

United States Department of Agriculture Natural Resources Conservation Service

Ecological Site Description

Site Type: Rangeland

Site Name: Thin Sandy

Site ID: R058DY026SD

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



Physiographic Features

This site occurs on moderately steep to steep uplands.

Landform: hillslope

Aspect: N/A

	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	2,300	4,000
Slope (percent):	9	25
Water Table Depth (inches):	80	80
Flooding:		
Frequency:	None	None
Duration:	None	None
Ponding:		
Depth (inches):	None	None
Frequency:	None	None
Duration:	None	None
Runoff Class:	Low	Medium

Climatic Features

The climate in this MLRA is typical of the drier portions of the Northern Great Plains where sagebrush steppes to the west yield to grassland 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>
Frost-free period (days):	110	123
Freeze-free period (days):	130	140
Mean Annual Precipitation (inches):	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 features common to soils in this site are the loamy fine sand or fine sandy loam textured surface layers and slopes of 9 to 25 percent. The soils in this site are well to excessively drained and formed in residuum derived from sandstone. The surface layer is two to four inches thick. The texture of the subsurface layers range from loamy fine sand to fine sand. This site should show slight to no evidence of rills or wind scoured areas. Bunch grasses are occasionally pedestalled but no exposed roots will be present. Water flow paths are broken, irregular in appearance, or discontinuous with numerous vegetative barriers. The soil surface is stable and intact.

These soils are somewhat susceptible to water erosion. The hazard of water erosion increases on slopes greater than about 15 percent. 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: residuum
Parent Material Origin: sandstone
Surface Texture: loamy fine sand, fine sandy loam
Surface Texture Modifier: none
Subsurface Texture Group: sandy
Surface Fragments ≤3” (% Cover): 0-5
Surface Fragments >3” (%Cover): 0
Subsurface Fragments ≤3” (% Volume): 0-10
Subsurface Fragments >3” (% Volume): 0

	<u>Minimum</u>	<u>Maximum</u>
Drainage Class:	well	excessive
Permeability Class:	moderately rapid	moderately rapid
Depth to Bedrock (inches):	20	80
Electrical Conductivity (mmhos/cm)*:	0	0
Sodium Absorption Ratio*:	0	0
Soil Reaction (1:1 Water)*:	5.6	8.4
Soil Reaction (0.1M CaCl₂)*:	NA	NA
Available Water Capacity (inches)*:	3	4
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

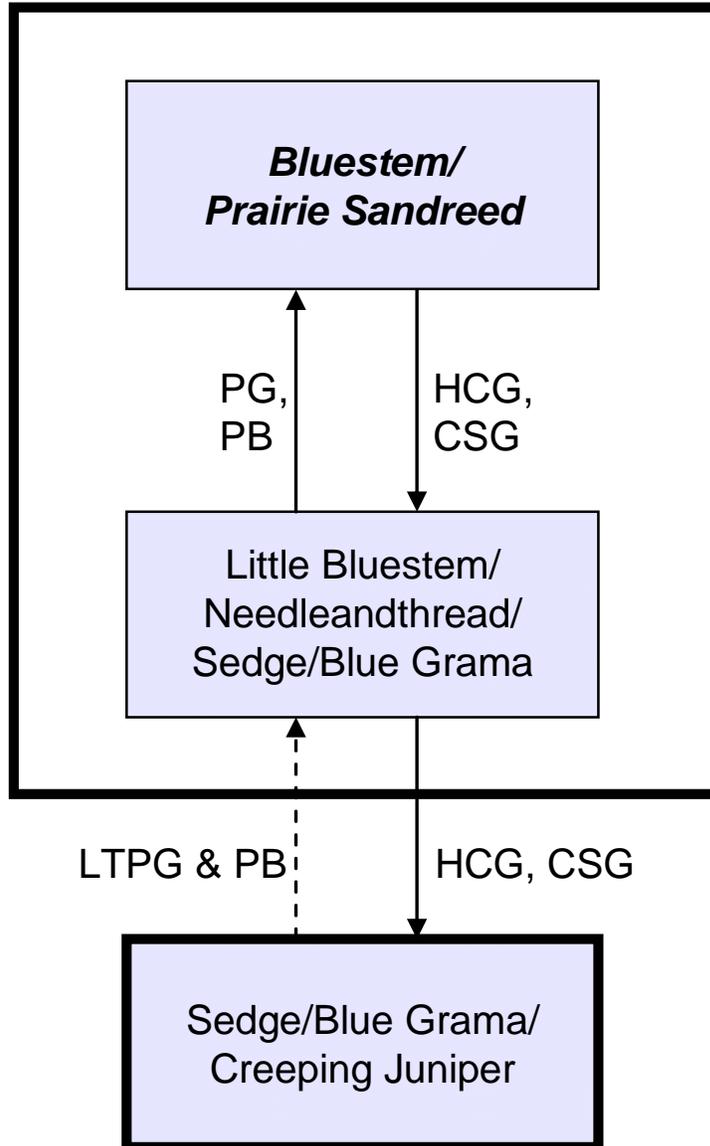
This site developed under Northern Great Plains climatic conditions, natural influences of large herbivores, occasional fire, and other biotic and abiotic factors that typically influence soil/site development. Changes will occur in the plant communities due to short-term weather variations, impacts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

