

United States Department of Agriculture Natural Resources Conservation Service

Ecological Site Description

Site Type: Rangeland

Site Name: Saline Overflow

Site ID: R058DY033SD

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



Physiographic Features

This site occurs on concave to nearly level areas adjacent to streams and on gently sloping uplands.

Landform: flood plain, swale, drainageway

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:	Occasional	Frequent
Duration:	Brief	Brief
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 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. Green up of cool-season plants may occur in September and October when adequate soil moisture is present.

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

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

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

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

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

Influencing Water Features

No significant water features influence this site.

Representative Soil Features

The features common to soils in this site are the silt loam and loam textured surface layers and slopes of zero to three percent. The soils in this site are well drained and formed in fine-loamy alluvium derived from sedimentary rock. The surface layer is 10 to 15 inches thick. The texture of the subsurface layers range from fine sand to silty clay loam. 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. The soil surface is stable and intact. These soils are susceptible to water erosion. The hazard of water erosion increases when vegetation is greatly reduced and bare ground increases. Headcuts can begin resulting in gullies to occur.

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

	<u>Minimum</u>	<u>Maximum</u>
Drainage Class:	well	well
Permeability Class:	slow	slow
Depth to Bedrock (inches):	80	80
Electrical Conductivity (mmhos/cm)*:	0	16
Sodium Absorption Ratio*:	0	8
Soil Reaction (1:1 Water)*:	6.1	9.0
Soil Reaction (0.1M CaCl₂)*:	NA	NA
Available Water Capacity (inches)*:	7	7
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.

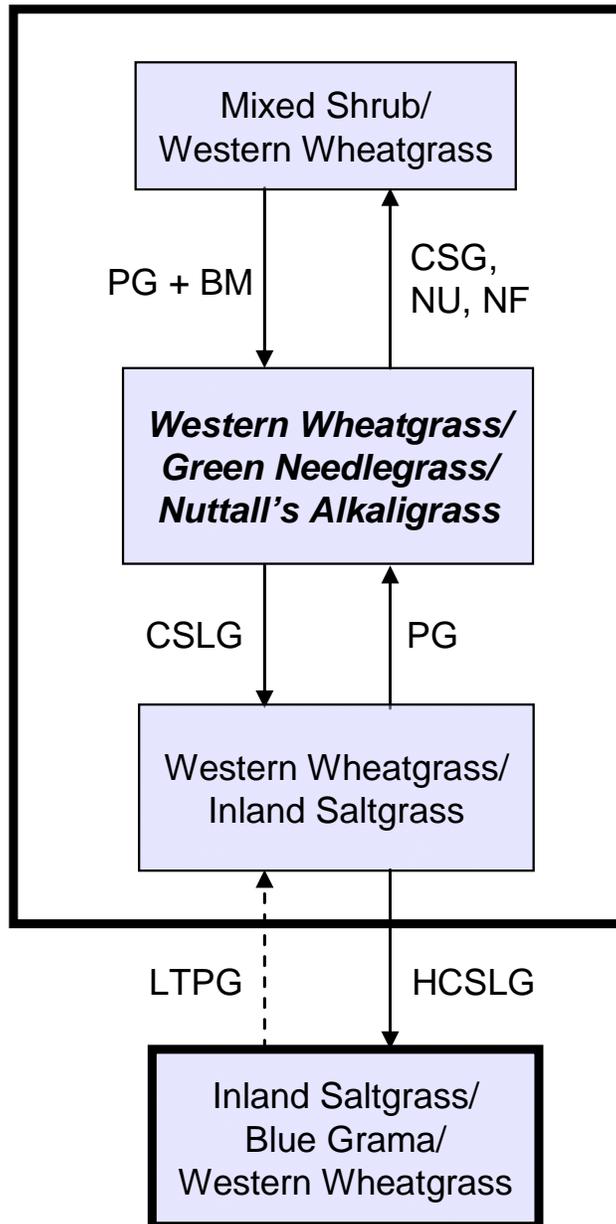
The plant community upon which interpretations are primarily based is the Western Wheatgrass/Green Needlegrass/Nuttall’s Alkaligrass Plant Community. This plant community has been determined by studying rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational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

Continuous grazing without adequate recovery periods following each grazing occurrence over several years causes this site to depart from the Western Wheatgrass/Green Needlegrass/Nuttall’s Alkaligrass Plant Community. Species such as western wheatgrass and blue grama will initially increase. Nuttall’s alkaligrass, green needlegrass, and switchgrass will decrease in frequency and production. Heavy continuous grazing causes inland saltgrass to increase and eventually develops into a sod condition. Extended periods of nonuse and no fire will result in a plant community having high litter levels, which favors an increase in western snowberry, chokecherry, silver buffaloberry,

Kentucky bluegrass, and annual bromes.

