

# United States Department of Agriculture Natural Resources Conservation Service

## Ecological Site Description

**Site Type:** Rangeland

**Site Name:** Closed Depression

**Site ID:** R058DY019SD

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



### Physiographic Features

This site occurs on concave to nearly level depressions.

**Landform:** depression

**Aspect:** N/A

	<u>Minimum</u>	<u>Maximum</u>
<b>Elevation (feet):</b>	2,300	4,000
<b>Slope (percent):</b>	0	2
<b>Water Table Depth (inches):</b>	80	80
<b>Flooding:</b>		
<b>Frequency:</b>	None	None
<b>Duration:</b>	None	None
<b>Ponding:</b>		
<b>Depth (inches):</b>	0	18
<b>Frequency:</b>	Rare	Occasional
<b>Duration:</b>	Brief	Long
<b>Runoff Class:</b>	Negligible	Negligible

### Climatic Features

The climate in this MLRA is typical of the drier portions of the Northern Great Plains where sagebrush steppes to the west yield to grassland to the east. Annual precipitation ranges from 14 to 16 inches. Most of the rainfall occurs as frontal storms early in the growing season. Some high intensity, convective thunderstorms occur in the summer. Precipitation in winter occurs as snow. Temperatures show a wide range between summer and winter and between daily maximums and minimums, due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Outbreaks of cold air from Canada in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring. The normal average annual temperature is about 44°F. January is the coldest month with average temperatures ranging from about 12°F (Marmarth, North Dakota (ND)), to about 20°F (Baker, Montana (MT)). July is the warmest month with temperatures averaging from about 70°F (Marmarth, ND), to about 76°F (Baker, MT). The range of normal average monthly temperatures between the coldest and warmest months is about 55°F. Hourly winds are estimated to average about 11 miles per hour (mph) annually, ranging from about 13 mph during the spring to about 10 mph during the summer. Daytime winds are generally stronger than nighttime and strong storms may bring brief periods of high winds with gusts to more than 50

mph.

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

	<u>Minimum</u>	<u>Maximum</u>
<b>Frost-free period (days):</b>	110	123
<b>Freeze-free period (days):</b>	130	140
<b>Mean Annual Precipitation (inches):</b>	14	16

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

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

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

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

**Influencing Water Features**

No significant water features influence this site.

**Representative Soil Features**

The soils in this site are poorly drained and formed in clayey alluvium derived from sedimentary rock. The silty clay to clay surface layer is two to three inches thick. The soils have a very slow infiltration rate. The soils crack when dry and heavy traffic can cause surface compaction when wet. 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:** sandstone or siltstone  
**Surface Texture:** silty clay, clay  
**Surface Texture Modifier:** none  
**Subsurface Texture Group:** clayey  
**Surface Fragments ≤3” (% Cover):** 0  
**Surface Fragments >3” (%Cover):** 0  
**Subsurface Fragments ≤3” (% Volume):** 0  
**Subsurface Fragments >3” (% Volume):** 0

	<u>Minimum</u>	<u>Maximum</u>
<b>Drainage Class:</b>	poorly	poorly
<b>Permeability Class:</b>	very slow	very slow
<b>Depth to Bedrock (inches):</b>	80	80
<b>Electrical Conductivity (mmhos/cm)*:</b>	0	16
<b>Sodium Absorption Ratio*:</b>	0	4
<b>Soil Reaction (1:1 Water)*:</b>	5.6	9.0
<b>Soil Reaction (0.1M CaCl2)*:</b>	NA	NA
<b>Available Water Capacity (inches)*:</b>	6	6
<b>Calcium Carbonate Equivalent (percent)*:</b>	0	15

