

United States Department of Agriculture Natural Resources Conservation Service

Ecological Site Description

Site Type: Rangeland

Site Name: Shallow Loamy

Site ID: R058DY024SD

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



Physiographic Features

This site occurs on moderately steep to steep uplands.

Landform: hill, ridge

Aspect: N/A

	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	2,300	4,000
Slope (percent):	5	48
Water Table Depth (inches):	None	None
Flooding:		
Frequency:	None	None
Duration:	None	None
Ponding:		
Depth (inches):	None	None
Frequency:	None	None
Duration:	None	None
Runoff Class:	Low	High

Climatic Features

The climate in this MLRA is typical of the drier portions of the Northern Great Plains where sagebrush steppes to the west yield to grassland 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 occasional strong storms may bring brief periods of high winds with gusts to more

than 50 mph.

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

	<u>Minimum</u>	<u>Maximum</u>
Frost-free period (days):	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 common features of soils in this site are the loam to silty clay loam textured substratum and slopes of 5 to 48 percent. The soils in this site are well-drained and formed in residuum from sandstone or siltstone. The silt loam to loam surface layer is four to six inches thick. The soils have a moderately slow 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.

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 coupled with high accumulations of lime and slow permeability strongly influences the soil-water-plant relationship. Loss of the soil surface

layer 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 or siltstone
Surface Texture: loam, silt loam
Surface Texture Modifier: none
Subsurface Texture Group: loamy
Surface Fragments ≤ 3” (% Cover): 10-15
Surface Fragments > 3” (%Cover): 0-45
Subsurface Fragments ≤ 3” (% Volume): 10-15
Subsurface Fragments > 3” (% Volume): 0-5

	<u>Minimum</u>	<u>Maximum</u>
Drainage Class:	well	well
Permeability Class:	moderately slow	moderately slow
Depth to Bedrock (inches):	10	20
Electrical Conductivity (mmhos/cm)*:	0	8
Sodium Absorption Ratio*:	0	2
Soil Reaction (1:1 Water)*:	6.6	8.4
Soil Reaction (0.1M CaCl2)*:	NA	NA
Available Water Capacity (inches)*:	1	2
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.

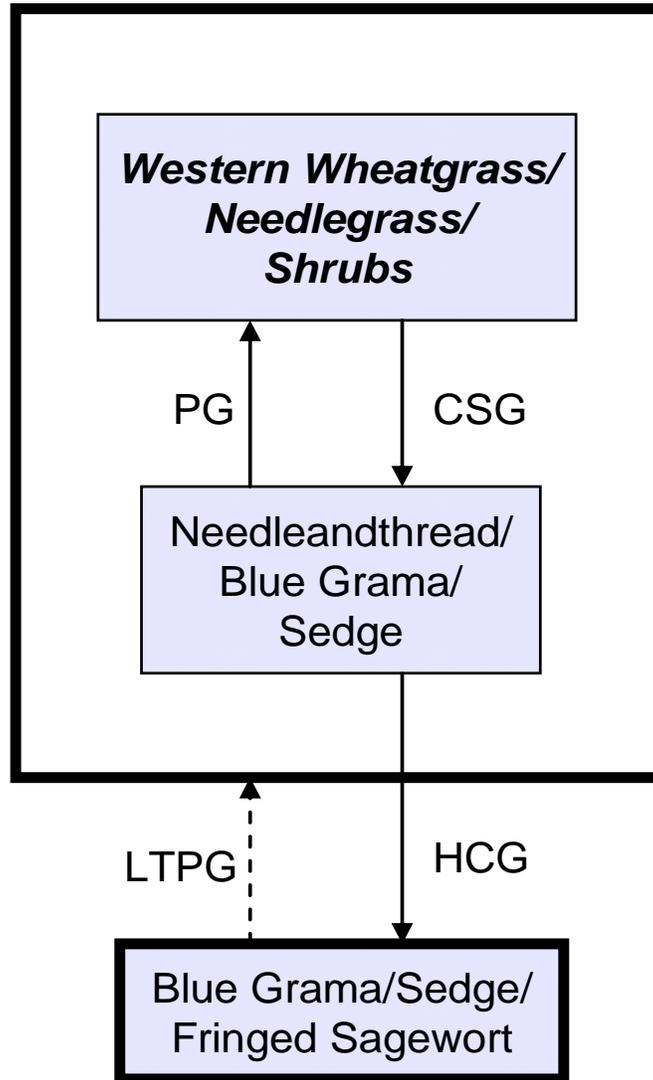
The plant community upon which interpretations are primarily based is the Western Wheatgrass/Needlegrass/Shrubs Plant Community. This plant community has been determined by studying rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. 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.