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); **HCSLG** – Heavy continuous season-long grazing; **LTPG** – Long-term prescribed grazing; **CSG** – Continuous seasonal grazing; **CSLG** – Continuous season-long grazing; **NF** – No fire; **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	Western Wheatgrass/Green Needlegrass/Nuttall's Alkaligrass		
			Group	lbs./acre	% Comp
GRASSES & GRASS-LIKES				1950 - 2340	75 - 90
RHIZOMATOUS COOL-SEASON GRASSES			1	520 - 910	20 - 35
western wheatgrass	Pascopyrum smithii	PASM	1	520 - 780	20 - 30
slender wheatgrass	Elymus trachycaulus	ELTR7	1	52 - 260	2 - 10
plains bluegrass	Poa arida	POAR3	1	0 - 130	0 - 5
COOL-SEASON BUNCHGRASSES			2	260 - 650	10 - 25
Nuttall's alkaligrass	Puccinellia nuttalliana	PUNU2	2	130 - 520	5 - 20
green needlegrass	Nassella viridula	NAVI4	2	130 - 520	5 - 20
Canada wildrye	Elymus canadensis	ELCA4	2	0 - 130	0 - 5
SHORT WARM-SEASON GRASSES			3	130 - 390	5 - 15
inland saltgrass	Distichlis spicata	DISP	3	52 - 390	2 - 15
blue grama	Bouteloua gracilis	BOGR2	3	52 - 260	2 - 10
TALL WARM-SEASON GRASSES			4	52 - 208	2 - 8
tall dropseed	Sporobolus compositus var. compositus	SPCOC2	4	26 - 130	1 - 5
switchgrass	Panicum virgatum	PAVI2	4	26 - 130	1 - 5
OTHER NATIVE GRASSES			5	26 - 130	1 - 5
prairie junegrass	Koeleria macrantha	KOMA	5	26 - 78	1 - 3
bottlebrush squirreltail	Elymus elymoides	ELEL5	5	0 - 52	0 - 2
other grasses		2GRAM	5	0 - 130	0 - 5
GRASS-LIKES			6	26 - 130	1 - 5
sedge	Carex spp.	CAREX	6	26 - 130	1 - 5
other grass-likes		2GL	6	0 - 104	0 - 4
FORBS			8	130 - 260	5 - 10
American licorice	Glycyrrhiza lepidota	GLLE3	8	0 - 78	0 - 3
American vetch	Vicia americana	VIAM	8	26 - 52	1 - 2
blue-eyed grass	Sisyrinchium spp.	SISYR	8	0 - 26	0 - 1
cinquefoil	Potentilla spp.	POTEN	8	26 - 52	1 - 2
cudweed sagewort	Artemisia ludoviciana	ARLU	8	26 - 78	1 - 3
goldenrod	Solidago spp.	SOLID	8	26 - 52	1 - 2
Maximilian sunflower	Helianthus maximiliani	HEMA2	8	0 - 52	0 - 2
meadow anemone	Anemone canadensis	ANCA8	8	0 - 26	0 - 1
prairie coneflower	Ratibida columnifera	RACO3	8	26 - 52	1 - 2
purple prairie clover	Dalea purpurea	DAPU5	8	26 - 52	1 - 2
scurfpea	Psoralegium spp.	PSORA2	8	26 - 52	1 - 2
wavyleaf thistle	Cirsium undulatum	CIUN	8	26 - 52	1 - 2
western yarrow	Achillea millefolium var. occidentalis	ACMIO	8	0 - 26	0 - 1
white prairie aster	Symphotrichum falcatum	SYFA	8	26 - 52	1 - 2
native forbs		2FN	8	26 - 104	1 - 4
SHRUBS			9	130 - 390	5 - 15
chokecherry	Prunus virginiana	PRVI	9	0 - 78	0 - 3
fringed sagewort	Artemisia frigida	ARFR4	9	26 - 78	1 - 3
rose	Rosa spp.	ROSA5	9	26 - 78	1 - 3
silver buffaloberry	Shepherdia argentea	SHAR	9	26 - 104	1 - 4
silver sagebrush	Artemisia cana	ARCA13	9	0 - 78	0 - 3
western snowberry	Symphoricarpos occidentalis	SYOC	9	26 - 130	1 - 5
wild plum	Prunus americana	PRAM	9	0 - 78	0 - 3
other shrubs		2SHRUB	9	0 - 104	0 - 4
TREES			10	0 - 52	0 - 2
American elm	Ulmus americana	ULAM	10	0 - 52	0 - 2
bur oak	Quercus macrocarpa	QUMA2	10	0 - 52	0 - 2
green ash	Fraxinus pennsylvanica	FRPE	10	0 - 52	0 - 2
plains cottonwood	Populus deltoides ssp. monilifera	PODEM	10	0 - 52	0 - 2
other trees		2TREE	10	0 - 52	0 - 2

