

United States Department of Agriculture Natural Resources Conservation Service

Ecological Site Description

Site Type: Rangeland

Site Name: Very Shallow

Site ID: R058DY016SD

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



Physiographic Features

This site occurs on moderately steep to steep uplands.

Landform: ridge, break

Aspect: N/A

	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	2,300	4,000
Slope (percent):	15	40
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 soils in this site are excessively to somewhat excessively drained and formed in colluvium or alluvium. The channery sandy loam to very gravelly loam surface layer is three to seven inches thick. The soils have a moderate infiltration rate. This site should show slight to 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. Subsurface soil layers are restrictive to water movement and root penetration.

These soils are mainly susceptible to water erosion. The hazard of water erosion increases on slopes greater than about 15 percent. Low available water capacity caused by the shallow rooting depth strongly influences the soil-water-plant relationship.

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

Parent Material Kind: colluvium, alluvium

Parent Material Origin: sandstone or siltstone

Surface Texture: loam, sandy loam

Surface Texture Modifier: channery, very gravelly

Subsurface Texture Group: loamy

Surface Fragments ≤3" (% Cover): 25-60

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

Subsurface Fragments ≤3" (% Volume): 45-90

Subsurface Fragments >3" (% Volume): 0-30

	<u>Minimum</u>	<u>Maximum</u>
Drainage Class:	somewhat excessive	excessive
Permeability Class:	moderate	moderate
Depth to Bedrock (inches):	3	10
Electrical Conductivity (mmhos/cm)*:	0	2
Sodium Absorption Ratio*:	0	0
Soil Reaction (1:1 Water)*:	6.6	8.4
Soil Reaction (0.1M CaCl₂)*:	NA	NA
Available Water Capacity (inches)*:	1	3
Calcium Carbonate Equivalent (percent)*:	0	15

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

Plant Communities

Ecological Dynamics of the Site

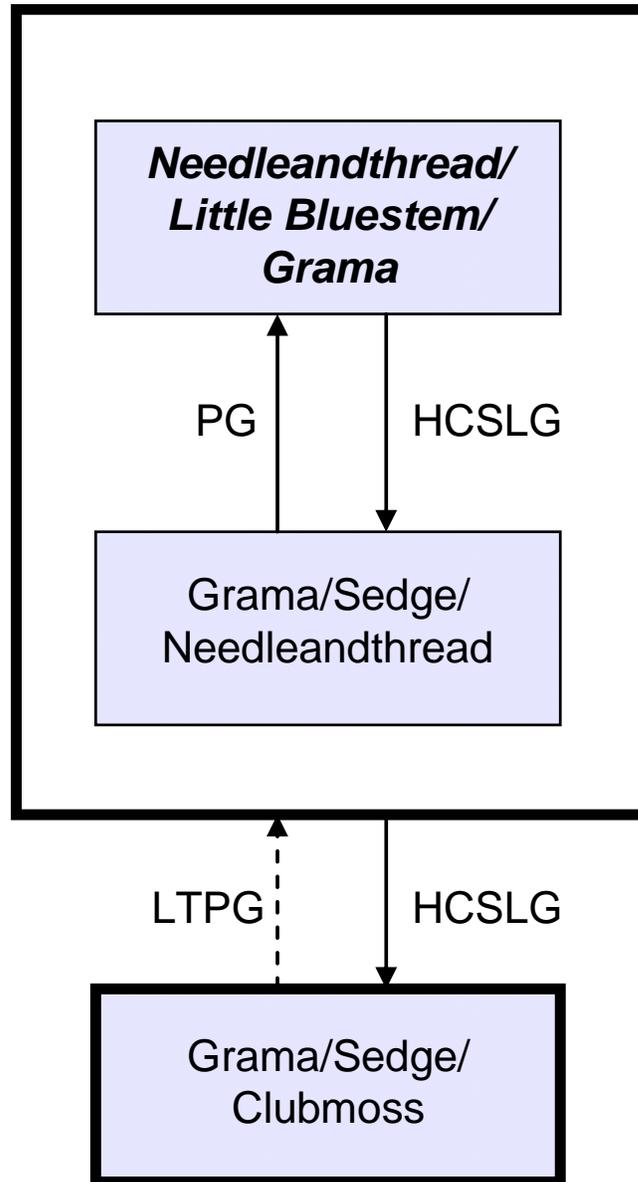
This site developed under Northern Great Plains climatic conditions, natural influences of large herbivores, occasional fire, and other biotic and abiotic factors that typically influence soil/site development. Changes will occur in the plant communities due to short-term weather variations, impacts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

Continuous grazing without adequate recovery periods following each grazing occurrence over several years causes this site to depart from the Needleandthread/Little Bluestem/Grama Plant Community. Species such as threadleaf sedge and blue grama will initially increase. Plains muhly, western wheatgrass, little bluestem, and sideoats grama will decrease in frequency and production and later disappear. Heavy continuous grazing causes blue grama and/or threadleaf sedge to dominate.

