

United States Department of Agriculture Natural Resources Conservation Service

Ecological Site Description

Site Type: Rangeland

Site Name: Clayey Overflow

Site ID: R058DY021SD

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



Physiographic Features

This site is nearly level to gently sloping and occurs on uplands and river valleys.

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

	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	2,300	4,000
Slope (percent):	0	3
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

Stream Type: B6, C6 (Rosgen System)

Representative Soil Features

The soils in this site are moderately well to well-drained and formed in alluvium. The silty clay loam to clay surface layer is 3 to 11 inches thick. The soils have a very slow to moderately slow infiltration rate. This site should show no evidence of rills, wind scoured areas, or pedestalled plants. Water flow paths are broken, irregular in appearance, or discontinuous with numerous debris dams or vegetative barriers. The soil surface is stable and intact.

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

Parent Material Kind: alluvium
Parent Material Origin: siltstone, mudstone
Surface Texture: silty clay loam, clay, silty clay
Surface Texture Modifier: none
Subsurface Texture Group: clayey
Surface Fragments ≤3” (% Cover): 0
Surface Fragments >3” (%Cover): 0
Subsurface Fragments ≤3” (% Volume): 0-10
Subsurface Fragments >3” (% Volume): 0-5

	<u>Minimum</u>	<u>Maximum</u>
Drainage Class:	moderately well	well
Permeability Class:	very slow	moderately slow
Depth to Bedrock (inches):	80	80
Electrical Conductivity (mmhos/cm)*:	0	8
Sodium Absorption Ratio*:	0	5
Soil Reaction (1:1 Water)*:	6.6	8.4
Soil Reaction (0.1M CaCl ₂)*:	NA	NA
Available Water Capacity (inches)*:	6	8
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

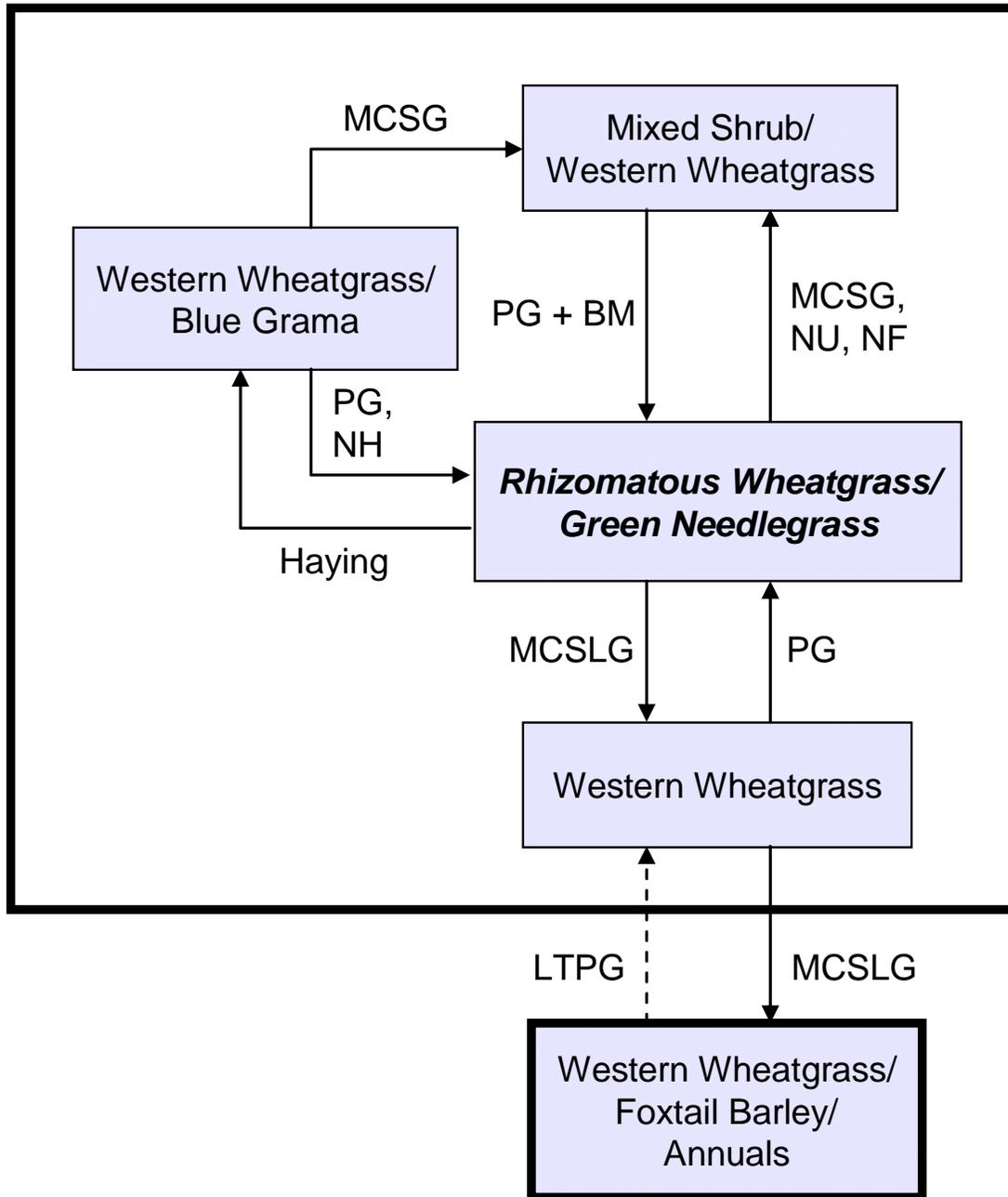
This site developed under Northern Great Plains climatic conditions, natural influences of large herbivores, occasional fire, and other biotic and abiotic factors that typically influence soil/site development. Changes will occur in the plant communities due to short-term weather variations, impacts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