Annual Production lbs./acre	LOW	RV	HIGH
GRASSES & GRASS-LIKES	1570 -	2119	-2590
FORBS	115 -	195	-295
SHRUBS	115 -	260	-460
TREES	0 -	26	-55
TOTAL	1800 -	2600	-3400

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/Green Needlegrass/Nuttall's Alkaligrass			Mixed Shrub/ Western Wheatgrass			Western Wheatgrass/ Inland Saltgrass			Inland Saltgrass/Blue Grama/ Western Wheatgrass		
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp
GRASSES & GRASS-LIKES			1950 - 2340	75 - 90		1365 - 1785	65 - 85		1125 - 1350	75 - 90		825 - 935	75 - 85
RHIZOMATOUS COOL-SEASON		1	520 - 910	20 - 35	1	315 - 630	15 - 30	1	300 - 450	20 - 30	1	11 - 110	1 - 10
western wheatgrass	PASM	1	520 - 780	20 - 30	1	315 - 525	15 - 25	1	300 - 450	20 - 30	1	11 - 110	1 - 10
slender wheatgrass	ELTR7	1	52 - 260	2 - 10	1	21 - 168	1 - 8	1	0 - 45	0 - 3			
plains bluegrass	POAR3	1	0 - 130	0 - 5	1	0 - 105	0 - 5	1	0 - 30	0 - 2			
COOL-SEASON BUNCHGRASSES		2	260 - 650	10 - 25	2	105 - 420	5 - 20	2	15 - 150	1 - 10	2	0 - 22	0 - 2
Nuttall's alkaligrass	PUNU2	2	130 - 520	5 - 20	2	42 - 315	2 - 15	2	15 - 120	1 - 8	2	0 - 22	0 - 2
green needlegrass	NAV14	2	130 - 520	5 - 20	2	42 - 315	2 - 15	2	0 - 105	0 - 7			
Canada wildrye	ELCA4	2	0 - 130	0 - 5	2	0 - 63	0 - 3						
SHORT WARM-SEASON GRASSES		3	130 - 390	5 - 15	3	105 - 252	5 - 12	3	150 - 450	10 - 30	3	385 - 605	35 - 55
inland saltgrass	DISP	3	52 - 390	2 - 15	3	42 - 252	2 - 12	3	150 - 375	10 - 25	3	275 - 495	25 - 45
blue grama	BOGR2	3	52 - 260	2 - 10	3	42 - 168	2 - 8	3	30 - 150	2 - 10	3	22 - 165	2 - 15
TALL WARM-SEASON GRASSES		4	52 - 208	2 - 8	4	0 - 84	0 - 4	4	0 - 45	0 - 3	4		
tall dropseed	SPCOC2	4	26 - 130	1 - 5	4	0 - 63	0 - 3	4	0 - 30	0 - 2			
switchgrass	PAVI2	4	26 - 130	1 - 5	4	0 - 42	0 - 2	4	0 - 15	0 - 1			
OTHER NATIVE GRASSES		5	26 - 130	1 - 5	5	21 - 105	1 - 5	5	15 - 60	1 - 4	5	0 - 33	0 - 3
prairie junegrass	KOMA	5	26 - 78	1 - 3	5	21 - 42	1 - 2	5	15 - 30	1 - 2	5	0 - 11	0 - 1
bottlebrush squirreltail	ELEL5	5	0 - 52	0 - 2	5	0 - 42	0 - 2	5	0 - 15	0 - 1			
other grasses	2GRAM	5	0 - 130	0 - 5	5	0 - 105	0 - 5	5	0 - 60	0 - 4	5	0 - 22	0 - 2
GRASS-LIKES		6	26 - 130	1 - 5	6	21 - 105	1 - 5	6	15 - 60	1 - 4	6	11 - 55	1 - 5
sedge	CAREX	6	26 - 130	1 - 5	6	21 - 105	1 - 5	6	15 - 45	1 - 3	6	11 - 33	1 - 3
other grass-like	2GL	6	0 - 104	0 - 4	6	0 - 84	0 - 4	6	0 - 30	0 - 2	6	0 - 22	0 - 2
NON-NATIVE GRASSES		7			7	21 - 210	1 - 10	7	30 - 180	2 - 12	7	11 - 110	1 - 10
bluegrass	POA				7	21 - 168	1 - 8	7	30 - 180	2 - 12	7	11 - 88	1 - 8
cheatgrass	BRTE				7	0 - 105	0 - 5	7	0 - 75	0 - 5	7	0 - 44	0 - 4
FORBS		8	130 - 260	5 - 10	8	105 - 315	5 - 15	8	75 - 225	5 - 15	8	55 - 165	5 - 15
American licorice	GLLE3	8	0 - 78	0 - 3	8	21 - 63	1 - 3	8	0 - 30	0 - 2			