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

## Plant Communities

### Ecological Dynamics of the Site

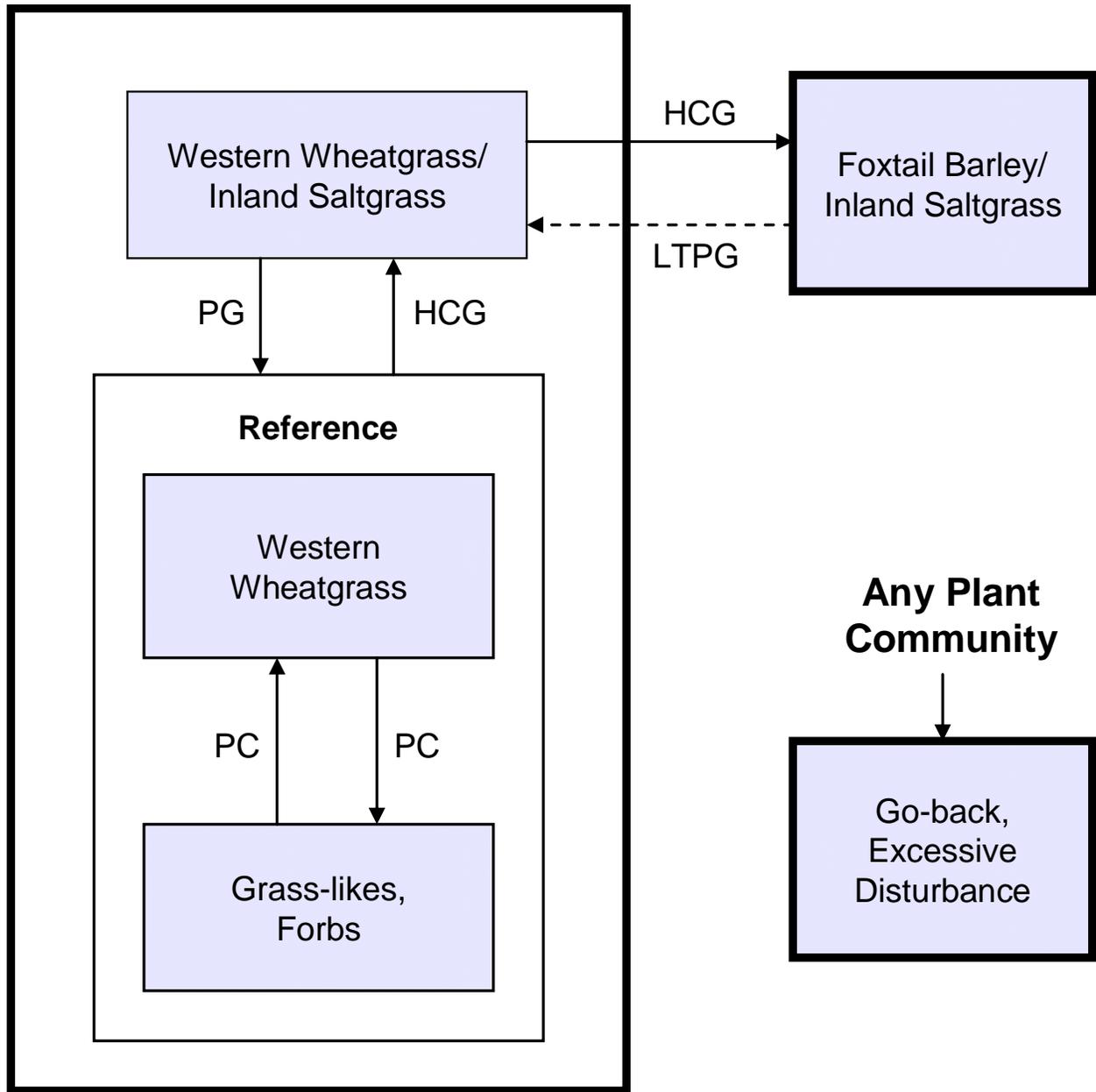
This site developed under Northern Great Plains climatic conditions, natural influences of large herbivores, occasional fire, and other biotic and abiotic factors that typically influence soil/site development. Changes will occur in the plant communities due to short-term weather variations, impacts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

This site is very sensitive to precipitation fluctuations from year to year. With above average precipitation, the site becomes very wet, leading to a much different plant community than what would be present with average to below average precipitation. In dry years, plant density becomes very low. The two plant communities influenced strongly by precipitation alone (Western Wheatgrass; and Grass-likes, Forbs) make up the natural fluctuation of what could be considered the Historic Climax Plant Community.