The plant community upon which interpretations are primarily based is the Needleandthread/Little Bluestem/Grama 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



HCSLG – Heavy, continuous season-long grazing; **LTPG** – Long-term prescribed grazing; **PG** – Prescribed grazing.

Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SCIENTIFIC NAME	SYMBOL	Needleandthread/Little Bluestem/Grama		
			Group	lbs./acre	% Comp
GRASSES & GRASS-LIKES				640 - 720	80 - 90
MID COOL-SEASON BUNCHGRASSES			1	120 - 200	15 - 25
needleandthread	Hesperostipa comata ssp. comata	HECOC8	1	120 - 200	15 - 25
bluebunch wheatgrass	Pseudoroegneria spicata	PSSP6	1	0 - 40	0 - 5
MID/TALL WARM-SEASON GRASSES			2	120 - 200	15 - 25
little bluestem	Schizachyrium scoparium	SCSC	2	40 - 120	5 - 15
sideoats grama	Bouteloua curtipendula	BOCU	2	16 - 80	2 - 10
plains muhly	Muhlenbergia cuspidata	MUCU3	2	16 - 64	2 - 8
prairie sandreed	Calamovilfa longifolia	CALO	2	0 - 40	0 - 5
SHORT WARM-SEASON GRASSES			3	120 - 200	15 - 25
blue grama	Bouteloua gracilis	BOGR2	3	40 - 144	5 - 18
hairy grama	Bouteloua hirsuta	BOHI2	3	8 - 40	1 - 5
threeawn	Aristida spp.	ARIST	3	8 - 40	1 - 5
buffalograss	Bouteloua dactyloides	BODA2	3	0 - 40	0 - 5
WHEATGRASSES			4	16 - 80	2 - 10
western wheatgrass	Pascopyrum smithii	PASM	4	16 - 80	2 - 10
thickspike wheatgrass	Elymus lanceolatus ssp. lanceolatus	ELLAL	4	0 - 40	0 - 5
slender wheatgrass	Elymus trachycaulus	ELTR7	4	0 - 24	0 - 3
OTHER NATIVE GRASSES			5	8 - 40	1 - 5
prairie junegrass	Koeleria macrantha	KOMA	5	8 - 32	1 - 4
sand dropseed	Sporobolus cryptandrus	SPCR	5	0 - 16	0 - 2
Sandberg bluegrass	Poa secunda	POSE	5	0 - 16	0 - 2
plains reedgrass	Calamagrostis montanensis	CAMO	5	0 - 8	0 - 1
other grasses		ZGRAM	5	0 - 24	0 - 3
GRASS-LIKES			6	40 - 80	5 - 10
threadleaf sedge	Carex filifolia	CAFI	6	40 - 80	5 - 10
other grass-likes		ZGL	6	0 - 40	0 - 5
FORBS			7	40 - 80	5 - 10
American pasqueflower	Pulsatilla patens ssp. multifida	PUPAM	7	8 - 16	1 - 2
cudweed sagewort	Artemisia ludoviciana	ARLU	7	8 - 16	1 - 2
cutleaf ironplant	Machaeranthera pinnatifida	MAPI	7	0 - 8	0 - 1
dotted gayfeather	Liatis punctata	LIPU	7	8 - 16	1 - 2
eriogonum	Eriogonum spp.	ERIOG	7	0 - 8	0 - 1
green sagewort	Artemisia campestris	ARCA12	7	8 - 24	1 - 3
hairy goldaster	Heterotheca villosa	HEVI4	7	8 - 24	1 - 3
milkvetch	Astragalus spp.	ASTRA	7	8 - 16	1 - 2
prairie coneflower	Ratibida columnifera	RACO3	7	0 - 8	0 - 1
purple coneflower	Echinacea angustifolia	ECAN2	7	0 - 16	0 - 2
purple prairie clover	Dalea purpurea	DAPU5	7	8 - 24	1 - 3
pussytoes	Antennaria spp.	ANTEN	7	8 - 16	1 - 2
rush skeletonweed	Lygodesmia juncea	LYJU	7	0 - 8	0 - 1
scarlet gaura	Gaura coccinea	GACO5	7	0 - 8	0 - 1
scarlet globemallow	Sphaeralcea coccinea	SPCO	7	0 - 8	0 - 1
spiny phlox	Phlox hoodii	PHHO	7	8 - 16	1 - 2
stemless hymenoxys	Tetranneuris acaulis var. acaulis	TEACA2	7	8 - 16	1 - 2
textile onion	Allium textile	ALTE	7	0 - 8	0 - 1
white prairie aster	Symphotrichum falcatum	SYFA	7	8 - 16	1 - 2
white prairie clover	Dalea candida	DACA7	7	0 - 8	0 - 1
native forbs		ZFN	7	0 - 32	0 - 4
SHRUBS			8	40 - 80	5 - 10
broom snakeweed	Gutierrezia sarothrae	GUSA2	8	0 - 8	0 - 1
cactus	Opuntia spp.	OPUNT	8	8 - 16	1 - 2
creeping juniper	Juniperus horizontalis	JUHO2	8	0 - 16	0 - 2
fringed sagewort	Artemisia frigida	ARFR4	8	8 - 32	1 - 4
kinnikinnick	Arctostaphylos uva-ursi	ARUV	8	0 - 16	0 - 2
rose	Rosa spp.	ROSA5	8	8 - 16	1 - 2
skunkbush sumac	Rhus trilobata	RHTR	8	0 - 16	0 - 2
yucca	Yucca glauca	YUGL	8	8 - 16	1 - 2
other shrubs		ZSHRUB	8	0 - 32	0 - 4
CRYPTOGAMS			9	0 - 8	0 - 1
clubmoss	Selaginella densa	SEDE2	9	0 - 8	0 - 1