Heavy continuous grazing and/or continuous seasonal (spring) grazing, without adequate recovery periods following each grazing occurrence causes this site to depart from the Western Wheatgrass/Needlegrass/Shrubs Plant Community. Blue grama will begin to increase. Western wheatgrass will increase initially and then begin to decrease. Green needlegrass will decrease in frequency and production. In time, heavy continuous grazing will likely cause upland sedges and blue grama to dominate. This resulting plant community is relatively stable and the competitive advantage prevents other species from establishing. This plant community is less productive than the Western

Wheatgrass/Needlegrass/Shrubs Plant Community. Runoff increases and infiltration will decrease. Soil erosion will be minimal.

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;
PG – Prescribed grazing.

Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SCIENTIFIC NAME	SYMBOL	Western Wheatgrass/ Needlegrass/Shrubs		
			Group	lbs./acre	% Comp
GRASSES & GRASS-LIKES				980 - 1190	70 - 85
RHIZOMATOUS WHEATGRASSES			1	210 - 350	15 - 25
western wheatgrass	Pascopyrum smithii	PASM	1	210 - 350	15 - 25
thickspike wheatgrass	Elymus lanceolatus ssp. lanceolatus	ELLAL	1	0 - 70	0 - 5
COOL-SEASON BUNCHGRASSES			2	70 - 280	5 - 20
needleandthread	Hesperostipa comata ssp. comata	HECOC8	2	28 - 210	2 - 15
green needlegrass	Nassella viridula	NAV14	2	28 - 140	2 - 10
slender wheatgrass	Elymus trachycaulus	ELTR7	2	14 - 70	1 - 5
bluebunch wheatgrass	Pseudoroegneria spicata	PSSP6	2	0 - 42	0 - 3
MD & TALL WARM-SEASON GRASSES			3	70 - 210	5 - 15
little bluestem	Schizachyrium scoparium	SCSC	3	70 - 210	5 - 15
plains muhly	Muhlenbergia cuspidata	MUCU3	3	14 - 112	1 - 8
big bluestem	Andropogon gerardii	ANGE	3	0 - 70	0 - 5
prairie sandreed	Calamovilfa longifolia	CALO	3	0 - 70	0 - 5
SHORT WARM-SEASON GRASSES			4	70 - 140	5 - 10
blue grama	Bouteloua gracilis	BOGR2	4	70 - 140	5 - 10
threeawn	Aristida spp.	ARIST	4	0 - 14	0 - 1
OTHER NATIVE GRASSES			5	14 - 70	1 - 5
prairie junegrass	Koeleria macrantha	KOMA	5	14 - 70	1 - 5
plains reedgrass	Calamagrostis montanensis	CAMO	5	0 - 28	0 - 2
Sandberg bluegrass	Poa secunda	POSE	5	0 - 28	0 - 2
other grasses		2GRAM	5	0 - 70	0 - 5
GRASS-LIKES			6	70 - 210	5 - 15
threadleaf sedge	Carex filifolia	CAFI	6	28 - 140	2 - 10
needleleaf sedge	Carex duriuscula	CADU6	6	14 - 112	1 - 8
sun sedge	Carex inops ssp. heliophila	CAINH2	6	0 - 42	0 - 3