The plant community upon which interpretations are primarily based is the Reference 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



**HCG** – Heavy continuous grazing; **LTPG** – Long-term prescribed grazing; **PC** – Precipitation cycles; **PG** – Prescribed grazing.

**Plant Community Composition and Group Annual Production**

COMMON/GROUP NAME	SCIENTIFIC NAME	SYMBOL	Reference Plant Community			
			Group	lbs./acre	% Comp	
<b>GRASSES &amp; GRASS-LIKES</b>				880 - 1980	40 - 90	
<b>RHIZOMATOUS WHEATGRASSES</b>			1	330 - 1320	15 - 60	
western wheatgrass	Pascopyrum smithii	PASM	1	110 - 1320	5 - 60	
thickspike wheatgrass	Elymus lanceolatus ssp. lanceolatus	ELLAL	1	0 - 660	0 - 30	
<b>OTHER NATIVE GRASSES</b>			2	110 - 550	5 - 25	
foxtail barley	Hordeum jubatum	HOJU	2	0 - 330	0 - 15	
fowl bluegrass	Poa palustris	POPA2	2	22 - 220	1 - 10	
plains bluegrass	Poa arida	POAR3	2	0 - 176	0 - 8	
alkali bluegrass	Poa juncifolia	POJU	2	0 - 110	0 - 5	
inland saltgrass	Distichlis spicata	DISP	2	22 - 220	1 - 10	
Nuttall's alkaligrass	Puccinellia nuttalliana	PUNU2	2	22 - 440	1 - 20	
slender wheatgrass	Elymus trachycaulus	ELTR7	2	0 - 110	0 - 5	
American sloughgrass	Beckmannia syzigachne	BESY	2	0 - 110	0 - 5	
alkali muhly	Muhlenbergia asperifolia	MUAS	2	22 - 220	1 - 10	
ticklegass	Agrostis scabra	AGSC5	2	0 - 110	0 - 5	
other grasses		2GRAM	2	0 - 220	0 - 10	
<b>GRASS-LIKES</b>			3	110 - 660	5 - 30	
prairie bulrush	Schoenoplectus maritimus	SCMA8	3	22 - 220	1 - 10	
rush	Juncus spp.	JUNCU	3	22 - 220	1 - 10	
sedge	Carex spp.	CAREX	3	110 - 330	5 - 15	
common spikerush	Eleocharis palustris	ELPA3	3	110 - 550	5 - 25	
needle spikerush	Eleocharis acicularis	ELAC	3	110 - 550	5 - 25	
other grass-likes		2GL	3	0 - 330	0 - 15	
<b>FORBS</b>			5	110 - 1320	5 - 60	
alkali plantain	Plantago eriopoda	PLER	5	0 - 220	0 - 10	
American licorice	Glycyrrhiza lepidota	GLLE3	5	0 - 330	0 - 15	
bluebells	Mertensia spp.	MERTE	5	0 - 110	0 - 5	
buttercup	Ranunculus spp.	RANUN	5	0 - 330	0 - 15	
evening-primrose	Oenothera spp.	OENOT	5	0 - 330	0 - 15	
lambquarters	Chenopodium album	CHAL7	5	0 - 440	0 - 20	
pepperweed	Lepidium spp.	LEPID	5	0 - 110	0 - 5	
povertyweed	Iva axillaris	IVAX	5	0 - 220	0 - 10	
prairie ironweed	Vernonia fasciculata	VEFA2	5	0 - 220	0 - 10	
Pursh seepweed	Suaeda calceoliformis	SUCA2	5	0 - 330	0 - 15	
showy deathcamas	Zigadenus elegans	ZIEL2	5	0 - 110	0 - 5	
silverleaf cinquefoil	Potentilla argentea	POAR8	5	0 - 220	0 - 10	
slender cinquefoil	Potentilla gracilis var. fastigiata	POGRF2	5	0 - 110	0 - 5	
smartweed	Polygonum spp.	POLYG4	5	0 - 440	0 - 20	
western dock	Rumex aquaticus	RUAQ	5	0 - 330	0 - 15	
wild mint	Mentha arvensis	MEAR4	5	0 - 330	0 - 15	
native forbs		2FN	5	0 - 440	0 - 20	
<b>Annual Production lbs./acre</b>				<b>LOW</b>	<b>RV</b>	<b>HIGH</b>
<b>GRASSES &amp; GRASS-LIKES</b>				1300 -	1485 -	2200
<b>FORBS</b>				100 -	715 -	1800
<b>TOTAL</b>				1400 -	2200 -	4000