American vetch	VIAM	8	26 - 52	1 - 2	8	0 - 21	0 - 1						
blue-eyed grass	SISYR	8	0 - 26	0 - 1									
cinquefoil	POTEN	8	26 - 52	1 - 2	8	0 - 21	0 - 1						
cudweed sagewort	ARLU	8	26 - 78	1 - 3	8	21 - 84	1 - 4	8	15 - 75	1 - 5	8	11 - 55	1 - 5
goldenrod	SOLID	8	26 - 52	1 - 2	8	21 - 84	1 - 4	8	15 - 75	1 - 5	8	11 - 55	1 - 5
Maximilian sunflower	HEMA2	8	0 - 52	0 - 2	8	0 - 21	0 - 1						
meadow anemone	ANCA8	8	0 - 26	0 - 1									
prairie coneflower	RACO3	8	26 - 52	1 - 2	8	0 - 42	0 - 2	8	0 - 15	0 - 1			
purple prairie clover	DAPU5	8	26 - 52	1 - 2	8	21 - 42	1 - 2	8	0 - 15	0 - 1			
scurfpea	PSORA2	8	26 - 52	1 - 2	8	21 - 84	1 - 4	8	15 - 75	1 - 5	8	11 - 55	1 - 5
wavyleaf thistle	CIUN	8	26 - 52	1 - 2	8	21 - 42	1 - 2	8	0 - 30	0 - 2			
western yarrow	ACMIO	8	0 - 26	0 - 1	8	21 - 42	1 - 2	8	15 - 45	1 - 3	8	11 - 55	1 - 5
white prairie aster	SYFA	8	26 - 52	1 - 2	8	21 - 63	1 - 3	8	15 - 60	1 - 4	8	11 - 33	1 - 3
native forbs	2FN	8	26 - 104	1 - 4	8	21 - 84	1 - 4	8	15 - 45	1 - 3	8	11 - 33	1 - 3
introduced forbs	2FI				8	0 - 84	0 - 4	8	0 - 75	0 - 5	8	0 - 88	0 - 8
SHRUBS		9	130 - 390	5 - 15	9	210 - 420	10 - 20	9	30 - 150	2 - 10	9	55 - 110	5 - 10
chokecherry	PRVI	9	0 - 78	0 - 3	9	0 - 84	0 - 4	9	0 - 15	0 - 1			
fringed sagewort	ARFR4	9	26 - 78	1 - 3	9	21 - 84	1 - 4	9	15 - 60	1 - 4	9	11 - 55	1 - 5
rose	ROSA5	9	26 - 78	1 - 3	9	21 - 63	1 - 3	9	15 - 45	1 - 3	9	11 - 22	1 - 2
silver buffaloberry	SHAR	9	26 - 104	1 - 4	9	21 - 126	1 - 6	9	0 - 60	0 - 4	9	0 - 22	0 - 2
silver sagebrush	ARCA13	9	0 - 78	0 - 3	9	21 - 84	1 - 4	9	0 - 45	0 - 3	9	0 - 11	0 - 1
western snowberry	SYOC	9	26 - 130	1 - 5	9	42 - 252	2 - 12	9	15 - 60	1 - 4	9	11 - 44	1 - 4
wild plum	PRAM	9	0 - 78	0 - 3	9	0 - 84	0 - 4	9	0 - 30	0 - 2			
other shrubs	2SHRUB	9	0 - 104	0 - 4	9	0 - 126	0 - 6	9	0 - 45	0 - 3	9	0 - 33	0 - 3
TREES		10	0 - 52	0 - 2	10	0 - 42	0 - 2	10	0 - 30	0 - 2	10	0 - 22	0 - 2
American elm	ULAM	10	0 - 52	0 - 2	10	0 - 42	0 - 2	10	0 - 30	0 - 2	10	0 - 22	0 - 2
bur oak	QUMA2	10	0 - 52	0 - 2	10	0 - 42	0 - 2	10	0 - 30	0 - 2	10	0 - 22	0 - 2
green ash	FRPE	10	0 - 52	0 - 2	10	0 - 42	0 - 2	10	0 - 30	0 - 2	10	0 - 22	0 - 2
plains cottonwood	PODEM	10	0 - 52	0 - 2	10	0 - 42	0 - 2	10	0 - 30	0 - 2	10	0 - 22	0 - 2
other trees	2TREE	10	0 - 52	0 - 2	10	0 - 42	0 - 2	10	0 - 30	0 - 2	10	0 - 22	0 - 2
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			1570 - 2119 - 2590		1120 - 1554 - 1890		805 - 1245 - 1645		600 - 897 - 1270				
FORBS			115 - 195 - 295		95 - 210 - 365		70 - 150 - 255		50 - 110 - 185				
SHRUBS			115 - 260 - 460		185 - 315 - 500		25 - 90 - 165		50 - 83 - 120				
TREES			0 - 26 - 55		0 - 21 - 45		0 - 15 - 35		0 - 11 - 25				
TOTAL			1800 - 2600 - 3400		1400 - 2100 - 2800		900 - 1500 - 2100		700 - 1100 - 1600				