Several years of continuous grazing without adequate recovery periods, following each grazing occurrence will likely cause this site to depart from the Bluestem/Prairie Sandreed Plant Community. Species such as needleandthread and little bluestem will initially increase. Sand bluestem, prairie sandreed, big bluestem, and plains muhly will decrease in frequency and production. Heavy continuous grazing causes sedge and blue grama to increase and eventually dominate and pioneer perennials, and annuals to increase.

The plant community upon which interpretations are primarily based is the Bluestem/Prairie Sandreed 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



CSG – Continuous seasonal grazing; **HCG** – Heavy continuous grazing; **LTPG** – Long-term prescribed grazing; **PB** – Prescribed burning; **PG** – Prescribed grazing.

Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SCIENTIFIC NAME	SYMBOL	Bluestem/Prairie Sandreed		
			Group	lbs./acre	% Comp
GRASSES & GRASS-LIKES				1440 - 1620	80 - 90
TALL WARM-SEASON GRASSES			1	270 - 630	15 - 35
prairie sandreed	Calamovilfa longifolia	CALO	1	180 - 450	10 - 25
big bluestem	Andropogon gerardii	ANGE	1	90 - 180	5 - 10
sand bluestem	Andropogon hallii	ANHA	1	90 - 180	5 - 10
WARM-SEASON GRASSES			2	180 - 540	10 - 30
litttle bluestem	Schizachyrium scoparium	SCSC	2	180 - 450	10 - 25
plains muhly	Muhlenbergia cuspidata	MUCU3	2	18 - 90	1 - 5
sideoats grama	Bouteloua curtipendula	BOCU	2	0 - 90	0 - 5
other perennial grasses		2GP	2	0 - 90	0 - 5
COOL-SEASON GRASSES			3	90 - 270	5 - 15
needleandthread	Hesperostipa comata ssp. comata	HECOC8	3	36 - 270	2 - 15
western wheatgrass	Pascopyrum smithii	PASM	3	36 - 270	2 - 15
prairie junegrass	Koeleria macrantha	KOMA	3	18 - 90	1 - 5
Scribner panicum	Dichanthelium oligosanthes var. scribnerianum	DIOLS	3	18 - 54	1 - 3
sixweeks fescue	Vulpia octoflora	VUOC	3	0 - 18	0 - 1
other perennial grasses		2GP	3	0 - 90	0 - 5
SHORT WARM-SEASON GRASSES			4	36 - 180	2 - 10
blue grama	Bouteloua gracilis	BOGR2	4	36 - 144	2 - 8
hairy grama	Bouteloua hirsuta	BOHI2	4	18 - 90	1 - 5
sand dropseed	Sporobolus cryptandrus	SPCR	4	0 - 54	0 - 3
red threeawn	Aristida purpurea var. longiseta	ARPUL	4	0 - 54	0 - 3
GRASS-LIKES			5	90 - 180	5 - 10