Annual Production lbs./acre	LOW	RV	HIGH
GRASSES & GRASS-LIKES	430 -	676	-920
FORBS	35 -	60	-85
SHRUBS	35 -	60	-85
CRYPTOGAMS	0 -	4	-10
TOTAL	500 -	800	-1100

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	Needleandthread/Little Bluestem/Grama			Grama/Sedge/Needleandthread			Grama/Sedge/Clubmoss		
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp
GRASSES & GRASS-LIKES			640 - 720	80 - 90		420 - 510	70 - 85		240 - 320	60 - 80
MID COOL-SEASON BUNCHGRASS		1	120 - 200	15 - 25	1	30 - 90	5 - 15	1	0 - 20	0 - 5
needleandthread	HECOC8	1	120 - 200	15 - 25	1	30 - 90	5 - 15	1	0 - 20	0 - 5
bluebunch wheatgrass	PSSP6	1	0 - 40	0 - 5						
MID/TALL WARM-SEASON GRASS		2	120 - 200	15 - 25	2	6 - 60	1 - 10	2	0 - 20	0 - 5
little bluestem	SCSC	2	40 - 120	5 - 15	2	6 - 48	1 - 8	2	0 - 16	0 - 4
sideoats grama	BOCU	2	16 - 80	2 - 10	2	0 - 30	0 - 5	2	0 - 4	0 - 1
plains muhly	MUCU3	2	16 - 64	2 - 8	2	0 - 18	0 - 3			
prairie sandreed	CALO	2	0 - 40	0 - 5						
SHORT WARM-SEASON GRASSES		3	120 - 200	15 - 25	3	120 - 210	20 - 35	3	120 - 180	30 - 45
blue grama	BOGR2	3	40 - 144	5 - 18	3	90 - 150	15 - 25	3	100 - 160	25 - 40
hairy grama	BOHI2	3	8 - 40	1 - 5	3	6 - 60	1 - 10	3	4 - 40	1 - 10
threeawn	ARIST	3	8 - 40	1 - 5	3	6 - 60	1 - 10	3	12 - 60	3 - 15
buffalograss	BODA2	3	0 - 40	0 - 5	3	0 - 48	0 - 8	3	0 - 40	0 - 10
WHEATGRASSES		4	16 - 80	2 - 10	4	6 - 30	1 - 5	4	0 - 12	0 - 3
western wheatgrass	PASM	4	16 - 80	2 - 10	4	6 - 30	1 - 5	4	0 - 12	0 - 3
thickspike wheatgrass	ELLAL	4	0 - 40	0 - 5	4	0 - 6	0 - 1	4	0 - 4	0 - 1
slender wheatgrass	ELTR7	4	0 - 24	0 - 3						
OTHER NATIVE GRASSES		5	8 - 40	1 - 5	5	6 - 48	1 - 8	5	4 - 28	1 - 7
prairie junegrass	KOMA	5	8 - 32	1 - 4	5	6 - 30	1 - 5	5	4 - 12	1 - 3
sand dropseed	SPCR	5	0 - 16	0 - 2	5	0 - 24	0 - 4	5	0 - 12	0 - 3
Sandberg bluegrass	POSE	5	0 - 16	0 - 2	5	0 - 18	0 - 3	5	0 - 8	0 - 2
plains reedgrass	CAMO	5	0 - 8	0 - 1						
other grasses	2GRAM	5	0 - 24	0 - 3	5	0 - 18	0 - 3	5	0 - 12	0 - 3
GRASS-LIKES		6	40 - 80	5 - 10	6	60 - 120	10 - 20	6	60 - 100	15 - 25
threadleaf sedge	CAFI	6	40 - 80	5 - 10	6	60 - 120	10 - 20	6	60 - 100	15 - 25
other grass-likes	2GL	6	0 - 40	0 - 5	6	0 - 60	0 - 10	6	0 - 40	0 - 10
FORBS		7	40 - 80	5 - 10	7	30 - 90	5 - 15	7	40 - 80	10 - 20
American pasqueflower	PUPAM	7	8 - 16	1 - 2	7	0 - 6	0 - 1			
