U P U D	N D N U	U P U D	N D N U	N D N U	U P U D	U P U D
prairie 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
sedge	U D U D	U P N 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	N D U N	U P U U	N D U N	N D U N	U P U U	U P 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
western 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
<b>Forbs</b>							
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
bracted spiderwort	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N
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
dotted gayfeather	U U D U	U P P U	U U D U	U P P U	U P P U	U U D U	U P P U
false gromwell	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
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
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
hoary puccoon	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
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
rush skeletonweed	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N
scarlet gaura	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
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
wavyleaf 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
white prairie aster	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
<b>Shrubs and Trees</b>							
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
big sagebrush	U N 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
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
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
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
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
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
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
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
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

N = not used; U = undesirable; D = desirable; P = preferred; T = toxic

<sup>†</sup> Quarters: 1 – Jan., Feb., Mar.; 2 – Apr., May, Jun.; 3 – Jul., Aug., Sep.; 4 – Oct., Nov., Dec.

## Animal Community – Grazing Interpretations

As this site improves in condition through proper management (from the more shortgrass dominated plant communities to the interpretive plant community), the advantage for livestock production includes: higher forage production from cool-season grasses, improved early spring forage production, and higher water infiltration. The disadvantage for livestock include: reduction in cool-/warm-season grass mix which would provides better management flexibility, less plant diversity, and a potential increase in soil erosion. The Go-back or Invaded Plant Community is of limited value for livestock production.

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

## Hydrology Functions

Water is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic group B, with localized areas in group 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 percent ground cover have the greatest potential for high infiltration and lower runoff. An exception would be where shortgrasses 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

No appreciable wood products are typically present on this site.

## Other Products

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

## Supporting Information

### Associated Sites

Loamy (R058DY010SD), Sandy (R058DY009SD), Loamy Overflow (R058DY020SD)

### Similar Sites

(R058DY009SD) – Sandy [more needleandthread; less production]

(R058DY020SD) – Loamy Overflow [more big bluestem; more production]

## Inventory Data References

Information presented here has been derived from NRCS clipping data and other inventory data. Field observations and experience were also used. Those involved in developing this site description

include: Stan Boltz, RMS, NRCS; Dave Dewald, Wildlife BIO, NRCS; Jody Forman, RMS, NRCS; Dennis Froemke, RMS, NRCS; and Darrell Vanderbusch, Soil Scientist, NRCS.

## State Correlation

This site has been correlated between MT, ND, and South Dakota (SD) in MLRA 58D.

## Field Offices

Baker, MT (Fallon County)

Belle Fourche, SD (Butte County)

Bowman, ND (Bowman and Slope Counties)

Buffalo, SD (Harding County)

Ekalaka, MT (Carter County)

## Relationship to Other Established Classifications

Level IV Ecoregions of the Conterminous United States: 43e – Sagebrush Steppe.

## 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://nasis.nrcs.usda.gov>)

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

\_\_\_\_\_  
ND, State Range Management Specialist

\_\_\_\_\_  
Date

\_\_\_\_\_  
SD, State Range Management Specialist

\_\_\_\_\_  
Date