threadleaf sedge	Carex filifolia	CAFI	5	90 - 180	5 - 10
sun sedge	Carex inops ssp. heliophila	CAINH2	5	0 - 54	0 - 3
other grass-likes		2GL	5	0 - 90	0 - 5
FORBS			7	90 - 180	5 - 10
American pasqueflower	Pulsatilla patens ssp. multifida	PUPAM	7	0 - 18	0 - 1
bracted spiderwort	Tradescantia bracteata	TRBR	7	0 - 18	0 - 1
eriogonum	Eriogonum spp.	ERIOG	7	0 - 18	0 - 1
gayfeather	Liatris spp.	LIATR	7	18 - 36	1 - 2
goldenrod	Solidago spp.	SOLID	7	18 - 36	1 - 2
green sagewort	Artemisia campestris	ARCA12	7	18 - 36	1 - 2
Gunnison's mariposa lily	Calochortus gunnisonii	CAGU	7	0 - 18	0 - 1
hairy goldaster	Heterotheca villosa	HEVI4	7	18 - 36	1 - 2
Indian breadroot	Pediomelum esculentum	PEES	7	0 - 18	0 - 1
Lambert crazyweed	Oxytropis lambertii	OXLA3	7	0 - 18	0 - 1
milkvetch	Astragalus spp.	ASTRA	7	0 - 18	0 - 1
penstemon	Penstemon spp.	PENST	7	0 - 18	0 - 1
prairie coneflower	Ratibida columnifera	RACO3	7	18 - 36	1 - 2
purple coneflower	Echinacea angustifolia	ECAN2	7	18 - 36	1 - 2
purple prairie clover	Dalea purpurea	DAPU5	7	18 - 36	1 - 2
pussytoes	Antennaria spp.	ANTEN	7	0 - 18	0 - 1
rush skeletonweed	Lygodesmia juncea	LYJU	7	0 - 18	0 - 1
scarlet gaura	Gaura coccinea	GACO5	7	18 - 36	1 - 2
scarlet globemallow	Sphaeralcea coccinea	SPCO	7	0 - 18	0 - 1
scurfpea	Psoraleidium spp.	PSORA2	7	18 - 36	1 - 2
silky prairie clover	Dalea villosa	DAVI	7	18 - 36	1 - 2
spiny phlox	Phlox hoodii	PHHO	7	0 - 18	0 - 1
stiff sunflower	Helianthus pauciflorus	HEPA19	7	18 - 36	1 - 2
wavyleaf thistle	Cirsium undulatum	CIUN	7	0 - 18	0 - 1
white prairie aster	Symphyotrichum falcatum	SYFA	7	18 - 36	1 - 2
native forbs		2FN	7	18 - 90	1 - 5
SHRUBS			8	90 - 180	5 - 10
cactus	Opuntia spp.	OPUNT	8	0 - 18	0 - 1
creeping juniper	Juniperus horizontalis	JUHO2	8	18 - 36	1 - 2
dwarf false indigo	Amorpha nana	AMNA	8	18 - 36	1 - 2
fringed sagewort	Artemisia frigida	ARFR4	8	18 - 36	1 - 2
rose	Rosa spp.	ROSA5	8	18 - 54	1 - 3
skunkbush sumac	Rhus trilobata	RHTR	8	0 - 36	0 - 2
western sandcherry	Prunus pumila var. besseyi	PRPUB	8	0 - 36	0 - 2
yucca	Yucca glauca	YUGL	8	0 - 36	0 - 2
other shrubs		2SHRUB	8	18 - 90	1 - 5

Annual Production lbs./acre	LOW	RV	HIGH
GRASSES & GRASS-LIKES	1030	1530	2000
FORBS	85	135	200
SHRUBS	85	135	200
TOTAL	1200	1800	2400