As this site deteriorates, species such as blue grama and sagebrush will increase, and introduced species such as Kentucky bluegrass and Canada thistle will invade the site. Grasses such as slender wheatgrass, green needlegrass, big bluestem, rhizomatous wheatgrasses, prairie cordgrass, and switchgrass will decrease in frequency and production.

The plant community upon which interpretations are primarily based is the Rhizomatous Wheatgrass/Green Needlegrass Plant Community. This plant community has been determined by studying rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily grazed to lightly grazed areas, seasonal use pastures, and historical accounts also have been used. Plant communities, states, transitional pathways, and thresholds have been determined through similar studies and experience.

The following is a diagram that illustrates the common plant communities that can occur on the site and the transition pathways between communities. The ecological processes are discussed in more detail in the plant community descriptions following the diagram.

Plant Communities and Transitional Pathways



BM – Brush management (fire, chemical, mechanical); **LTPG** – Long-term prescribed grazing; **MCSG** – Moderate, continuous seasonal grazing; **MCSLG** – Moderate, continuous season-long grazing; **NF** – No fire; **NH** – No haying; **NU** – Non-use; **PG** – Prescribed grazing (proper stocking rates with adequate recovery periods during the growing season).

Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SCIENTIFIC NAME	SYMBOL	Rhizomatous Wheatgrass/ Green Needlegrass		
			Group	lbs./acre	% Comp
GRASSES & GRASS-LIKES				1875 - 2250	75 - 90
WHEATGRASSES			1	500 - 1000	20 - 40
western wheatgrass	Pascopyrum smithii	PASM	1	375 - 1000	15 - 40
thickspike wheatgrass	Elymus lanceolatus ssp. lanceolatus	ELLAL	1	50 - 250	2 - 10
slender wheatgrass	Elymus trachycaulus	ELTR7	1	25 - 250	1 - 10
Montana wheatgrass	Elymus albicans	ELAL7	1	0 - 125	0 - 5
COOL-SEASON BUNCHGRASSES			2	375 - 625	15 - 25
green needlegrass	Nassella viridula	NAVI4	2	250 - 625	10 - 25
Canada wildrye	Elymus canadensis	ELCA4	2	0 - 125	0 - 5
foxtail barley	Hordeum jubatum	HOJU	2	0 - 125	0 - 5
TALL WARM-SEASON GRASSES			3	25 - 250	1 - 10
tall dropseed	Sporobolus compositus var. compositus	SPCOC2	3	25 - 125	1 - 5
green muhly	Muhlenbergia racemosa	MURA	3	0 - 125	0 - 5
switchgrass	Panicum virgatum	PAVI2	3	0 - 125	0 - 5
prairie cordgrass	Spartina pectinata	SPPE	3	0 - 75	0 - 3
SHORT WARM-SEASON GRASSES			4	50 - 250	2 - 10
blue grama	Bouteloua gracilis	BOGR2	4	25 - 125	1 - 5
buffalograss	Bouteloua dactyloides	BODA2	4	25 - 125	1 - 5
mat muhly	Muhlenbergia richardsonis	MURI	4	0 - 75	0 - 3
inland saltgrass	Distichlis spicata	DISP	4	0 - 75	0 - 3
OTHER NATIVE GRASSES			5	25 - 125	1 - 5
prairie junegrass	Koeleria macrantha	KOMA	5	25 - 75	1 - 3
other grasses		2GRAM	5	0 - 125	0 - 5
GRASS-LIKES			6	25 - 125	1 - 5
sedge	Carex spp.	CAREX	6	25 - 125	1 - 5
rush	Juncus spp.	JUNCU	6	0 - 75	0 - 3
spikerush	Eleocharis spp.	ELEOC	6	0 - 50	0 - 2
FORBS			8	125 - 250	5 - 10
American licorice	Glycyrrhiza lepidota	GLLE3	8	25 - 50	1 - 2
American vetch	Vicia americana	VIAM	8	25 - 50	1 - 2
cudweed sagewort	Artemisia ludoviciana	ARLU	8	25 - 75	1 - 3
false boneset	Brickellia eupatorioides	BREU	8	0 - 50	0 - 2
false Solomon's-seal	Maianthemum stellatum	MAST4	8	0 - 25	0 - 1
goldenrod	Solidago spp.	SOLID	8	25 - 50	1 - 2
Maximilian sunflower	Helianthus maximiliani	HEMA2	8	25 - 75	1 - 3
mint	Mentha spp.	MENTH	8	0 - 25	0 - 1
prairie coneflower	Ratibida columnifera	RACO3	8	0 - 25	0 - 1
purple prairie clover	Dalea purpurea	DAPU5	8	25 - 50	1 - 2
scarlet gaura	Gaura coccinea	GACO5	8	0 - 25	0 - 1
scurfpea	Psoralegium spp.	PSORA2	8	25 - 50	1 - 2
wavyleaf thistle	Cirsium undulatum	CIUN	8	25 - 50	1 - 2
western yarrow	Achillea millefolium var. occidentalis	ACMIO	8	25 - 50	1 - 2
white prairie aster	Symphotrichum falcatum	SYFA	8	25 - 50	1 - 2
native forbs		2FN	8	25 - 100	1 - 4
SHRUBS			9	50 - 250	2 - 10
big sagebrush	Artemisia tridentata	ARTR2	9	0 - 50	0 - 2
chokecherry	Prunus virginiana	PRVI	9	0 - 75	0 - 3
fourwing saltbush	Atriplex canescens	ATCA2	9	0 - 50	0 - 2
fringed sagewort	Artemisia frigida	ARFR4	9	25 - 50	1 - 2
leadplant	Amorpha canescens	AMCA6	9	25 - 50	1 - 2
rose	Rosa spp.	ROSA5	9	25 - 50	1 - 2
silver sagebrush	Artemisia cana	ARCA13	9	25 - 75	1 - 3
western snowberry	Symphoricarpos occidentalis	SYOC	9	25 - 75	1 - 3
willow	Salix spp.	SALIX	9	0 - 50	0 - 2
other shrubs		2SHRUB	9	0 - 75	0 - 3
TREES			10	0 - 125	0 - 5
American elm	Ulmus americana	ULAM	10	0 - 125	0 - 5
boxelder	Acer negundo	ACNE2	10	0 - 125	0 - 5
green ash	Fraxinus pennsylvanica	FRPE	10	0 - 125	0 - 5
plains cottonwood	Populus deltoides ssp. monilifera	PODEM	10	0 - 125	0 - 5
other trees		2TREE	10	0 - 125	0 - 5