FORBS			8	70 - 270	5 - 15
American pasqueflower	Pulsatilla patens ssp. multifida	PUPAM	8	0 - 14	0 - 1
American vetch	Vicia americana	VIAM	8	14 - 28	1 - 2
cudweed sagewort	Artemisia ludoviciana	ARLU	8	14 - 42	1 - 3
cutleaf ironplant	Machaeranthera pinnatifida	MAPI	8	0 - 14	0 - 1
deervetch	Lotus unifoliolatus var. unifoliolatus	LOUNU	8	0 - 14	0 - 1
dotted gayfeather	Liatris punctata	LIPU	8	14 - 42	1 - 3
eriogonum	Eriogonum spp.	ERIOG	8	0 - 42	0 - 3
goldenrod	Solidago spp.	SOLID	8	14 - 42	1 - 3
Lambert crazyweed	Oxytropis lambertii	OXLA3	8	0 - 14	0 - 1
milkvetch	Astragalus spp.	ASTRA	8	14 - 28	1 - 2
penstemon	Penstemon spp.	PENST	8	0 - 28	0 - 2
prairie coneflower	Ratibida columnifera	RACO3	8	0 - 14	0 - 1
prairie smoke	Geum triflorum	GETR	8	0 - 14	0 - 1
purple coneflower	Echinacea angustifolia	ECAN2	8	14 - 70	1 - 5
purple prairie clover	Dalea purpurea	DAPU5	8	14 - 28	1 - 2
pussytoes	Antennaria spp.	ANTEN	8	0 - 14	0 - 1
rush skeletonweed	Lygodesmia juncea	LYJU	8	0 - 14	0 - 1
scarlet gaura	Gaura coccinea	GACO5	8	14 - 28	1 - 2
scarlet globemallow	Sphaeralcea coccinea	SPCO	8	0 - 14	0 - 1
scurfpea	Psoraleum spp.	PSORA2	8	14 - 28	1 - 2
spiny phlox	Phlox hoodii	PHHO	8	0 - 14	0 - 1
stemless hymenoxys	Tetaneuris acaulis var. acaulis	TEACA2	8	0 - 14	0 - 1
wavyleaf thistle	Cirsium undulatum	CIUN	8	14 - 28	1 - 2
western yarrow	Achillea millefolium var. occidentalis	ACMIO	8	0 - 14	0 - 1
white prairie aster	Symphotrichum falcatum	SYFA	8	0 - 14	0 - 1
woolly Indianwheat	Plantago patagonica	PLPA2	8	0 - 14	0 - 1
native forbs		2FN	8	14 - 42	1 - 3
SHRUBS			9	140 - 270	10 - 15
big sagebrush	Artemisia tridentata	ARTR2	9	0 - 70	0 - 5
creeping juniper	Juniperus horizontalis	JUHO2	9	0 - 14	0 - 1
dwarf false indigo	Amorpha nana	AMNA	9	0 - 42	0 - 3
fringed sagewort	Artemisia frigida	ARFR4	9	14 - 28	1 - 2
plains pricklypear	Opuntia polyacantha	OPPO	9	14 - 28	1 - 2
prairie rose	Rosa arkansana	ROAR3	9	14 - 42	1 - 3
silver sagebrush	Artemisia cana	ARCA13	9	0 - 70	0 - 5
skunkbush sumac	Rhus trilobata	RHTR	9	14 - 112	1 - 8
western snowberry	Symphoricarpos occidentalis	SYOC	9	0 - 28	0 - 2
yucca	Yucca glauca	YUGL	9	0 - 70	0 - 5
other shrubs		2SHRUB	9	14 - 42	1 - 3
CRYPTOGAMS			10	0 - 14	0 - 1
clubmoss	Selaginella densa	SEDE2	10	0 - 14	0 - 1

Annual Production lbs./acre		LOW	RV	HIGH
GRASSES & GRASS-LIKES		710 -	1078	- 1405
FORBS		85 -	140	- 240
SHRUBS		125 -	175	- 240
CRYPTOGAMS		0 -	7	- 15
TOTAL		900 -	1400	- 1900