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	Reference Plant Community			Western Wheatgrass/ Inland Saltgrass			Foxtail Barley/Inland Saltgrass		
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp
<b>GRASSES &amp; GRASS-LIKES</b>			<b>880 - 1980</b>	<b>40 - 90</b>		<b>1440 - 1620</b>	<b>80 - 90</b>		<b>640 - 720</b>	<b>80 - 90</b>
<b>RHIZOMATOUS WHEATGRASSES</b>		<b>1</b>	<b>330 - 1320</b>	<b>15 - 60</b>	<b>1</b>	<b>720 - 1080</b>	<b>40 - 60</b>	<b>1</b>	<b>40 - 120</b>	<b>5 - 15</b>
western wheatgrass	PASM	1	110 - 1320	5 - 60	1	720 - 1080	40 - 60	1	40 - 120	5 - 15
thickspike wheatgrass	ELLAL	1	0 - 660	0 - 30	1	180 - 540	10 - 30	1	0 - 80	0 - 10
<b>OTHER NATIVE GRASSES</b>		<b>2</b>	<b>110 - 550</b>	<b>5 - 25</b>	<b>2</b>	<b>360 - 900</b>	<b>20 - 50</b>	<b>2</b>	<b>320 - 640</b>	<b>40 - 80</b>
foxtail barley	HOJU	2	0 - 330	0 - 15	2	54 - 180	3 - 10	2	240 - 480	30 - 60
fowl bluegrass	POPA2	2	22 - 220	1 - 10	2	18 - 108	1 - 6	2	0 - 32	0 - 4
plains bluegrass	POAR3	2	0 - 176	0 - 8	2	0 - 90	0 - 5			
alkali bluegrass	POJU	2	0 - 110	0 - 5	2	0 - 90	0 - 5	2	0 - 32	0 - 4
inland saltgrass	DISP	2	22 - 220	1 - 10	2	360 - 720	20 - 40	2	80 - 240	10 - 30
Nuttall's alkaligrass	PUNU2	2	22 - 440	1 - 20	2	90 - 180	5 - 10	2	40 - 80	5 - 10
slender wheatgrass	ELTR7	2	0 - 110	0 - 5	2	0 - 90	0 - 5	2	0 - 40	0 - 5
American sloughgrass	BESY	2	0 - 110	0 - 5	2	0 - 90	0 - 5	2	0 - 40	0 - 5
alkali muhly	MUAS	2	22 - 220	1 - 10	2	0 - 90	0 - 5	2	8 - 80	1 - 10
ticklegass	AGSC5	2	0 - 110	0 - 5	2	0 - 90	0 - 5	2	0 - 40	0 - 5
other grasses	2GRAM	2	0 - 220	0 - 10	2	0 - 90	0 - 5	2	0 - 40	0 - 5
<b>GRASS-LIKES</b>		<b>3</b>	<b>110 - 660</b>	<b>5 - 30</b>	<b>3</b>	<b>90 - 360</b>	<b>5 - 20</b>	<b>3</b>	<b>16 - 160</b>	<b>2 - 20</b>
prairie bulrush	SCMA8	3	22 - 220	1 - 10	3	0 - 90	0 - 5	3	0 - 40	0 - 5
rush	JUNCU	3	22 - 220	1 - 10	3	36 - 180	2 - 10	3	16 - 80	2 - 10
sedge	CAREX	3	110 - 330	5 - 15	3	90 - 270	5 - 15	3	40 - 120	5 - 15
common spikerush	ELPA3	3	110 - 550	5 - 25	3	36 - 180	2 - 10	3	16 - 80	2 - 10
needle spikerush	ELAC	3	110 - 550	5 - 25	3	0 - 90	0 - 5	3	0 - 80	0 - 10
other grass-likes	2GL	3	0 - 330	0 - 15	3	0 - 180	0 - 10	3	0 - 80	0 - 10