Annual Production lbs./acre		LOW	RV	HIGH
GRASSES & GRASS-LIKES		1745 -	2100	-2390
FORBS		110 -	188	-285
SHRUBS		45 -	150	-285
TREES		0 -	63	-140
TOTAL		1900 -	2500	-3100

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	Rhizomatous Wheatgrass/ Green Needlegrass			Western Wheatgrass			Mixed Shrub/ Western Wheatgrass			Western Wheatgrass/ Foxtail Barley/Annuals		
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp
GRASSES & GRASS-LIKES			1875 - 2250	75 - 90		1125 - 1350	75 - 90		1365 - 1785	65 - 85		675 - 810	75 - 90
WHEATGRASSES		1	500 - 1000	20 - 40	1	375 - 675	25 - 45	1	525 - 840	25 - 40	1	90 - 315	10 - 35
western wheatgrass	PASM	1	375 - 1000	15 - 40	1	375 - 675	25 - 45	1	420 - 840	20 - 40	1	90 - 315	10 - 35
thickspike wheatgrass	ELLAL	1	50 - 250	2 - 10	1	15 - 75	1 - 5	1	21 - 105	1 - 5	1	0 - 45	0 - 5
slender wheatgrass	ELTR7	1	25 - 250	1 - 10	1	0 - 75	0 - 5	1	21 - 210	1 - 10			
Montana wheatgrass	ELAL7	1	0 - 125	0 - 5	1	0 - 45	0 - 3	1	0 - 105	0 - 5			
COOL-SEASON BUNCHGRASSES		2	375 - 625	15 - 25	2	150 - 300	10 - 20	2	210 - 420	10 - 20	2	18 - 72	2 - 8
green needlegrass	NAV4	2	250 - 625	10 - 25	2	75 - 225	5 - 15	2	210 - 420	10 - 20	2	0 - 45	0 - 5
Canada wildrye	ELCA4	2	0 - 125	0 - 5	2	0 - 45	0 - 3	2	0 - 105	0 - 5			
foxtail barley	HOJU	2	0 - 125	0 - 5	2	15 - 120	1 - 8	2	0 - 105	0 - 5	2	18 - 72	2 - 8
TALL WARM-SEASON GRASSES		3	25 - 250	1 - 10	3	15 - 75	1 - 5	3	21 - 105	1 - 5	3	0 - 27	0 - 3
tall dropseed	SPOC2	3	25 - 125	1 - 5	3	15 - 75	1 - 5	3	21 - 105	1 - 5	3	0 - 27	0 - 3
green muhly	MURA	3	0 - 125	0 - 5	3	0 - 15	0 - 1	3	0 - 21	0 - 1			
switchgrass	PAW2	3	0 - 125	0 - 5	3	0 - 15	0 - 1	3	0 - 21	0 - 1			
prairie cordgrass	SPPE	3	0 - 75	0 - 3				3	0 - 21	0 - 1			
SHORT WARM-SEASON GRASSES		4	50 - 250	2 - 10	4	30 - 180	2 - 12	4	42 - 210	2 - 10	4	18 - 135	2 - 15
blue grama	BOGR2	4	25 - 125	1 - 5	4	15 - 75	1 - 5	4	21 - 105	1 - 5	4	9 - 45	1 - 5
buffalograss	BODA2	4	25 - 125	1 - 5	4	15 - 75	1 - 5	4	0 - 105	0 - 5	4	0 - 45	0 - 5
mat muhly	MURI	4	0 - 75	0 - 3	4	0 - 75	0 - 5	4	0 - 63	0 - 3	4	0 - 27	0 - 3
inland saltgrass	DISP	4	0 - 75	0 - 3	4	0 - 75	0 - 5	4	21 - 105	1 - 5	4	9 - 90	1 - 10
OTHER NATIVE GRASSES		5	25 - 125	1 - 5	5	15 - 75	1 - 5	5	21 - 105	1 - 5	5	9 - 45	1 - 5
prairie junegrass	KOMA	5	25 - 75	1 - 3	5	15 - 45	1 - 3	5	21 - 42	1 - 2	5	9 - 18	1 - 2
other grasses	ZGRAM	5	0 - 125	0 - 5	5	0 - 75	0 - 5	5	0 - 105	0 - 5	5	0 - 45	0 - 5
GRASS-LIKES		6	25 - 125	1 - 5	6	15 - 75	1 - 5	6	21 - 105	1 - 5	6	9 - 63	1 - 7
sedge	CAREX	6	25 - 125	1 - 5	6	15 - 75	1 - 5	6	21 - 105	1 - 5	6	9 - 27	1 - 3
rush	JUNCU	6	0 - 75	0 - 3	6	0 - 45	0 - 3	6	0 - 42	0 - 2	6	0 - 36	0 - 4
spikerush	ELEOC	6	0 - 50	0 - 2	6	0 - 30	0 - 2	6	0 - 21	0 - 1	6	0 - 36	0 - 4
NON-NATIVE GRASSES		7			7	15 - 150	1 - 10	7	21 - 105	1 - 5	7	90 - 225	10 - 25
bluegrass	POA	7	15 - 150	1 - 10	7	15 - 150	1 - 10	7	21 - 105	1 - 5	7	45 - 180	5 - 20
cheatgrass	BRTE	7			7	15 - 75	1 - 5	7	21 - 105	1 - 5	7	9 - 90	1 - 10
FORBS		8	125 - 250	5 - 10	8	75 - 150	5 - 10	8	105 - 315	5 - 15	8	45 - 135	5 - 15
American licorice	GLLE3	8	25 - 50	1 - 2	8	15 - 30	1 - 2	8	21 - 63	1 - 3	8	0 - 9	0 - 1