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	Western Wheatgrass/ Needlegrass/Shrubs			Needleandthread/ Blue Grama/Sedge			Blue Grama/Sedge/ Fringed Sagewort		
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp
GRASSES & GRASS-LIKES			980 - 1190	70 - 85		660 - 880	60 - 80		520 - 720	65 - 90
RHIZOMATOUS WHEATGRASSES		4	210 - 350	15 - 25	4	22 - 110	2 - 10	4	0 - 40	0 - 5
western wheatgrass	PASM	1	210 - 350	15 - 25	1	22 - 110	2 - 10	1	0 - 40	0 - 5
thickspike wheatgrass	ELLAL	1	0 - 70	0 - 5	1	0 - 55	0 - 5	1	0 - 24	0 - 3
COOL-SEASON BUNCHGRASSES		2	70 - 350	5 - 25	2	110 - 220	10 - 20	2	0 - 80	0 - 10
needleandthread	HECOC8	2	28 - 210	2 - 15	2	110 - 220	10 - 20	2	0 - 80	0 - 10
green needlegrass	NAV14	2	28 - 140	2 - 10	2	0 - 55	0 - 5			
slender wheatgrass	ELTR7	2	14 - 70	1 - 5	2	0 - 11	0 - 1			
bluebunch wheatgrass	PSSP6	2	0 - 42	0 - 3						
MID/TALL WARM-SEASON GRASSES		3	70 - 210	5 - 15	3	11 - 55	1 - 5	3		
little bluestem	SCSC	3	70 - 210	5 - 15	3	11 - 55	1 - 5			
plains muhly	MUCU3	3	14 - 112	1 - 8	3	0 - 33	0 - 3			
big bluestem	ANGE	3	0 - 70	0 - 5						
prairie sandreed	CALO	3	0 - 70	0 - 5						
SHORT WARM-SEASON GRASSES		4	70 - 140	5 - 10	4	110 - 220	10 - 20	4	160 - 240	20 - 30
blue grama	BOGR2	4	70 - 140	5 - 10	4	110 - 220	10 - 20	4	160 - 240	20 - 30
threeawn	ARIST	4	0 - 14	0 - 1	4	11 - 44	1 - 4	4	8 - 56	1 - 7
OTHER NATIVE GRASSES		5	14 - 70	1 - 5	5	11 - 55	1 - 5	5	8 - 40	1 - 5
prairie junegrass	KOMA	5	14 - 70	1 - 5	5	11 - 33	1 - 3	5	8 - 16	1 - 2
plains reedgrass	CAMO	5	0 - 28	0 - 2	5	0 - 11	0 - 1			
Sandberg bluegrass	POSE	5	0 - 28	0 - 2	5	0 - 33	0 - 3	5	0 - 16	0 - 2
other grasses	2GRAM	5	0 - 70	0 - 5	5	0 - 55	0 - 5	5	0 - 40	0 - 5
GRASS-LIKES		6	70 - 140	5 - 10	6	55 - 165	5 - 15	6	120 - 240	15 - 30
threadleaf sedge	CAFI	6	28 - 140	2 - 10	6	55 - 165	5 - 15	6	80 - 200	10 - 25
needleleaf sedge	CADU6	6	14 - 112	1 - 8	6	22 - 110	2 - 10	6	40 - 120	5 - 15
sun sedge	CAINH2	6	0 - 42	0 - 3	6	0 - 55	0 - 5	6	0 - 64	0 - 8
NON-NATIVE GRASSES		7			7	11 - 55	1 - 5	7	8 - 40	1 - 5
bluegrass	POA				7	11 - 55	1 - 5	7	8 - 40	1 - 5
cheatgrass	BRTE				7	11 - 55	1 - 5	7	8 - 40	1 - 5
FORBS		8	70 - 210	5 - 15	8	55 - 165	5 - 15	8	40 - 80	5 - 10
American pasqueflower	PUPAM	8	0 - 14	0 - 1						
American vetch	VIAM	8	14 - 28	1 - 2	8	0 - 11	0 - 1			
cutleaf ironplant	MAPI	8	0 - 14	0 - 1	8	0 - 11	0 - 1			
deervetch	LOUNU	8	0 - 14	0 - 1						
dotted gayfeather	LIPU	8	14 - 42	1 - 3	8	11 - 22	1 - 2	8	0 - 8	0 - 1
erigonum	ERIOG	8	0 - 42	0 - 3	8	0 - 22	0 - 2	8	0 - 8	0 - 1
goldenrod	SOLID	8	14 - 42	1 - 3	8	11 - 44	1 - 4	8	8 - 32	1 - 4