<b>NON-NATIVE GRASSES</b>		<b>4</b>			<b>4</b>	<b>0 - 90</b>	<b>0 - 5</b>	<b>4</b>	<b>24 - 120</b>	<b>3 - 15</b>
bluegrass	POA				4	0 - 90	0 - 5	4	16 - 80	2 - 10
cheatgrass	BRTE				4	0 - 90	0 - 5	4	0 - 80	0 - 10
<b>FORBS</b>		<b>5</b>	<b>110 - 1320</b>	<b>5 - 60</b>	<b>5</b>	<b>90 - 360</b>	<b>5 - 20</b>	<b>5</b>	<b>40 - 160</b>	<b>5 - 20</b>
alkali plantain	PLER	5	0 - 220	0 - 10	5	0 - 90	0 - 5	5	0 - 40	0 - 5
American licorice	GLLE3	5	0 - 330	0 - 15	5	0 - 90	0 - 5	5	0 - 40	0 - 5
bluebells	MERTE	5	0 - 110	0 - 5	5	0 - 36	0 - 2			
buttercup	RANUN	5	0 - 330	0 - 15	5	0 - 90	0 - 5	5	0 - 40	0 - 5
cocklebur	XANTH2				5	0 - 180	0 - 10	5	0 - 80	0 - 10
curly dock	RUCR				5	0 - 144	0 - 8			
curlycup gumweed	GRSQ				5	0 - 90	0 - 5	5	0 - 40	0 - 5
evening-primrose	OENOT	5	0 - 330	0 - 15	5	0 - 54	0 - 3	5	0 - 40	0 - 5
lambquarters	CHAL7	5	0 - 440	0 - 20	5	0 - 180	0 - 10	5	0 - 80	0 - 10
pepperweed	LEPID	5	0 - 110	0 - 5	5	0 - 90	0 - 5	5	0 - 40	0 - 5
povertyweed	IVAX	5	0 - 220	0 - 10	5	0 - 180	0 - 10	5	8 - 80	1 - 10
prairie ironweed	VEFA2	5	0 - 220	0 - 10	5	0 - 90	0 - 5	5	0 - 40	0 - 5
Pursh seepweed	SUCA2	5	0 - 330	0 - 15	5	0 - 180	0 - 10	5	0 - 80	0 - 10
showy deathcamas	ZIEL2	5	0 - 110	0 - 5	5	0 - 36	0 - 2	5	0 - 16	0 - 2
silverleaf cinquefoil	POAR8	5	0 - 220	0 - 10	5	0 - 54	0 - 3	5	0 - 24	0 - 3
slender cinquefoil	POGRF2	5	0 - 110	0 - 5	5	0 - 54	0 - 3	5	0 - 24	0 - 3
smartweed	POLYG4	5	0 - 440	0 - 20	5	0 - 90	0 - 5	5	0 - 80	0 - 10
sweetclover	MELIL				5	0 - 360	0 - 20	5	0 - 80	0 - 10
western dock	RUAQ	5	0 - 330	0 - 15	5	0 - 270	0 - 15	5	0 - 120	0 - 15
wild mint	MEAR4	5	0 - 330	0 - 15	5	0 - 90	0 - 5			
native forbs	2FN	5	0 - 440	0 - 20	5	0 - 180	0 - 10	5	0 - 80	0 - 10
introduced forbs	2FI				5	0 - 90	0 - 5	5	0 - 80	0 - 10
<b>Annual Production lbs./acre</b>			<b>LOW RV HIGH</b>			<b>LOW RV HIGH</b>			<b>LOW RV HIGH</b>	
<b>GRASSES &amp; GRASS-LIKES</b>			1300 - 1485 - 2200			1115 - 1575 - 1980			465 - 700 - 920	
<b>FORBS</b>			100 - 715 - 1800			85 - 225 - 420			35 - 100 - 180	
<b>TOTAL</b>			1400 - 2200 - 4000			1200 - 1800 - 2400			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. 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.