cudweed sagewort	ARLU	7	8 - 16	1 - 2	7	6 - 30	1 - 5	7	4 - 28	1 - 7
cutleaf ironplant	MAPI	7	0 - 8	0 - 1	7	0 - 6	0 - 1			
dotted gayfeather	LIPU	7	8 - 16	1 - 2	7	0 - 6	0 - 1			
erigonum	ERIOG	7	0 - 8	0 - 1	7	0 - 6	0 - 1	7	0 - 4	0 - 1
green sagewort	ARCA12	7	8 - 24	1 - 3	7	6 - 30	1 - 5	7	4 - 32	1 - 8
hairy goldaster	HEVI4	7	8 - 24	1 - 3	7	0 - 12	0 - 2			
milkvetch	ASTRA	7	8 - 16	1 - 2	7	6 - 12	1 - 2	7	4 - 8	1 - 2
prairie coneflower	RACO3	7	0 - 8	0 - 1						
purple coneflower	ECAN2	7	0 - 16	0 - 2	7	0 - 6	0 - 1			
purple prairie clover	DAPU5	7	8 - 24	1 - 3	7	6 - 12	1 - 2	7	0 - 4	0 - 1
pussytoes	ANTEN	7	8 - 16	1 - 2	7	6 - 12	1 - 2	7	4 - 8	1 - 2
rush skeletonweed	LYJU	7	0 - 8	0 - 1	7	0 - 6	0 - 1	7	0 - 4	0 - 1
scarlet gaura	GACO5	7	0 - 8	0 - 1						
scarlet globemallow	SPCO	7	0 - 8	0 - 1	7	0 - 6	0 - 1	7	0 - 4	0 - 1
spiny phlox	PHHO	7	8 - 16	1 - 2	7	6 - 12	1 - 2	7	4 - 12	1 - 3
stemless hymenoxys	TEACA2	7	8 - 16	1 - 2	7	0 - 6	0 - 1			
textile onion	ALTE	7	0 - 8	0 - 1	7	0 - 6	0 - 1			
white prairie aster	SYFA	7	8 - 16	1 - 2	7	6 - 24	1 - 4	7	4 - 20	1 - 5
white prairie clover	DACA7	7	0 - 8	0 - 1						
native forbs	2FN	7	0 - 32	0 - 4	7	0 - 30	0 - 5	7	0 - 20	0 - 5
introduced forbs	2FI				7	0 - 30	0 - 5	7	0 - 20	0 - 5
SHRUBS		8	40 - 80	5 - 10	8	30 - 90	5 - 15	8	20 - 60	5 - 15
broom snakeweed	GUSA2	8	0 - 8	0 - 1	8	6 - 18	1 - 3	8	4 - 20	1 - 5
cactus	OPUNT	8	8 - 16	1 - 2	8	6 - 18	1 - 3	8	4 - 12	1 - 3
creeping juniper	JUHO2	8	0 - 16	0 - 2	8	0 - 18	0 - 3	8	0 - 12	0 - 3
fringed sagewort	ARFR4	8	8 - 32	1 - 4	8	12 - 48	2 - 8	8	8 - 40	2 - 10
kinnikinnick	ARUV	8	0 - 16	0 - 2	8	0 - 12	0 - 2			
rose	ROSA5	8	8 - 16	1 - 2	8	6 - 18	1 - 3	8	0 - 4	0 - 1
skunkbush sumac	RHTR	8	0 - 16	0 - 2	8	0 - 12	0 - 2			
yucca	YUGL	8	8 - 16	1 - 2	8	6 - 18	1 - 3	8	0 - 16	0 - 4
other shrubs	2SHRUB	8	0 - 32	0 - 4	8	0 - 24	0 - 4	8	0 - 16	0 - 4
CRYPTOGAMS		9	0 - 8	0 - 1	9	6 - 18	1 - 3	9	4 - 20	1 - 5
clubmoss	SEDE2	9	0 - 8	0 - 1	9	6 - 18	1 - 3	9	4 - 20	1 - 5
Annual Production lbs./acre			LOW RV HIGH		LOW RV HIGH		LOW RV HIGH		LOW RV HIGH	
GRASSES & GRASS-LIKES			430 - 676 - 920		350 - 468 - 690		200 - 288 - 425			
FORBS			35 - 60 - 85		25 - 60 - 95		35 - 60 - 85			
SHRUBS			35 - 60 - 85		25 - 60 - 95		15 - 40 - 65			
CRYPTOGAMS			0 - 4 - 10		0 - 12 - 20		0 - 12 - 25			
TOTAL			500 - 800 - 1100		400 - 600 - 900		250 - 400 - 600			