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	Bluestem/Prairie Sandreed			Little Bluestem/Needleandthread/ Sedge/Blue Grama			Sedge/Blue Grama/ Creeping Juniper		
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp
GRASSES & GRASS-LIKES			1440 - 1620	80 - 90		1040 - 1170	80 - 90		675 - 765	75 - 85
TALL WARM-SEASON GRASSES		1	270 - 630	15 - 35	1	13 - 104	1 - 8	1	0 - 18	0 - 2
prairie sandreed	CALO	1	180 - 450	10 - 25	1	13 - 104	1 - 8	1	0 - 18	0 - 2
big bluestem	ANGE	1	90 - 180	5 - 10	1	0 - 26	0 - 2			
sand bluestem	ANHA	1	90 - 180	5 - 10	1	0 - 26	0 - 2			
WARM-SEASON GRASSES		2	180 - 540	10 - 30	2	130 - 325	10 - 25	2	0 - 45	0 - 5
little bluestem	SCSC	2	180 - 450	10 - 25	2	130 - 325	10 - 25	2	0 - 45	0 - 5
plains muhly	MUCU3	2	18 - 90	1 - 5	2	0 - 26	0 - 2			
sideoats grama	BOCU	2	0 - 90	0 - 5	2	0 - 26	0 - 2			
other perennial grasses	ZGP	2	0 - 90	0 - 5	2	0 - 39	0 - 3	2	0 - 18	0 - 2
COOL-SEASON GRASSES		3	90 - 270	5 - 15	3	195 - 325	15 - 25	3	18 - 90	2 - 10
needleandthread	HECOC8	3	36 - 270	2 - 15	3	130 - 260	10 - 20	3	9 - 72	1 - 8
western wheatgrass	PASM	3	36 - 270	2 - 15	3	13 - 104	1 - 8	3	0 - 45	0 - 5
prairie junegrass	KOMA	3	18 - 90	1 - 5	3	13 - 65	1 - 5	3	9 - 27	1 - 3
Scribner panicum	DIOLS	3	18 - 54	1 - 3	3	13 - 52	1 - 4	3	9 - 36	1 - 4
sixweeks fescue	VUOC	3	0 - 18	0 - 1	3	0 - 26	0 - 2	3	0 - 27	0 - 3
other perennial grasses	ZGP	3	0 - 90	0 - 5	3	0 - 52	0 - 4	3	0 - 27	0 - 3
SHORT WARM-SEASON GRASSES		4	36 - 180	2 - 10	4	130 - 260	10 - 20	4	135 - 270	15 - 30
blue grama	BOGR2	4	36 - 144	2 - 8	4	65 - 195	5 - 15	4	90 - 225	10 - 25
hairy grama	BOHI2	4	18 - 90	1 - 5	4	13 - 104	1 - 8	4	9 - 90	1 - 10
sand dropseed	SPCR	4	0 - 54	0 - 3	4	13 - 104	1 - 8	4	9 - 90	1 - 10
red threeawn	ARPUL	4	0 - 54	0 - 3	4	13 - 65	1 - 5	4	9 - 63	1 - 7
GRASS-LIKES		5	90 - 180	5 - 10	5	130 - 260	10 - 20	5	225 - 315	25 - 35
threadleaf sedge	CAFI	5	90 - 180	5 - 10	5	65 - 195	5 - 15	5	180 - 270	20 - 30
sun sedge	CAINH2	5	0 - 54	0 - 3	5	13 - 104	1 - 8	5	18 - 90	2 - 10
other grass-likes	ZGL	5	0 - 90	0 - 5	5	0 - 104	0 - 8	5	0 - 90	0 - 10
NON-NATIVE GRASSES		6			6	13 - 65	1 - 5	6	9 - 72	1 - 8
bluegrass	POA				6	0 - 65	0 - 5	6	0 - 45	0 - 5
cheatgrass	BRTE				6	13 - 65	1 - 5	6	9 - 63	1 - 7
FORBS		7	90 - 180	5 - 10	7	65 - 130	5 - 10	7	45 - 90	5 - 10
American pasqueflower	PUPAM	7	0 - 18	0 - 1						
bracted spiderwort	TRBR	7	0 - 18	0 - 1						
erigonum	ERIOG	7	0 - 18	0 - 1	7	0 - 13	0 - 1	7	0 - 9	0 - 1