### Reference Plant Community

The plant community upon which interpretations are primarily based is the Reference Plant Community. It is actually made up of two somewhat distinct plant communities, which are described below. The Reference Plant Community can be found on areas that are properly managed with grazing and/or prescribed burning, and on areas receiving occasional short periods of deferment.

The potential vegetation is about 40 to 90 percent grass and grass-like species, and 5 to 60 percent forbs. The dominant species fluctuate significantly depending on precipitation cycles. Significant grasses and grass-likes present include western wheatgrass, Nuttall’s alkaligrass, slender wheatgrass, inland saltgrass, bluegrass, ticklegrass, common spikerush, needle Spikerush, and other rushes and sedges. Significant forbs include smartweed, American licorice, buttercup, evening-primrose, silverleaf cinquefoil, slender cinquefoil, and western dock.

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 this sites potential. When present, plant litter is properly distributed with very little movement offsite. Natural plant mortality can be significant following periods of below average precipitation. The diversity in plant species allows for both the fluctuation of ponding as well as the occurrence of randomly occurring drought.

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: SD5808

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

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

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	4	11	19	23	20	12	6	5	0	0

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

- Heavy, continuous grazing will convert the plant community to the *Western Wheatgrass/Inland Saltgrass Plant Community*.

The following describes the transitional plant communities that occur within the Reference Plant Community:

**Western Wheatgrass Plant Community:** Following several years of above average precipitation, the plant community stabilizes and becomes dominated with perennial grasses such as western wheatgrass. Other grasses and grass-likes present include Nuttall’s alkaligrass, sedge, rush, bulrush, slender wheatgrass. The occurrence of forbs will be considerably lower, including some species such as American licorice, bluebells, seepweed, and western dock. The plant community is made up of about 80 to 90 percent grasses and grass-likes, and about 10 to 20 percent forbs. The total annual production (air-dry weight) of this plant community is typically about 3,500 lbs./acre.

**Grass-likes, Forbs Plant Community:** This plant community often occurs after a period of higher precipitation that follows an extended dry cycle. Grasses and grass-likes commonly occurring include sedge, bulrush, spikerush, rush, foxtail barley, ticklegrass, western wheatgrass, and bluegrasses. The forbs commonly found include western dock, mint, Pursh seepweed, lambsquarters, knotweed, evening-primrose, buttercup, and American licorice. The plant community is made up of about 5 to 10 percent grasses, 30 to 40 percent grass-likes, and about 50 to 60 percent forbs. The total annual production (air-dry weight) is about 2,500 lbs./acre.

**Western Wheatgrass/Inland Saltgrass Plant Community**

This plant community is the result of heavy continuous grazing, and in some cases, repeated seasonal grazing such as spring grazing every year. Lack of litter and short plant heights result in higher soil temperatures, poor water infiltration rates, high evaporation, and increased percolation of the high water table, which increases salt concentrations on the surface. This gives inland saltgrass and other salt tolerant species a competitive advantage over less tolerant species.