American vetch	VIAM	8	25 - 50	1 - 2	8	0 - 15	0 - 1	8	0 - 21	0 - 1			
cudweed sagewort	ARLU	8	25 - 75	1 - 3	8	15 - 60	1 - 4	8	21 - 105	1 - 5	8	9 - 45	1 - 5
false bonaset	BREU	8	0 - 50	0 - 2				8	0 - 21	0 - 1			
false Solomon's-seal	MAST4	8	0 - 25	0 - 1				8	0 - 21	0 - 1			
goldenrod	SOLID	8	25 - 50	1 - 2	8	15 - 45	1 - 3	8	21 - 63	1 - 3	8	9 - 45	1 - 5
Maximilian sunflower	HEMA2	8	25 - 75	1 - 3	8	0 - 30	0 - 2	8	21 - 63	1 - 3			
mint	MENTH	8	0 - 25	0 - 1	8	0 - 15	0 - 1	8	0 - 21	0 - 1			
prairie coneflower	RACO3	8	0 - 25	0 - 1	8	0 - 15	0 - 1	8	0 - 42	0 - 2			
purple prairie clover	DAPU5	8	25 - 50	1 - 2	8	0 - 15	0 - 1	8	21 - 42	1 - 2			
scarlet gaura	GACO5	8	0 - 25	0 - 1	8	0 - 15	0 - 1	8	0 - 21	0 - 1			
scurfs	PSORA2	8	25 - 50	1 - 2	8	15 - 45	1 - 3	8	21 - 84	1 - 4	8	9 - 27	1 - 3
wayleaf thistle	CIUN	8	25 - 50	1 - 2	8	0 - 30	0 - 2	8	21 - 42	1 - 2			
western yarrow	ACMIO	8	25 - 50	1 - 2	8	15 - 45	1 - 3	8	21 - 63	1 - 3	8	9 - 36	1 - 4
white prairie aster	SYFA	8	25 - 50	1 - 2	8	15 - 45	1 - 3	8	21 - 63	1 - 3	8	9 - 45	1 - 5
native forbs	2FN	8	25 - 100	1 - 4	8	15 - 75	1 - 5	8	21 - 105	1 - 5	8	9 - 45	1 - 5
introduced forbs	2FI				8	0 - 75	0 - 5	8	0 - 105	0 - 5	8	9 - 90	1 - 10
SHRUBS		9	50 - 250	2 - 10	9	15 - 120	1 - 8	9	105 - 315	5 - 15	9	18 - 72	2 - 8
big sagebrush	ARTR2	9	0 - 50	0 - 2	9	0 - 15	0 - 1	9	0 - 84	0 - 4			
chokecherry	PRVI	9	0 - 75	0 - 3	9	0 - 15	0 - 1	9	0 - 105	0 - 5			
fourwing saltbush	ATCA2	9	0 - 50	0 - 2				9	0 - 63	0 - 3			
fringed sagewort	ARFR4	9	25 - 50	1 - 2	9	15 - 45	1 - 3	9	21 - 42	1 - 2	9	9 - 45	1 - 5
leadplant	AMCA6	9	25 - 50	1 - 2	9	0 - 15	0 - 1	9	21 - 63	1 - 3			
rose	ROSA5	9	25 - 50	1 - 2	9	15 - 30	1 - 2	9	21 - 63	1 - 3	9	0 - 9	0 - 1
silver sagebrush	ARCA13	9	25 - 75	1 - 3	9	15 - 30	1 - 2	9	21 - 105	1 - 5	9	0 - 9	0 - 1
western snowberry	SYOC	9	25 - 75	1 - 3	9	15 - 60	1 - 4	9	21 - 168	1 - 8	9	9 - 45	1 - 5
willow	SALIX	9	0 - 50	0 - 2				9	0 - 63	0 - 3			
other shrubs	2SHRUB	9	0 - 75	0 - 3	9	0 - 45	0 - 3	9	0 - 105	0 - 5	9	0 - 45	0 - 5
TREES		10	0 - 125	0 - 5	10	0 - 75	0 - 5	10	0 - 105	0 - 5	10	0 - 27	0 - 3
American elm	ULAM	10	0 - 125	0 - 5	10	0 - 75	0 - 5	10	0 - 105	0 - 5	10	0 - 27	0 - 3
boxelder	ACNE2	10	0 - 125	0 - 5	10	0 - 75	0 - 5	10	0 - 105	0 - 5	10	0 - 27	0 - 3
green ash	FRPE	10	0 - 125	0 - 5	10	0 - 75	0 - 5	10	0 - 105	0 - 5	10	0 - 27	0 - 3
plains cottonwood	PODEM	10	0 - 125	0 - 5	10	0 - 75	0 - 5	10	0 - 105	0 - 5	10	0 - 27	0 - 3
other trees	2TREE	10	0 - 125	0 - 5	10	0 - 75	0 - 5	10	0 - 105	0 - 5	10	0 - 27	0 - 3
Annual Production lbs./acre			LOW RV HIGH		LOW RV HIGH		LOW RV HIGH		LOW RV HIGH		LOW RV HIGH		LOW RV HIGH
GRASSES & GRASS-LIKES			1745 - 2100 - 2390		820 - 1283 - 1725		910 - 1628 - 2055		445 - 752 - 1145				
FORBS			110 - 188 - 285		70 - 113 - 165		95 - 210 - 365		40 - 90 - 150				
SHRUBS			45 - 150 - 285		10 - 68 - 130		95 - 210 - 365		15 - 45 - 75				
TREES			0 - 63 - 140		0 - 38 - 80		0 - 53 - 115		0 - 14 - 30				
TOTAL			1900 - 2500 - 3100		900 - 1500 - 2100		1100 - 2100 - 2900		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.