gayfeather	LIATR	7	18 - 36	1 - 2	7	0 - 26	0 - 2	7	0 - 9	0 - 1
goldenrod	SOLID	7	18 - 36	1 - 2	7	13 - 39	1 - 3	7	9 - 27	1 - 3
green sagewort	ARCA12	7	18 - 36	1 - 2	7	13 - 52	1 - 4	7	9 - 45	1 - 5
Gunnison's mariposa lily	CAGU	7	0 - 18	0 - 1						
hairy goldaster	HEVI4	7	18 - 36	1 - 2	7	0 - 13	0 - 1			
Indian breadroot	PEES	7	0 - 18	0 - 1	7	0 - 13	0 - 1			
Lambert crazyweed	OXLA3	7	0 - 18	0 - 1	7	0 - 13	0 - 1	7	0 - 9	0 - 1
milkvetch	ASTRA	7	0 - 18	0 - 1	7	0 - 13	0 - 1	7	0 - 9	0 - 1
penstemon	PENST	7	0 - 18	0 - 1						
prairie coneflower	RACO3	7	18 - 36	1 - 2	7	13 - 26	1 - 2	7	0 - 9	0 - 1
purple coneflower	ECAN2	7	18 - 36	1 - 2	7	0 - 13	0 - 1			
purple prairie clover	DAPU5	7	18 - 36	1 - 2	7	0 - 26	0 - 2			
pussytoes	ANTEN	7	0 - 18	0 - 1	7	0 - 13	0 - 1	7	0 - 9	0 - 1
rush skeletonweed	LYJU	7	0 - 18	0 - 1	7	0 - 13	0 - 1	7	0 - 9	0 - 1
scarlet gaura	GACO5	7	18 - 36	1 - 2	7	0 - 13	0 - 1			
scarlet globemallow	SPCO	7	0 - 18	0 - 1	7	0 - 26	0 - 2	7	0 - 9	0 - 1
scurfpea	PSORA2	7	18 - 36	1 - 2	7	13 - 39	1 - 3	7	9 - 27	1 - 3
silky prairie clover	DAVI	7	18 - 36	1 - 2	7	0 - 13	0 - 1			
spiny phlox	PHHO	7	0 - 18	0 - 1	7	0 - 13	0 - 1	7	0 - 9	0 - 1
stiff sunflower	HEPA19	7	18 - 36	1 - 2	7	0 - 13	0 - 1			
wayleaf thistle	CIUN	7	0 - 18	0 - 1	7	0 - 13	0 - 1			
white prairie aster	SYFA	7	18 - 36	1 - 2	7	13 - 39	1 - 3	7	9 - 27	1 - 3
native forbs	ZFN	7	18 - 90	1 - 5	7	13 - 65	1 - 5	7	9 - 45	1 - 5
introduced forbs	ZFI				7	0 - 52	0 - 4	7	0 - 45	0 - 5
SHRUBS		8	90 - 180	5 - 10	8	65 - 130	5 - 10	8	45 - 135	5 - 15
cactus	OPUNT	8	0 - 18	0 - 1	8	0 - 26	0 - 2	8	0 - 27	0 - 3
creeping juniper	JUHO2	8	18 - 36	1 - 2	8	13 - 65	1 - 5	8	18 - 90	2 - 10
dwarf false indigo	AMNA	8	18 - 36	1 - 2	8	0 - 13	0 - 1			
fringed sagewort	ARFR4	8	18 - 36	1 - 2	8	13 - 65	1 - 5	8	9 - 72	1 - 8
rose	ROSA5	8	18 - 54	1 - 3	8	13 - 26	1 - 2	8	0 - 9	0 - 1
skunkbush sumac	RHTR	8	0 - 36	0 - 2	8	0 - 13	0 - 1	8	0 - 9	0 - 1
western sandcherry	PRPUB	8	0 - 36	0 - 2	8	0 - 13	0 - 1			
yucca	YUGL	8	0 - 36	0 - 2	8	0 - 39	0 - 3	8	0 - 36	0 - 4
other shrubs	ZSHRUB	8	18 - 90	1 - 5	8	0 - 52	0 - 4	8	0 - 27	0 - 3
Annual Production lbs./acre			LOW RV HIGH		LOW RV HIGH		LOW RV HIGH		LOW RV HIGH	
GRASSES & GRASS-LIKES			1030 - 1530 - 2000		780 - 1105 - 1610		420 - 743 - 1155			
FORBS			85 - 135 - 200		60 - 98 - 145		40 - 68 - 95			
SHRUBS			85 - 135 - 200		60 - 98 - 145		40 - 90 - 150			
TOTAL			1200 - 1800 - 2400		900 - 1300 - 1900		500 - 900 - 1400			