Western wheatgrass and inland saltgrass drastically increase and are the dominant species with the balance being a few species of cool-season grasses, and grass-likes including Nuttall’s alkaligrass, plains bluegrass, ticklegrass, common spikerush, needle spikerush, and other sedges and rushes. Early cool-season grasses including foxtail barley and bluegrass begin to increase and/or invade. Forbs that will invade are curly dock, sweetclover, and cocklebur while lambsquarters, pepperweed, povertyweed, and western dock will increase. This plant community can occur throughout the pasture, on spot grazed areas, and around water sources where season-long grazing patterns occur.

This plant community is relatively stable and well adapted to increased salinity. Plant vigor, litter, frequency, and production have decreased. The biological integrity, water, and nutrient cycles of this plant community are becoming impaired. This plant community is less productive than the Reference Plant Community.

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: SD5808

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

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

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	4	11	19	23	20	12	6	5	0	0

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

- Heavy continuous grazing without adequate recovery opportunity between grazing events will move this plant community across an ecological threshold to the *Foxtail Barley/Inland Saltgrass Plant Community*.

- Prescribed grazing that includes changing season of use and allowing adequate recovery periods between grazing events will lead this plant community back to the *Reference Plant Community*.

### Foxtail Barley/Inland Saltgrass Plant Community

This plant community developed with heavy continuous grazing where adequate recovery periods between grazing events were not allowed. Patches of inland saltgrass sod are typical and foxtail barley and bluegrass is well distributed throughout the community. Nuttall's alkaligrass and western wheatgrass have been greatly reduced in production and vigor, and may persist in remnant amounts.

This plant community is resistant to change due to the grazing tolerance of inland saltgrass and increased surface salts. A significant amount of production and diversity has been lost when compared to the Reference Plant Community. Loss of key cool season grasses and increased bare ground have negatively impacted energy flow and nutrient cycling. Water infiltration is reduced significantly due to the massive shallow root system "root pan," characteristic of inland saltgrass, and increased bare ground.

It will take a long time to bring this plant community back to the Reference Plant Community with management alone. Renovation (mechanical and/or chemical inputs) is not recommended due to high salt content of the soil and saltgrass persistence.

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

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

- Under long-term prescribed grazing, including adequate recovery periods, this plant community will move through the successional stages, and may eventually lead to the *Western Wheatgrass/Inland Saltgrass Plant Community*. This process will take a long period of time (25+ years).

## 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 Closed Depression Ecological Site (ES) provides upland and wetland complexes cover with an associated forb component. It was typically part of an expansive grassland landscape that included combinations of Shallow Loamy, Shallow Clayey, Thin Loamy, Thin Claypan, Sandy, Sandy Claypan, Loamy, Loamy Terrace, Sandy Terrace, and Clayey ESs.

The Closed Depression ES has remained relatively intact but may be subject to haying under drier conditions. This site has sufficient hydrology to support hydrophytic vegetation and wildlife species associated with ponded and saturated soil conditions. This site receives surface water from adjacent upland sites, snow melt, and rainfall events. The site provides important wetland habitat for birds, small rodents, bats, mammalian predators, reptiles, and insects. These sites also provide forage sites for greater sage-grouse broods.

**Western Wheatgrass and Grass-likes, Forbs (Reference):** This site fluctuates between two separate climax plant communities depending upon the precipitation cycle. During drier cycles, the site is dominated by western wheatgrass. During wetter cycles the site is dominated by grass-like plants (e.g., sedges and rushes) and forbs.

During drier cycles, the western wheatgrass dominated site provides upland wildlife habitat. Mixed-grass species and/or species associated with the adjacent ESs will utilize this site.

During wetter cycles, the sedge, rush, and forb site provides wetland wildlife habitat.