Rhizomatous Wheatgrass/Green Needlegrass Plant Community

The plant community upon which interpretations are primarily based is the Rhizomatous Wheatgrass/Green Needlegrass Plant Community. This is also considered to be climax. Potential vegetation is about 75 to 90 percent grasses or grass-like plants, 5 to 10 percent forbs, 2 to 10 percent shrubs, and 0 to 5 percent trees. The major grasses include rhizomatous wheatgrasses and green needlegrass. Other grass and grass-like species in the plant community include Montana wheatgrass, Canada wildrye, tall dropseed, green muhly, foxtail barley, switchgrass, sedge, blue grama, and buffalograss. Shrubs such as silver sagebrush, leadplant, chokecherry, big sagebrush, rose, and snowberry are present. Forbs such as white prairie aster, American vetch, prairie coneflower, purple prairie clover, American licorice, cudweed sagewort, and goldenrod are common. Trees occurring on the site include scattered green ash, cottonwood, boxelder, and elm.

This plant community is well adapted to the Northern Great Plains climatic conditions. Individual species can vary greatly in production depending on growing conditions (timing and amount of precipitation and temperature). Community dynamics, nutrient cycle, water cycle, and energy flow are functioning properly. Plant litter is properly distributed with very little movement offsite and natural plant mortality is very low. Runoff from adjacent sites and moderate or high available water capacity provides a favorable soil-water-plant relationship.