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.

Needleandthread/Little Bluestem/Grama Plant Community

The plant community upon which interpretations are primarily based is the Needleandthread/Little Bluestem/Grama Plant Community. This is also considered to be climax. This plant community can be found on areas that are properly managed with prescribed grazing that allows for proper utilization, changes in season of use and adequate recovery periods following each grazing event.

The potential vegetation is about 80 to 90 percent grass or grass-like species, 5 to 10 percent forbs, 5 to 10 percent shrubs, and 0 to 1 percent cryptogams. An even mix of both warm- and cool-season species dominates this plant community. The major grasses include needleandthread, little bluestem, and blue grama. Other grasses occurring on the site include sideoats grama, western wheatgrass, and threadleaf sedge. The significant forbs include gayfeather, purple coneflower, prairie clover, and cutleaf ironplant. Significant shrubs are fringed sagewort, rose, skunkbush sumac, 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). Community dynamics, nutrient cycle, water cycle, and energy flow are functioning at the sites potential. Plant litter is properly distributed with some movement offsite and natural plant mortality is low. The diversity in plant species allows for high drought tolerance.

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

- Heavy, continuous season long grazing will convert the plant community to the *Grama/Sedge/Needleandthread Plant Community*.

Grama/Sedge/Needleandthread Plant Community

This plant community typically develops over a period of several years with heavy continuous season-long grazing. It is made up of approximately 70 to 85 percent grass and grass-like species, 5 to 15 percent forbs, 5 to 15 percent shrubs, and 1 to 3 percent cryptogams. The dominant grasses are blue grama, threadleaf sedge, and needleandthread. Significant forbs include cudweed sagewort, green

sagewort, and white prairie aster. Dominant shrubs in include fringed sagewort, yucca, and broom snakeweed.

Compared to the Needleandthread/Little Bluestem/Grama Plant Community, blue grama and sedge have greatly increased. Little bluestem, sideoats grama, plains muhly, and western wheatgrass are greatly diminished. Desirable plant species have decreased. This plant community is not resistant to change due to the higher percentage of bare ground. 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 pathways leading to other plant communities are as follows:

- With prescribed grazing and favorable climatic conditions, this plant community can shift to the *Needleandthread/Little Bluestem/Grama Plant Community*.

Grama/Sedge/Clubmoss Plant Community

This plant community can develop from the adverse effects of heavy, continuous season-long grazing. Short grasses/grass-likes and forbs increase to dominate the site and annual production decreases dramatically. Lack of litter and short plant heights result in higher soil temperatures, poor water infiltration rates, and higher evaporation, which gives blue grama and sedges a competitive advantage over cool- and warm-season mid-grasses. Clubmoss, while not dominant by weight, forms an extensive mat, and restricts infiltration. Other grasses may include hairy grama, threeawn, buffalograss, and little bluestem. Significant forbs include green sagewort and cudweed sagewort. The significant shrubs include broom snakeweed, cactus, and fringed sagewort. This plant community is relatively stable. The competitive advantage of blue grama, threadleaf sedge, and clubmoss prevents other species from establishing. This plant community is less productive than the Needleandthread/Little Bluestem/Grama Plant Community. Runoff increases and infiltration has decreased. Soil erosion does not increase appreciably.