The predominance of hydrophytic vegetation, including a high diversity of sedges and other grass-like species, favors shorebirds (e.g., plovers, sandpipers, and snipe) and wetland associated songbirds. This plant community provides habitat for salamanders, various frog and toad species, and various snake species. Invertebrates are an important component of the food web. Raptors such as northern harrier, short-eared owl, Swainson's hawk, and American kestrel, will use this site. Prey populations are limited to small mammals such as water shrew and meadow vole and invertebrates. When associated with ESs dominated by big sagebrush, greater sage-grouse will use the site for brood rearing/foraging habitat.

**Western Wheatgrass/Inland Saltgrass and Foxtail Barley/Inland Saltgrass:**

Resulting from heavy continuous grazing, this site becomes dominated by shorter more saline tolerant species. The predominance of saline tolerant hydrophytic vegetation does not favor any particular wildlife group. However, the site may receive limited shorebird use. This plant community provides habitat for limited invertebrate populations. Herptile use is either extremely limited or nonexistent. Raptors such as northern harrier, short-eared owl, Swainson's hawk, and American kestrel will use

this site. Prey populations are limited to small mammals such as water shrew and meadow vole and invertebrates.

**Go-back:** This site can be reached whenever severe mechanical disturbance (i.e., abandoned farmland) is eliminated. Early successional plant communities include annual and perennial weedy type species first to occupy the site. These sites provide diverse foraging, reproductive, and escape cover favoring multiple edge species. This pioneer plant community provides abundant opportunity for insect, bird, and small mammal foraging due to abundant flowers and seed sources.

**Excessive Disturbance:** This plant community develops under severe disturbance and/or excessive defoliation. This can result from heavy livestock concentration or cropping. The dominant vegetation includes pioneer 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 foxtail barley, quackgrass, and other nonnative species due to severe soil disturbances and relatively high percent of bare ground. Wildlife use improves with lower levels of foxtail barley and quackgrass invasion. Significant concentrations of these two species will significantly limit wildlife use. Wildlife use may remain relatively unchanged if the annual/pioneer plants are not invasive because of the relative high seed and flower production.

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

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
<b>Grasses and Grass-likes</b>							
alkali bluegrass	U D U D	D P U D	U D U D	U P N D	U P N D	U D U D	U D U D
alkali 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
American sloughgrass	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
common spikerush	N U D U	N U U N	N U D U	N U U N	N U U N	N U D U	N U D U
fowl bluegrass	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 U N
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
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
needle spikerush	N U D U	N U U N	N U D U	N U U N	N U U N	N U D U	N U D U
Nuttall's alkaligrass	U P D D	P P P P	U P D D	P P P P	P P P P	U P D D	U P D D
plains bluegrass	U D U D	N D N U	U D U D	U P N D	U P N D	U D U D	U D U D
prairie bulrush	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	U U U U
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
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
tickleggrass	U D U U	U D U U	U D U U	U D U U	U D U U	U D U U	U D U 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
<b>Forbs</b>							
alkali plantain	U D U U	N U U N	U D U U	N U U N	N U U N	U D U U	N U U N
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
bluebells	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
buttercup	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
evening-primrose	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
lambquarters	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
pepperweed	N N N N	N N N N	N U N N	N N N N	N N N N	N N N N	N N N N
povertyweed	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
prairie ironweed	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
Pursh seepweed	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
showy deathcamas	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
silverleaf cinquefoil	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
slender cinquefoil	N N N N	N U D N	N N N N	N U D N	N U D N	N N N N	N U D N
smartweed	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 dock	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
wild mint	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

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

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

### Animal Community – Grazing Interpretations

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

### Similar Sites

(R058DY010SD) – Saline Lowland [less western wheatgrass; less forbs]  
(R058DY011SD) – Clayey [less grass-like species; less 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

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MT, State Range Management Specialist

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Date

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

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Date

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

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Date