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

Growth curve number: SD5807

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

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

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	5	13	20	25	18	11	5	3	0	0

Transitional pathways leading to other plant communities are as follows.

- Haying will convert this plant community to the *Western Wheatgrass/Blue Grama Plant Community*.
- Moderate continuous season-long grazing will shift this plant community to the *Western Wheatgrass Plant Community*.
- Moderate, continuous seasonal grazing or nonuse and no fire will convert this plant community to the *Mixed Shrub/Western Wheatgrass Plant Community*.

Western Wheatgrass/Green Needlegrass Plant Community

This plant community is the result of haying. Western wheatgrass and blue grama dominate. These grasses form a sod, which is very productive and is often used for dryland hay. This plant community is productive but lacks the diversity of the Rhizomatous Wheatgrass/Green Needlegrass Plant Community. The soil of this plant community is protected. The watershed is functioning but may produce slightly increased runoff.

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

Growth curve number: SD5807

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

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

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	5	13	20	25	18	11	5	3	0	0

Transitional pathways leading to other plant communities are as follows.

- Prescribed grazing and no haying will eventually return this plant community to the *Rhizomatous Wheatgrass/Green Needlegrass Plant Community*.
- Moderate, continuous seasonal grazing will convert this plant community to the *Mixed Shrub/Western Wheatgrass Plant Community*.

Western Wheatgrass Plant Community

This plant community results from continuous season-long grazing without adequate recovery periods between each grazing event during the growing season. Recognition of this plant community will enable the land user to implement key management decisions before a significant ecological threshold is crossed. Western wheatgrass is the dominant species. Green needlegrass, slender wheatgrass, and switchgrass are greatly reduced. Forb species include cudweed sagewort, goldenrod, western yarrow, white prairie aster, prairie coneflower, and scurfpea. Leadplant is greatly reduced while other shrub species would tend to be heavily browsed. This plant community is relatively stable and less productive than the Rhizomatous Wheatgrass/Green Needlegrass Plant Community. Reduction of litter and short plant heights result in higher soil temperatures, poor water infiltration rates, and increased runoff. This plant community can occur throughout the site, on spot grazed areas, and around water sources where season-long grazing patterns occur. Soil erosion will be minimal due to the sod forming habit of Kentucky bluegrass.

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

Growth curve number: SD5806

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

Growth curve description: Cool-season dominant, lowland.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	6	15	20	26	17	9	4	3	0	0

Transitional pathways leading to other plant communities are as follows.

- Moderate, continuous season-long grazing will move this plant community across the ecological threshold to the *Western Wheatgrass/Foxtail Barley/Annuals Plant Community*.

- Prescribed grazing will shift this plant community back to the *Rhizomatous Wheatgrass/Green Needlegrass Plant Community*.

Mixed Shrub/Western Wheatgrass Plant Community

This plant community develops after an extended period of nonuse and exclusion of fire. This plant community will also develop with moderate or heavy continuous seasonal grazing. In either case, shrubs increase and can sometimes dominate the plant community. Cool-season grasses make up the majority of the understory with the balance made up of short warm-season grasses, annual cool-season grasses, and miscellaneous forbs. Western wheatgrass is the dominant grass. Grasses of secondary importance include blue grama, prairie Junegrass, green needlegrass and slender wheatgrass. Woody plants such as big sagebrush, silver sagebrush, and snowberry have increased with canopy cover up to 20 percent. Forbs commonly found in this plant community include cudweed sagewort, goldenrod, western yarrow, and scurfpea.

When compared to the Rhizomatous Wheatgrass/Green Needlegrass Plant Community, western wheatgrass has increased, while green needlegrass has decreased. Production of cool-season grasses has also been reduced. This plant community is stable and protected from excessive erosion. The biotic integrity is usually intact, but it can be at risk if dominated by short grasses or shrubs, and if invaded by introduced species.

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: SD5807

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

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

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	5	13	20	25	18	11	5	3	0	0

Transitional pathways leading to other plant communities are as follows.

- Brush control followed by prescribed grazing, will result in a plant community very similar to the *Rhizomatous Wheatgrass/Green Needlegrass Plant Community*.

Western Wheatgrass/Foxtail Barley/Annuals Plant Community

This plant community developed with heavy continuous season-long grazing. Western wheatgrass and Kentucky bluegrass dominate the community. Green needlegrass has been greatly reduced. Western yarrow, scurfpea, cudweed sagewort, and goldenrod have increased. Nonnative grasses and forbs such as annual bromes, thistle, and cocklebur will invade this plant community.

This plant community is resistant to change to a higher successional plant community due to low plant diversity and competition of the invaded species. A significant amount of production and diversity has been lost when compared to the Rhizomatous Wheatgrass/Green Needlegrass Plant Community. The loss of desirable species has negatively impacted energy flow and nutrient cycling. Water infiltration is reduced significantly. Soil loss may be accelerated where concentrated flows occur. It will take a very long time to restore this plant community back to the Rhizomatous Wheatgrass/Green Needlegrass Plant Community with improved management. Renovation would be very costly.