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

Bluestem/Prairie Sandreed Plant Community

The interpretive plant community for this site is the Bluestem/Prairie Sandreed Plant Community. This is also considered to be climax. This plant community can be found on areas that are properly managed with grazing and/or prescribed burning, and sometimes on areas receiving occasional short periods of deferment. The potential vegetation is about 80 to 90 percent grasses or grass-like plants, 5 to 10 percent forbs, and 5 to 10 percent shrubs. Warm-season grasses dominate this plant community. The major grasses include prairie sandreed, little bluestem, needleandthread, and western wheatgrass. Other grasses or grass-like species occurring on the site include big bluestem, sand bluestem, sedge, blue grama, prairie Junegrass, plains muhly, and sideoats grama. Significant forbs include dotted gayfeather, green sagewort, goldenrod, hairy goldaster, purple coneflower, and purple prairie clover. The significant shrubs that occur include western sandcherry, fringed sagewort, rose, dwarf false indigo, and yucca.

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). The diversity in plant species allows for high drought tolerance. This is a healthy and sustainable plant community. Moderate or high available water capacity provides a favorable soil-water-plant relationship. Overall, the interpretive plant community has the appearance of being stable, diverse, and productive. Plant litter is properly distributed with very little movement offsite and natural plant mortality is very low.

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 community pathways leading to other plant communities are as follows:

- Heavy continuous grazing or continuous seasonal grazing (grazing at the same time of year every year) will lead to the *Little Bluestem/Needleandthread/Sedge/Blue Grama Plant Community*. This occurs with exposure to herbivory during a major portion of the growing season and inadequate recovery periods after grazing occurrences.

Little Bluestem/Needleandthread/Sedge/Blue Grama Plant Community

This plant community develops under heavy continuous grazing or continuous seasonal grazing (grazing at the same time of year every year with inadequate recovery periods). The potential vegetation is made up of approximately 80 to 90 percent grasses and grass-like species, 5 to 10 percent forbs, and 5 to 10 percent shrubs. The dominant grass or grass-like species include little bluestem, needleandthread, sedge, and blue grama. Other grasses or grass-like species may include prairie sandreed, western wheatgrass, hairy grama, and sand dropseed. Significant forbs include white prairie aster, scurfpea, green sagewort, and goldenrod. The dominant shrubs that occur include yucca, creeping juniper, and fringed sagewort.

Compared to the Bluestem/Prairie Sandreed Plant Community, the shortgrass species including blue grama and threadleaf sedge have increased. The warm-season species including prairie sandreed, big bluestem, sand bluestem, plains muhly, and sideoats grama have decreased in composition. Annual bromes, bluegrass, sweetclover, and other annual grasses and forbs can invade the site. This plant community can occur in a mosaic with patchy, slightly used areas occurring adjacent to and intermingled with this plant community.

This plant community is not resistant to change. Changes in grazing management can result in a shift to another plant community. This community is fairly resilient following normal disturbances because of the high diversity of plant species and the high amount of litter. Soil erosion is low. The water cycle is functioning due to the litter cover on the soil surface. Infiltration is high because of the soil texture and surface litter.