Lambert crazyweed	OXLA3	8	0 - 14	0 - 1	8	0 - 11	0 - 1			
milkvetch	ASTRA	8	14 - 28	1 - 2	8	0 - 11	0 - 1			
penstemon	PENST	8	0 - 28	0 - 2						
prairie coneflower	RACO3	8	0 - 14	0 - 1	8	0 - 11	0 - 1			
prairie smoke	GETR	8	0 - 14	0 - 1						
purple coneflower	ECAN2	8	14 - 70	1 - 5	8	0 - 33	0 - 3	8	0 - 8	0 - 1
purple prairie clover	DAPU5	8	14 - 28	1 - 2	8	0 - 11	0 - 1			
pussytoes	ANTEN	8	0 - 14	0 - 1	8	0 - 11	0 - 1	8	0 - 8	0 - 1
rush skeletonweed	LYJU	8	0 - 14	0 - 1	8	0 - 11	0 - 1	8	0 - 8	0 - 1
scarlet gaura	GACO5	8	14 - 28	1 - 2	8	0 - 11	0 - 1			
scarlet globemallow	SPCO	8	0 - 14	0 - 1	8	0 - 11	0 - 1	8	0 - 8	0 - 1
scurfpea	PSORA2	8	14 - 28	1 - 2	8	11 - 33	1 - 3	8	8 - 24	1 - 3
spiny phlox	PHHO	8	0 - 14	0 - 1	8	0 - 11	0 - 1	8	0 - 8	0 - 1
stemless hymenoxys	TEACA2	8	0 - 14	0 - 1	8	0 - 11	0 - 1			
wayleaf thistle	CIUN	8	14 - 28	1 - 2	8	0 - 22	0 - 2	8	0 - 16	0 - 2
western yarrow	ACMIO	8	0 - 14	0 - 1	8	11 - 22	1 - 2	8	8 - 32	1 - 4
white prairie aster	SYFA	8	0 - 14	0 - 1	8	0 - 11	0 - 1			
woolly Indianwheat	PLPA2	8	0 - 14	0 - 1	8	0 - 11	0 - 1	8	0 - 8	0 - 1
native forbs	2FN	8	14 - 42	1 - 3	8	11 - 22	1 - 2	8	8 - 16	1 - 2
introduced forbs	2FI				8	0 - 33	0 - 3	8	0 - 32	0 - 4
SHRUBS		9	140 - 210	10 - 15	9	110 - 220	10 - 20	9	40 - 120	5 - 15
big sagebrush	ARTR2	9	0 - 70	0 - 5	9	0 - 77	0 - 7	9	0 - 32	0 - 4
creeping juniper	JUHO2	9	0 - 14	0 - 1	9	0 - 22	0 - 2	9	0 - 24	0 - 3
dwarf false indigo	AMNA	9	0 - 42	0 - 3	9	0 - 11	0 - 1			
fringed sagewort	ARFR4	9	14 - 28	1 - 2	9	11 - 55	1 - 5	9	24 - 80	3 - 10
plains pricklypear	OPPO	9	14 - 28	1 - 2	9	11 - 33	1 - 3	9	8 - 24	1 - 3
prairie rose	ROAR3	9	14 - 42	1 - 3	9	11 - 22	1 - 2	9	8 - 16	1 - 2
silver sagebrush	ARCA13	9	0 - 70	0 - 5	9	0 - 77	0 - 7	9	0 - 32	0 - 4
skunkbush sumac	RHTR	9	14 - 112	1 - 8	9	11 - 55	1 - 5	9	0 - 24	0 - 3
western snowberry	SYOC	9	0 - 28	0 - 2	9	0 - 33	0 - 3	9	0 - 16	0 - 2
yucca	YUGL	9	0 - 70	0 - 5	9	0 - 66	0 - 6	9	0 - 40	0 - 5
other shrubs	2SHRUB	9	14 - 42	1 - 3	9	11 - 44	1 - 4	9	8 - 40	1 - 5
TREES		10	0 - 14	0 - 1	10	11 - 44	1 - 4	10	8 - 56	1 - 7
clubmoss	SEDE2	10	0 - 14	0 - 1	10	11 - 44	1 - 4	10	8 - 56	1 - 7
Annual Production lbs./acre			LOW RV HIGH		LOW RV HIGH		LOW RV HIGH		LOW RV HIGH	
GRASSES & GRASS-LIKES			710 - 1078 - 1405		545 - 798 - 1020		325 - 628 - 925			
FORBS			85 - 140 - 240		50 - 110 - 185		35 - 60 - 85			
SHRUBS			125 - 175 - 240		100 - 165 - 250		35 - 80 - 130			
TREES			0 - 7 - 15		5 - 28 - 45		5 - 32 - 60			
TOTAL			900 - 1400 - 1900		700 - 1100 - 1500		400 - 800 - 1200			