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

Growth curve number: SD5806

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

Growth curve description: Cool-season dominant, lowland.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	6	15	20	26	17	9	4	3	0	0

Transitional pathways leading to other plant communities are as follows.

- Long-term prescribed grazing may move this plant community toward the *Western Wheatgrass Plant Community*. It may eventually return to the *Rhizomatous Wheatgrass/Green Needlegrass Plant Community* or associated successional plant community stages assuming an adequate seed/vegetative source is available.

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

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

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

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

Although this ES is primarily dominated by western wheatgrass, this site can support a plant community composed of various age classes of elm, green ash, and boxelder; with a shrub component of chokecherry, western snowberry, silver buffaloberry, etc. The presence or absence of this tree/shrub component is an important factor influencing wildlife species composition.

This site is subject to invasion of grass species such as annual brome grasses and Kentucky bluegrass. Woody species such as Russian olive and Tamarisk (salt cedar), may invade this site.

This site provides habitat for grassland and shrub thicket nesting birds, small rodents, bats, mammalian predators, and a variety of reptiles, amphibians, and insects. Within the MLRA, this site provides the suitable habitat for numerous riparian associated species. This site provides foraging and brood rearing habitat for upland game birds such as greater sage-grouse and sharp-tailed grouse. However, due to the presence of invasive grass and/or woody species ground nesting birds, reproduction is reduced.

Rhizomatous Wheatgrass/Green Needlegrass: This site is dominated by western wheatgrass and green needlegrass with a shrub community generally dominated by western snowberry that favors grazers and mixed-feeders, such as white-tailed deer. Plant communities associated with shrub thickets and low shrubs provide habitat for songbirds such as brown thrasher, yellow warbler, gray catbird, Say's phoebe, loggerhead shrike, Lazuli bunting, and yellow breasted chat. Raptors such as red-tailed hawk, Swainson's hawk, American kestrel, and great-horned owl may use this site. Insects, such as pollinators, play a limited role in maintaining the forb community but provide a significant forage base for birds and other species. Diverse prey populations are available for grassland raptors and mammalian predators, especially bobcat.

Although this site provides a lower diversity of grasses, forbs, and shrubs, the site does provide limited nutrition levels for small and large herbivores including voles, mice, thirteen-lined ground squirrel, Eastern cottontail rabbit, white-tailed jackrabbit, and deer. This ES provides excellent fawning habitat for white-tailed deer. The relatively tall stature of this plant community provides suitable thermal, protective, and escape cover for small and large mammals. This plant community provides limited habitat for amphibians, mostly toads. Numerous reptile species such as lizards, bull, and garter snakes may occupy the site. Introduced bird species such as ring-necked pheasant and gray partridge will use this site.

Mixed Shrub/Western Wheatgrass: Resulting from moderate, continuous season-long grazing, nonuse, or reduction in fire frequency, shrubs and western wheatgrass will dominate. Shrub diversity and density has increased. The minor tree component remains largely unchanged. Livestock damage to trees is often noticeable. The increase in the shrub component results in increased habitat for yellow warbler, gray catbird, loggerhead shrike, Bell's vireo, brown thrasher, Lazuli bunting, and yellow breasted chat. When present, the tree component continues to provide habitat for red-tailed hawk, American kestrel, and Say's phoebe. This plant community provides limited habitat for amphibians, mostly toads. Numerous reptile species such as lizards, bull, and garter snakes may occupy the site.

Western Wheatgrass/Blue Grama: Resulting from haying, the plant community will become dominated by western wheatgrass and blue grama. The forb and shrub diversity will be dramatically reduced. The shift from to western wheatgrass and blue grama will result in a significant change to the wildlife community. Almost all shrub or low shrub dependent birds will not use this site due to haying of the shrubs, especially western snowberry. Small mammals such as voles and mice will continue to use the site. Predators utilizing this plant community include the coyote, red fox, long-tailed weasel, raccoon, and bobcat.

Western Wheatgrass: Resulting from moderate, continuous season-long grazing western wheatgrass will dominate this site. Tree and shrub diversity and abundance have either been greatly decreased or eliminated. The reduction of the tree and shrub component results in either an elimination or significant reduction of tree and shrub utilizing birds such as brown thrasher, yellow

warbler, gray catbird, loggerhead shrike, Lazuli bunting, and yellow breasted chat. Grassland nesting bird species will increase. Small mammals such as voles and mice will continue to use the site. Predators utilizing this plant community include the coyote, red fox, and long-tailed weasel.

Western Wheatgrass/Foxtail Barley/Annuals: This plant community develops under moderate, continuous season-long grazing of western wheatgrass. The dominant vegetation includes foxtail barley and annual grasses, forbs, invaders, and early successional biennial and perennial species. Plant species from adjacent ESs may become minor components of this plant community. The community is susceptible to invasion of annual bromegrasses, and other nonnative species due to severe soil disturbances and relatively high percent of bare ground.