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 community pathways leading to other plant communities are as follows:

- Prescribed grazing, which allows for adequate plant recovery periods will move this plant community to the *Bluestem/Prairie Sandreed Plant Community*.
- With continuous seasonal grazing or heavy continuous grazing, this plant community will move towards the *Sedge/Blue Grama/Creeping Juniper Plant Community*.

Sedge/Blue Grama/Creeping Juniper Plant Community

This plant community typically develops over a period of several years with heavy continuous grazing or continuous seasonal grazing (grazing at the same time of year every year for extended periods during the growing season). It is made up of approximately 75 to 85 percent grasses and grass-like species, 5 to 10 percent forbs, and 5 to 15 percent shrubs. The dominant grasses are sedge and blue grama. Significant forbs include green sagewort, scurfpea, goldenrod, and white prairie aster. Dominant shrubs in this community include creeping juniper, fringed sagewort, and yucca.

Compared to the Bluestem/Prairie Sandreed Plant Community, sedge and blue grama have greatly increased. Prairie sandreed is greatly diminished. Sand bluestem, big bluestem, and little bluestem are essentially absent. Desirable plant species have decreased.

This plant community is resistant to change due to the sod forming habit of the sedges and blue grama. The water cycle is impaired due to a reduction in litter and the potential for higher runoff and decreased infiltration. The risk for soil erosion increases.

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 community pathways leading to other plant communities are as follows:

- With long-term prescribed grazing and favorable climatic conditions, which allow for adequate plant recovery periods, this plant community may eventually shift to the *Little Bluestem/Needleandthread/Sedge/Blue Grama Plant Community*.

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, in-stream 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. Bison were historically a 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 Thin Sandy Ecological Site (ES) provides upland grassland cover with an associated forb and shrub component. It was typically part of an expansive grassland landscape that included combinations of Loamy, Shallow Loamy, Shallow Clayey, Thin Loamy, Claypan, Sands, Sandy, Sandy Claypan, Clayey, and Thin Claypan ESs. This site provided habitat for species requiring unfragmented grassland. Important habitat features include upland nesting habitat for

grassland birds, forbs and insects for brood habitat, and a forage source for small and large herbivores. Many grassland and shrub steppe nesting bird populations are declining. Extirpated species include free-ranging bison, grizzly bear, gray wolf, black-footed ferret, mountain plover, Rocky Mountain locust, and swift fox.

The majority of the Thin Sandy ES remains intact and provides increasingly important habitat for grassland nesting birds, small rodents, coyotes, and a variety of reptiles, amphibians, and insects. Invasive species such as annual brome grasses and crested wheat have impacted the biological integrity of the site for some grassland birds.

Bluestem/Prairie Sandreed: The predominance of grasses plus high diversity of forbs and shrubs in this community favors grazers and mixed-feeders, such as deer and pronghorn. Insects, such as pollinators, play a large role in maintaining the forb community and provide a forage base for grassland birds and other species. The complex plant structural diversity provides habitat for a wide array of migratory and resident birds. Grasshopper sparrow, chestnut-collared longspur, Sprague's pipit, horned lark, lark bunting, and sharp-tailed grouse are common and benefit from the structure and composition this plant community provides. Diverse prey populations are available for grassland raptors such as ferruginous hawk, Swainson's hawk, golden eagle, and prairie falcon.

The diversity of grasses, forbs, and shrubs provide high nutrition levels for small and large herbivores including voles, mice, thirteen-lined ground squirrel, white-tailed jackrabbit, and deer. The higher stature of this plant community provides thermal, protective, and escape cover for herbivores and grassland birds. Predators utilizing this plant community include coyote, American badger, red fox, and long-tailed weasel. This plant community provides habitat for herptiles such as the spade foot toad, bull snake, and western rattlesnake.

Little Bluestem/Needleandthread/Sedge/Blue Grama: Resulting from continuous seasonal and heavy continuous grazing the warm-season grass component has been substantially reduced and a shift to a medium to short height plant community occurs. The forb and shrub diversity is substantially decreased.