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.

Western Wheatgrass/Needlegrass/Shrubs Plant Community

The interpretive plant community for this site is the Western Wheatgrass/Needlegrass/Shrubs 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 70-85 percent grasses or grass-like plants, 5-15 percent forbs, 10-15 percent shrubs, and 0-1 percent cryptogams. Cool-season grasses dominate this plant community. The major grasses include western wheatgrass, green needlegrass, and needleandthread. Other grasses or grass-likes occurring on the site include blue grama, big bluestem, prairie Junegrass, buffalograss, and sedge. Significant forbs include scarlet globemallow, prairie coneflower, purple prairie clover, penstemon, American vetch, and green sagewort. The significant shrubs that occur include big sagebrush, leadplant, snowberry, winterfat, and rose.

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: SD5802

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

Growth curve description: Cool-season dominant, warm-season subdominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	10	23	34	15	6	5	4	0	0

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

- Continuous seasonal grazing will lead to the *Needleandthread/Blue Grama/Sedge Plant Community*. This occurs with exposure to herbivory during the entire growing season at moderate stocking rates.

Needleandthread/Blue Grama/Sedge Plant Community

This plant community develops under continuous seasonal grazing (i.e., grazing an area during the same season every year) or from over utilization during extended drought periods. The potential vegetation is made up of approximately 60-80 percent grasses and grass-like species, 5-15 percent forbs, 10-20 percent shrubs, and 1-4 percent cryptogams. The dominant grasses include blue grama and western wheatgrass. Other grasses or grass-likes may include sedge, needleandthread, and prairie Junegrass. Significant forbs include cudweed sagewort, goldenrod, purple coneflower, scurfpea, and western yarrow. The dominant shrubs that occur include big sagebrush, silver sagebrush, and fringed sagewort.

Compared to the Western Wheatgrass/Needlegrass/Shrubs Plant Community, the shortgrass species including blue grama and threadleaf sedge have increased. The cool-season species including western wheatgrass 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 somewhat resistant to change. The dominant herbaceous species are very adapted to grazing; however, the mid-grass species and the more palatable forbs will decrease. If the herbaceous component is intact, it tends to be resilient if disturbance is not long-term. Because of the sod forming habit of the shortgrass species, water infiltration is lower and runoff is moderate to high. Typically, the runoff is very clean because of the low potential for on-site soil erosion. However, offsite areas may be affected by increased runoff.

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

Growth curve number: 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 *Western Wheatgrass/Needlegrass/Shrubs Plant Community*.
- With heavy continuous grazing this plant community will move towards the *Blue Grama/Sedge/Fringed Sagewort Plant Community*.

Blue Grama/Sedge/Fringed Sagewort Plant Community

This plant community develops under heavy continuous grazing. It is made up of approximately 70-80 percent grasses, 5-10 percent forbs, 5-15 percent shrubs, and 1-7 percent cryptogams. The dominant grasses/grass-likes include blue grama and threadleaf sedge. Other grasses may include western wheatgrass, prairie Junegrass, threeawn, bluegrass, and cheatgrass. The dominant forbs include common pepperweed, cudweed sagewort, goldenrod, and western yarrow. The dominant shrubs include fringed sagewort and cactus.

Compared to the Western Wheatgrass/Needlegrass/Shrubs Plant Community, blue grama and sedge have increased and the cool-season midgrasses have diminished greatly. Nonpalatable forbs and cactus have increased and nonnative species have invaded the site. Plant diversity is low.