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/Green Needlegrass/Nuttall’s Alkaligrass Plant Community

The interpretive plant community for this site is the Western Wheatgrass/Green Needlegrass/Nuttall’s Alkaligrass 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 75 to 90 percent grasses or grass-like plants, 5 to 10 percent forbs, 5 to 15 percent shrubs, and 0 to 2 percent trees. This plant community is dominated by cool-season grasses. The major grasses include western wheatgrass, green needlegrass, and Nuttall’s alkaligrass. Other grasses or grass-likes occurring on the site include slender wheatgrass, blue grama, switchgrass, prairie Junegrass, and sedge. Significant forbs include cudweed sagewort, goldenrod, white prairie aster, and scurfpea. The significant shrubs that occur include rose, western snowberry, silver buffaloberry, and wild plum.

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 season-long grazing will lead to the *Western Wheatgrass/Inland Saltgrass Plant Community*. This occurs with exposure to herbivory during the entire growing season at moderate stocking rates.

- Continuous seasonal grazing with no fire or non-use and no fire will lead this plant community to the *Mixed Shrub/Western Wheatgrass Plant Community*.

Western Wheatgrass/Inland Saltgrass Plant Community

This plant community develops under continuous season-long grazing or from over utilization during extended drought periods. The potential vegetation is made up of approximately 75 to 90 percent grasses and grass-like species, 5 to 15 percent forbs, 2 to 10 percent shrubs, and 0 to 2 percent trees. The dominant grasses include western wheatgrass and inland saltgrass. Other grasses or grass-likes may include sedge, blue grama, slender wheatgrass, green needlegrass, bluegrass, cheatgrass, and prairie Junegrass. Significant forbs include cudweed sagewort, goldenrod, scurfpea, western yarrow, and white prairie aster. The dominant shrubs that occur include western snowberry, wild plum, and rose.

Compared to the Western Wheatgrass/Green Needlegrass/Nuttall’s Alkaligrass Plant Community, Nuttall’s alkaligrass and green needlegrass have decreased while the shortgrass species including blue grama and inland saltgrass have increased. Annual bromes, 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 relatively stable and less productive than the Western Wheatgrass/Green Needlegrass/Nuttall’s Alkaligrass 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 the saltgrass.