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

Growth curve number: SD6003

Growth curve name: Pierre Shale 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:

- Long-term prescribed grazing may eventually shift this plant community back to the *Grama/Sedge/Needleandthread Plant Community*.

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

Major Land Resource Area 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 Very Shallow 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 Very Shallow ES remains intact and provides increasingly important habitat for grassland nesting birds, small rodents, coyotes, and a variety of reptiles, amphibians, and insects.

Needleandthread/Little Bluestem/Grama: The predominance of grasses in this community favors herbivores. Insects, such as pollinators, play a role in maintaining the forb community and provide a forage base for grassland birds and other species. The 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 and forbs provide high nutrition levels for small and large herbivores including voles, mice, thirteen-lined ground squirrel, and white-tailed jackrabbit. This plant community provides

adequate 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.

Gramma/Sedge/Needleandthread: Resulting from heavy, continuous season-long grazing the warm-season grass component has been substantially reduced and a shift to a short to medium height plant community occurs. The forb diversity is substantially decreased.

The predominance of short grass and grass-like species and the loss of forbs in this community cause a reduction in 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.

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Gramma/Sedge/Clubmoss: This plant community develops under heavy, continuous season-long grazing. The forb diversity has decreased. Species such as the horned lark, upland sandpiper, and white-tailed jackrabbit will increase due to shrub loss. Species such as Brewer's sparrow, greater sage-grouse, as well as, desert cottontail will rarely use this site.

The short stature of this plant community limits thermal, protective, and escape cover. Prey populations are reduced but are more vulnerable to predation by raptors and mammalian predators. 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							
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
bluebunch wheatgrass	U P D D	P P P P	U P D D	D D D D	D D D D	U P D D	U P D D
buffalograss	U U D U	N U D U	U U D U	N U D U	N U D U	U U D U	U U D 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
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
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
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
Sandberg bluegrass	N U N N	N D N N	N U N N	N D N N	N D N N	N U N N	N U N N
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
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
thickspike wheatgrass	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
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
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
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
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
cutleaf ironplant	U U U U	N U N N	U U U U	N U N N	N U N N	U U U U	N U N N
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
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
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
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
milkvetch	U U U U	U D U U	U U U U	U D U U	U D U U	U U U U	U D U U
prairie coneflower	U U D U	U P P U	U U D U	U P P U	U P P U	U U D U	U P P U
purple 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 N N	U U U U	N U N N	N U N N	U U U U	N U N 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
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
stemless hymenoxys	U U U U	N U N N	U U U U	N U N N	N U N N	U U U U	N U N N
textile onion	U D U U	U D D U	U D U U	U D D U	U D D U	U D U U	U D D U
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
white prairie clover	U D P U	U P P U	U D P U	U P P U	U P P U	U D P U	U P P U
Shrubs and Cryptogams							
broom snakeweed	N N N N	U U U U	N N N N	U U U U	U U U U	N N N N	U U U U
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
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
kinnikinnick	N N N N	D U D P	N N N N	D U D P	D U U D	N N N N	D U D P
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
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
clubmoss	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

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 Grama/Sedge/Clubmoss 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

Shallow Loamy (R058DY024SD), Sandy (R058DY009SD), Shallow Sandy (R058DY028SD)

Similar Sites

(R058DY010SD) – Shallow Loamy [less needleandthread; more production]

(R058DY028SD) – Shallow Sandy [more prairie sandreed; 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; Chuck Berdan, Biologist (BIO),

Bureau of Land Management (BLM); Stan Boltz, RMS, NRCS; Dave Dewald, Wildlife BIO, NRCS; Jody Forman, RMS, NRCS; Dennis Froemke, RMS, NRCS; Tom Juntti, BIO, United States Forest Service (USFS); Cheryl Nielsen, RMS, NRCS; Jeff Printz, RMS, NRCS; Mike Stirling, RMS, NRCS; Dan Svingen, BIO, USFS; Darrell Vanderbusch, Soil Scientist, NRCS; Cindy Zachmeier, BIO, NRCS; and Tim Zachmeier, BIO, BLM.

<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