This plant community is very stable. Generally, this plant community will require significant management inputs (i.e., high animal impact, long-term prescribed grazing, favorable climatic conditions, etc.) and time to move it towards the Needleandthread/Blue Grama/Sedge Plant Community. Onsite soil erosion is low. Infiltration is low and runoff is high. Typically, the runoff is very clean because of the low potential for onsite soil erosion. However, offsite areas can be significantly impacted due to the increased runoff.

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

Growth curve number: 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:

- Long-term prescribed grazing, possibly including prescribed burning, and favorable climatic conditions, which allow for adequate plant recovery periods, may cause a shift to the *Needleandthread/Blue Grama/Sedge 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, 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. 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 Shallow Loamy 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 Clayey, Thin Loamy, Claypan, Sandy, Sandy Claypan,

Clayey, and Thin Claypan ESs. This site provided habitat for species requiring unfragmented grassland. Important habitat features and components found commonly or exclusively on this site may include greater sage-grouse and sharp-tailed grouse leks; 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 Shallow Loamy ES remains intact and provides increasingly important habitat for grassland and shrub steppe nesting birds, small rodents, coyote, 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 such as greater sage-grouse. Changes in historic fire regime and domestic grazing have impacted the forb/shrub/grass percentages. Greater sage-grouse and Brewer's sparrow benefit when big sagebrush increases.

Western Wheatgrass/Needlegrass/Shrubs and Needleandthread/Blue Grama/Sedge: 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.

Brewer's and grasshopper sparrow, lark bunting, western meadowlark, greater sage-grouse, and sharp-tailed grouse are common and benefit from the structure and composition this plant community provides. This site provides important breeding habitat for loggerhead shrike. This site provides excellent nesting and brood rearing habitat for sharp-tailed grouse. Brewer's sparrow and greater sage-grouse may be present depending on the frequency and distribution of big sagebrush. 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. This ES provides excellent wintering habitat for pronghorn. The moderate stature of this plant community provides suitable thermal, protective, and escape cover for small 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 spade foot toad, Great Plains toad, bull snake, and western rattlesnake.

Resulting from continuous seasonal grazing or from over utilization during extended drought periods, the shift to a needleandthread, blue grama, and sedge community occurs. The forb and shrub diversity has not decreased. The shift from the HCPC to the needleandthread/blue grama/sedge community does not result in a significant change to the wildlife community.

Blue Grama/Sedge/Fringed Sagewort: This plant community develops under heavy continuous grazing. The forb diversity has decreased; however, the shrub community remains diverse. The abundance of big sagebrush has diminished. The shift from a taller to shorter herbaceous plant community may favor prairie dog expansion and associate species such as ferruginous hawk, burrowing owl, tiger salamander, and swift fox. Species such as horned larks, upland sandpipers, and white-tailed jackrabbit will increase due to the loss of big sagebrush. The density of species such as Brewer's sparrow, greater sage-grouse, as well as, desert cottontail will decline based on the abundance of big sagebrush. However, this plant community may provide areas suitable for lek site development.

The short stature of this plant community limits thermal, protective, and escape cover. Predators utilizing this plant community include coyote, American badger, red fox, and long-tailed weasel.

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

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
Grasses and Grass-like							
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
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
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
needleleaf 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
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
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
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
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
thickspike wheatgrass	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
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
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
cutweed 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 U N	U U U U	N U U N	N U U N	U U U U	N U U N
deervetch	U U U U	U D D U	U U U U	U D D U	U D D U	U U U U	U D 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
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
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
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
prairie smoke	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
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
pusstoes	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
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 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
woolly Indianwheat	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
Shrubs and Cryptogams							
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
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 U
plains pricklypear	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
prairie 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
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 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
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 short grass 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 Blue Grama/Sedge/Fringed Sagewort 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 D. 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 variety 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), Stony Hills (R058DY029SD), Thin Claypan (R058DY015SD), Very Shallow (058DY016SD).

Similar Sites

(R058DY010SD) – Loamy [more green needlegrass; needleandthread; more productive]
(R058DY009SD) – Sandy [more prairie sandreed; more needleandthread; more productive]
(R058DY015SD) – Thin Claypan [more western wheatgrass; more blue grama; less productive]

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, US 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	1	2004	SD	Harding

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 & 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