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/Green Needlegrass/Nuttall’s Alkaligrass Plant Community*.
- With heavy continuous season-long grazing this plant community will move towards the *Inland Saltgrass/Blue Grama/Western Wheatgrass 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 continuous seasonal grazing (grazing the same time of year every year). In either case, shrubs increase and can sometimes dominate the plant community from a visual standpoint. Cool-season grasses make up the majority of the understory with the balance made up of short warm-season grasses and miscellaneous forbs. Western wheatgrass is the dominant grass. Grasses of secondary importance include green needlegrass, inland saltgrass, prairie Junegrass, and blue grama. Woody plants such as snowberry, wild plum, rose, chokecherry,

and silver buffaloberry increase with canopy cover up to 20 percent or more. Forbs commonly found in this plant community include cudweed sagewort, goldenrod, western yarrow, white prairie aster, and scurfpea.

This plant community is resistant to change without prescribed grazing and/or fire. The combination of both grazing and fire or other means to reduce shrub cover is most effective in moving this plant community toward the Western Wheatgrass/Green Needlegrass/Nuttall’s Alkaligrass Plant Community. Soil erosion is low but runoff is increased. Once this stage has advanced, time and external resources will be needed to see recovery in the diversity of the site.

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:

- Prescribed grazing with brush management and favorable climatic conditions, which allow for adequate plant recovery periods, may cause a shift to the *Western Wheatgrass/Green Needlegrass/Nuttall’s Alkaligrass Plant Community*.

Inland Saltgrass/Blue Grama/Western Wheatgrass Plant Community

This plant community developed with heavy continuous season-long grazing. Inland saltgrass dominates the community and can develop into a “sodbound” appearance. Low vigor western wheatgrass can be found scattered throughout the community. Green needlegrass has been greatly reduced. Nuttall’s alkaligrass may persist in minor amounts, greatly reduced in vigor, and not readily seen. Western yarrow, scurfpea, ragweed, and goldenrod have increased. Nonnative grasses and forbs such as annual bromes, thistle, and cocklebur may invade this plant community.

This plant community is resistant to change due to grazing tolerance of inland saltgrass. A significant amount of production and diversity has been lost when compared to the Western Wheatgrass/Green Needlegrass/Nuttall’s Alkaligrass Plant Community. The dominance of inland saltgrass and loss of other desirable species has negatively impacted energy flow and nutrient cycling. Water infiltration is reduced significantly. Soil loss may be accelerated where concentrated flows occur. Long-term improved management may restore this plant community. 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: SD5804

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

Growth curve description: Warm-season dominant, cool-season subdominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	7	18	25	25	15	7	1	0	0

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

- Under long-term prescribed grazing, including adequate recovery periods, this plant community may eventually move towards a plant community resembling the *Western Wheatgrass/Green Needlegrass/Nuttall's Alkaligrass Plant Community*. This will take a long period of time and intensive management.

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 Saline Overflow Ecological Site (ES) provides upland grassland cover with an associated forb, shrub, and tree component. It was typically part of a 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.

Due to the saline conditions and dominance of inland saltgrass, tree species are largely absent. This site provides habitat for grassland and shrub nesting birds, small rodents, and mammalian predators, with lesser numbers of reptiles, amphibians, and insects. This site provides limited foraging and brood rearing habitat for upland game birds such as greater sage-grouse and sharp-tailed grouse. However, due to the presence of inland saltgrass ground nesting bird reproduction may be reduced or at least shifted to favor short grass nesters.

Western Wheatgrass/Green Needlegrass/Nuttall's Alkaligrass: The predominance of grasses plus high diversity of forbs and shrubs in this community favors grazers and mixed-feeders, such as white-tailed deer. Plant communities associated with the shrub community provide habitat for songbirds such as the brown thrasher, yellow warbler, gray catbird, Say's phoebe, loggerhead shrike, Lazuli bunting, and yellow breasted chat. Insects, such as pollinators, play a large role in maintaining the forb community and provide a forage base for birds and other species. Diverse Prey populations are available for grassland raptors and mammalian predators.

The diversity of grasses, forbs and shrubs provide high nutrition levels for small and large herbivores including voles, mice, thirteen-lined ground squirrel, Eastern cottontail rabbit, white-tailed jackrabbit, and deer. The relatively high stature of this plant community provides suitable thermal, protective and escape cover for small and large mammals. This plant community provides limited habitat for various amphibian and reptile species such as frogs, toads, salamanders, and bull and garter snakes. Introduced bird species such as European starling, ring-necked pheasant, and gray partridge will use this site.