The predominance of grasses and the loss of forbs and shrubs in this community cause a reduction in the insect populations, such as pollinators, and reduce the value to most herbivores. Grasshopper sparrow, horned lark, lark bunting, and sharp-tailed grouse are common and benefit from the structure and composition this plant community provides. Diverse prey populations are available for grassland raptors such as ferruginous hawk, Swainson's hawk, golden eagle, and prairie falcon.

The diversity of grasses provide adequate nutrition levels for small and large herbivores including voles, mice, thirteen-lined ground squirrel, white-tailed jackrabbit, and deer. Predators utilizing this plant community include coyote, American badger, red fox, and long-tailed weasel. This plant community provides habitat for herptiles such as the spade foot toad, bull snake, and western rattlesnake.

Sedge/Blue Grama/Creeping Juniper: Resulting from heavy, continuous grazing or continuous, seasonal grazing sedges, blue grama and creeping juniper will dominate. The decrease in diversity of grasses, forbs, and shrubs will result in less seed production or lower quality nutrition for small herbivores including voles, mice, and thirteen-lined ground squirrel.

The short stature of this plant community limits suitable thermal, protective, and escape cover. Prey populations are reduced and are more vulnerable to raptor and mammalian predation. Predators utilizing this plant community include the coyote, American badger, red fox, and long-tailed weasel.

Extreme impairment of the ecological processes impacts offsite aquatic habitats through excessive runoff, nutrient, and sediment loads. Elevated surface temperatures resulting from reduced cover and litter will greatly reduce habitat for most amphibian species, grassland birds, and mammals.

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

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
Grasses and Grass-likes							
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
hairy 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
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 muhly	U U D U	U U D U	U U D U	N N N N	N N N N	U U D U	U U D U
prairie junegrass	U D U D	N D N U	U D U D	N D N U	N D N U	U D U D	U D U D
prairie sandreed	U D D U	U D U U	U D D U	U D U U	U D U U	U D D U	U D D U
red threeawn	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
sand 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
sand 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
Scribner panicum	U U D U	N U N N	U U D U	N U N N	N U N N	U U D U	U U D U
sideoats grama	U D P U	U P D U	U D P U	U P D U	U P D U	U D P U	U D P U
sixweeks fescue	N N N N	N U N N	N N N N	N U N N	N U N N	N N N N	N N N N
sun 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
threadleaf 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
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
Forbs							
American pasqueflower	N N N N	N U N N	N N N N	N U N N	N U N N	N N N N	N N N N
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
erigonum	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
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
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
Gunnison's mariposa lily	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
hairy goldaster	U U D U	N N N N	U U D U	N N N N	N N N N	U U D U	N N N N
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
Lambert crazyweed	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
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
penstemon	U U U U	U P P U	U U U U	U P P U	U P P U	U U U U	U P P 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 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
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
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
scarlet globemallow	U U D U	U D D U	U U D U	U D D U	U D D U	U U D U	U D D 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
silky 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
spiny phlox	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
stiff 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
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
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
Shrubs							
cactus	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
creeping juniper	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
dwarf false indigo	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
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
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
skunkbush sumac	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 U D
western sandcherry	D P P D	D U U D	D P P D	P U D P	D U U D	D P P D	P U U P
yucca	D N N D	D U U D	D N N D	D U U D	D U U D	D N N 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

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 Sedge/Blue Grama/Creeping Juniper 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. 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), Shallow Sandy (R058DY028SD)

Similar Sites

(R058DY010SD) – Loamy [more western wheatgrass; less needleandthread; more production]
(R058DY009SD) – Sandy [more western wheatgrass; 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: Ryan Beer, Range Management Specialist (RMS), NRCS; Stan Boltz, RMS, NRCS; Dennis

Froemke, RMS, NRCS; Cheryl Nielsen, RMS, NRCS; Jeff Printz, RMS, NRCS; Mike Stirling, RMS, NRCS; and Darrell Vanderbusch, Soil Scientist, 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 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