Soil erosion is potentially high, impacting offsite aquatic habitats through increased runoff, nutrient, and sediment loads. Reduced surface cover, low plant density, low plant vigor, loss of root biomass, and soil compaction, all contribute to decreased wildlife abundance and diversity.

Since secondary succession is highly variable plant and wildlife species will vary. This plant community provides habitat for generalist or early successional species.

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
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
Canada wildrye	U D U U	N U N N	U D U U	N U N N	N U N N	U D U U	U D U U
foxtail barley	U D N N	N P N N	U D N N	N P N N	N P N N	U D N N	U D N N
green muhly	U D D U	N U N N	U D D U	N U N N	N U N N	U D D U	U D D U
green needlegrass	U P U D	N P N P	U P U D	N P N P	N P N P	U P U D	U P U D
inland saltgrass	N U U N	N N N N	N U U N	N N N N	N N N N	N U U N	N U U N
mat muhly	N U U N	U U D U	N U U N	U U U U	U U U U	N U U N	N U U N
Montana 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
prairie cordgrass	U D D U	N N N N	U D D U	N N N N	N N N N	U D D U	U D 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
rush	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
sedge	U D U D	U P N D	U D U D	U D U D	U D U D	U D U D	U D U D
slender wheatgrass	U P U U	N D U N	U P U U	N D U N	N D U N	U P U U	U P U U
spikerush	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U
switchgrass	U D D U	U D U U	U D D U	N N N N	N N N N	U D D U	U D D U
tall dropseed	N U N N	N U N N	N U N N	N U N N	N U N N	N U N N	N U N N
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
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 licorice	U U D U	N U U N	U U D U	N U U N	N U U N	U U D U	N U U N
American vetch	U D P U	U P P U	U D P U	U P P U	U P P U	U D P U	U P P U
cudweed sagewort	U U U U	U U D U	U U U U	U U D U	U U D U	U U U U	U U D U
false boneset	U U D U	N D U N	U U D U	N D U N	N D U N	U U D U	N D U N
false Solomon's-seal	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
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
Maximilian sunflower	U D P U	U D P U	U D P U	U D P U	U D P U	U D P U	U D P U
mint	N N U N	N U U N	N N U N	N U U N	N U U N	N N U N	N N U N
prairie coneflower	U U D U	U P P U	U U D U	U P P U	U P P U	U U D U	U P P U
purple prairie clover	U D P U	U P P U	U D P U	U P P U	U P P U	U D P U	U P P U
scarlet gaura	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
scurfpea	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
wavyleaf thistle	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N
western yarrow	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
white prairie aster	U U D U	N N N N	U U D U	N N N N	N N N N	U U D U	N N N N
Shrubs and Trees							
American elm	N N N N	N N N N	N N N N	N U D N	N N N N	N N N N	N N N N
big sagebrush	U N U U	D U U D	U N U U	P U D P	P P P P	U N U U	D U U U
boxelder	N N N U	N N U U	N N N U	N N U U	N N U U	N N N U	N N U U
chokecherry	D T T D	D T T D	D T T D	P U D P	D U U D	D T T D	P U U P
fourwing saltbush	P D D P	P D D P	P D D P	P D D P	P D D P	P D D P	P D D P
fringed sagewort	U U U U	U U U U	U U U U	U D D U	U P P D	U U U U	U U U D
green ash	N U D U	N D D U	N U D U	N D D U	N U D U	N U D U	N D D U
leadplant	U P D U	U P D U	U P D U	U P D U	U P D U	U P D U	U P D U
plains cottonwood	D U U D	D U U D	D U U D	D U D D	D U U D	D U U D	D U U D
rose	U D D U	U D D U	U D D U	U D D U	U D D U	U D D U	U D D U
silver sagebrush	D U U D	D U U D	D U U D	P D D P	P P P P	D U U D	D U U D
western snowberry	U U U U	U U U U	U U U U	D U D D	U U U U	U U U U	D U U U
willow	P U D P	P U D P	P U D P	P U D P	U U U U	P U D P	P U D P

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 Western Wheatgrass/Foxtail Barley/Annuals 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 C. Infiltration and runoff potential for this site varies from moderate to high depending on soil hydrologic group, slope, and ground cover. In many cases, areas with greater than 75 percent ground cover have the greatest potential for high infiltration and lower runoff. An exception would be where shortgrasses form a strong sod and dominate the site. Normally, areas where ground cover is less than 50 percent have the greatest potential to have reduced infiltration and higher runoff (refer to Section 4, NRCS National Engineering Handbook for runoff quantities and hydrologic curves).

Recreational Uses

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

Wood Products

No appreciable wood products are typically present on this site.

Other Products

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

Supporting Information

Associated Sites

Loamy (R058DY010SD), Clayey (R058DY011SD), Loamy Terrace (R058DY022SD)

Similar Sites

(R058DY020SD) – Loamy Overflow [more big bluestem; less western wheatgrass]
(R058DY007SD) – Saline Lowland [more cordgrass and saltgrass; 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; Dave

Dewald, Wildlife BIO, NRCS; Jody Forman, 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