Mixed Shrub/Western Wheatgrass: Resulting from continuous seasonal grazing, nonuse, or reduction in fire frequency, shrubs, and western wheatgrass will dominate. Shrub diversity and density has increased. The tree component is minimal and remains largely unchanged. 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. Predators utilizing this plant community include the coyote, red fox, long-tailed weasel, and raccoon. This plant community provides limited habitat for a few amphibian and reptile species.

Western Wheatgrass/Inland Saltgrass Resulting from continuous seasonal grazing, western wheatgrass and inland saltgrass will dominate. The forb community remains relatively unchanged. The shrub community decreases in both diversity and abundance. The tree community is most likely absent. Shrub nesting bird occurrence would most likely be reduced. Small mammals such as voles and mice may decrease due to the decline in litter. Predators utilizing this plant community include the coyote, red fox, long-tailed weasel, and raccoon. This plant community provides limited habitat for a few amphibian and reptile species.

Inland Saltgrass/Blue Grama/Western Wheatgrass: Resulting from heavy, continuous season-long grazing, inland saltgrass and blue grama will dominate this site with lesser amounts of stressed western wheatgrass. The shrub diversity has decreased slightly but shrub abundance has greatly increased over the western wheatgrass and inland saltgrass community. The increase in shrub abundance results in increased habitat for brown thrasher, yellow warbler, gray catbird, loggerhead shrike, Lazuli bunting, and yellow breasted chat. The shorter grass species favor short grass nesting birds and may lead to increased predation by land and aerial predators (e.g., mammals and raptors). Increased soil temperature reduces habitat quality for most amphibians. This plant community provides limited habitat for a few amphibian and reptile species.

Ecological processes on this site have been impacted by decreased litter and increased sod, interfering with nutrient and water cycles decreasing graminoid diversity. Water infiltration is reduced significantly thereby increasing runoff, resulting in sediment loading and warmer water to adjacent waterways.

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
bottlebrush squirreltail	U D U U	N D U N	U D U U	N D U N	N D U N	U D U U	U D U 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
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
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 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
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
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
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
blue-eyed grass	U U U U	U U P U	U U U U	U U P U	U U P U	U U U U	U U P U
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
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
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
meadow anemone	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 U U
prairie coneflower	U U D U	U P P U	U U D U	U P P U	U P P U	U U D U	U P P U
purple 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
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
bur oak	T T T T	T T T T	N N N N	N U D U	N N N N	T T T T	N U D 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
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
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 buffaloberry	D U U U	D U U U	D U U U	P U D P	U U U U	D U U U	D U U 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
wild plum	D U U D	D U U D	D U U D	P U D D	D U U D	D U U D	D U U D

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

[†] Quarters: 1 – Jan., Feb., Mar.; 2 – Apr., May, Jun.; 3 – Jul., Aug., Sep.; 4 – Oct., Nov., Dec.

Animal Community – Grazing Interpretations

As this site improves in condition through proper management (from the more 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 Inland Saltgrass/Blue Grama/Western Wheatgrass Plant Community is of limited value for livestock production.

Grazing by domestic livestock is one of the major income-producing industries in the area. Rangeland in this area may provide yearlong forage. During the dormant period, the forage for livestock will likely be lacking protein to meet livestock requirements, and added protein will allow ruminants to better utilize the energy stored in grazed plant materials. A forage quality test (either directly or through fecal sampling) should be used to determine the level of supplementation needed.

Hydrology Functions

Water is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic group B. Infiltration and runoff potential for this site varies from low to moderate depending on slope and ground cover. In many cases, areas with greater than 75 percent ground cover have the greatest potential for high infiltration and lower runoff. An exception would be where shortgrasses form a strong sod and dominate the site. Normally, areas where ground cover is less than 50 percent have the greatest potential to have reduced infiltration and higher runoff (refer to Section 4, NRCS National Engineering Handbook for runoff quantities and hydrologic curves).

Recreational Uses

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

Wood Products

No appreciable wood products are typically present on this site.

Other Products

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

Supporting Information

Associated Sites

Loamy (R058DY010SD), Sandy (R058DY009SD), Loamy Terrace (R058DY022SD)

Similar Sites

(R058DY022SD) – Loamy Terrace [less Nuttall's alkaligrass; 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; Stan Boltz, RMS, NRCS; Dennis Froemke, RMS, NRCS; Cheryl Nielsen, RMS, NRCS; Jeff Printz, RMS, NRCS; and Darrell Vanderbusch, Soil Scientist, NRCS.

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