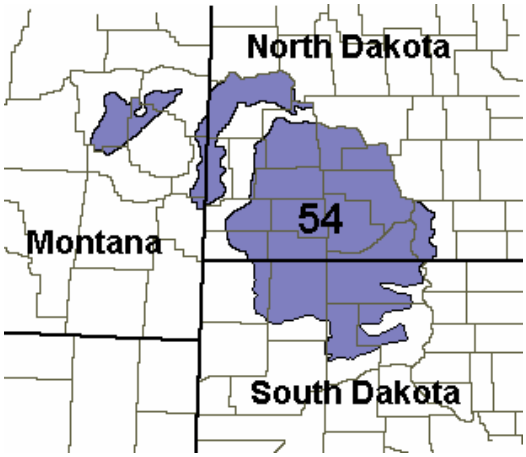
United States Department of Agriculture
Natural Resources Conservation Service

Ecological Site Description



Site Name: Saline Lowland

Site Type: Rangeland

Site ID: R054XY024ND

Major Land Resource Area (MLRA): 54–Rolling Soft Shale Plain

For more information on MLRA's refer to the following web site: http://www.essc.psu.edu/soil_info/soil_lrr/.

Physiographic Features

This site occurs on gently undulating to rolling sedimentary uplands.

Landform: flood plain, drainageway, and upland **Aspect:** NA

	Minimum	Maximum
Elevation (feet):	1600	3600
Slope (percent):	0	2
Water Table Depth (inches):	0	>36
Flooding:		
Frequency:	Rare	Occasional
Duration:	Very brief	Long
Ponding:		
Depth (inches):	0	0
Frequency:	None	None
Duration:	None	None
Runoff Class:	Low	High

Climatic Features

MLRA 54 is considered to have a continental climate – cold winters and hot summers, low humidity, light rainfall, and much sunshine. Extremes in temperature are characteristic. The climate is the result of this MLRA's location in the geographic center of North America. There are few natural barriers on the northern Great Plains. The air masses move unobstructed across the plains and account for rapid changes in temperature.

Annual precipitation ranges from 14 to 18 inches per year. The normal average annual temperature is about 42°F. January is the coldest month with average temperatures ranging from about 13°F (Beach, North Dakota (ND),) to about 16°F (Bison, South Dakota (SD)). July is the warmest month with temperatures averaging from about 69°F (Beach, ND,) to about 72°F (Timber Lake, SD). The range of normal average monthly temperatures between the coldest and warmest months is about 57°F. This large annual range attests to the continental nature of this MLRA's climate. Hourly winds are estimated to average about 11 miles per hour annually, ranging from about 13 miles per hour

during the spring to about 10 miles per hour 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 miles per hour.

Growth of native cool-season plants begins in late March and continues to early to mid July. Native warm-season plants begin growth in mid May and continue to the end of August. Green up of cool-season plants can occur in September and October when adequate soil moisture is present.

	Minimum	Maximum
Frost-free period (days):	119	136
Freeze-free period (days):	139	157
Mean Annual Precipitation (inches):	14	18

Average Monthly Precipitation (inches) and Temperature (ºF):

	Precip. Min.	Precip. Max	Temp. Min.	Temp. Max.
January	0.41	0.54	2.2	23.8
February	0.37	0.61	8.7	30.4
March	0.51	1.07	17.1	40.0
April	1.13	1.88	28.9	56.8
May	1.98	2.83	40.5	69.3
June	2.83	3.29	49.8	78.3
July	2.05	2.25	54.6	85.2
August	1.49	2.07	53.0	84.3
September	1.29	1.45	42.0	73.4
October	0.89	1.35	31.6	60.4
November	0.48	0.61	19.0	41.5
December	0.42	0.55	8.1	29.0

Climate Stations		Period	
Station ID	**Location or Name**	**From**	**To**
ND0590	Beach	1949	1999
MT7560	Sidney	1949	1999
SD8307	Timber Lake	1948	1999
ND2183	Dickinson FAA AP	1948	1999

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

Influencing Water Features

Stream Type: DA6
(Rosgen System)

Representative Soil Features

The common features of soils of this site are the sandy loam to clay-textured subsoils and slopes of zero to two percent. The soils in this site are poorly drained and formed in calcareous alluvium. The silt loam to very fine sandy loam surface layer is one to five inches thick. Salinity is moderate to strong. Rills and gullies should not typically be present. Water flow patterns should be barely distinguishable if at all present. Pedestals are only slightly present in association with bunchgrasses such as Nuttall's alkaligrass and slender wheatgrass. Litter typically falls in place, and signs of movement are not common. Chemical and physical crusts are common. Cryptogamic crusts occasionally occur on the soil surface. Typically, the interpretive plant community will have good cover of perennial grasses and limited areas of bare ground and infrequent salt crusts.

These soils are susceptible to wind and water erosion. The hazard of water erosion increases on areas that are denuded of vegetation. Stream channels are intact with occasional water pockets scattered throughout. Loss of the soil surface layer can result in a shift in species composition and/or production.

Major soil series correlated to this ecological site can be found in Section II of the Natural Resources Conservation Service (NRCS) Field Office Technical Guide or the following web sites:

North Dakota: http://www.nd.nrcs.usda.gov.
South Dakota: http://www.sd.nrcs.usda.gov.
Montana: http://www.mt.nrcs.usda.gov.

Parent Material Kind: alluvium
Parent Material Origin: sedimentary, unspecified
Surface Texture: loam, silt loam, very fine sandy loam
Surface Texture Modifier: none
Subsurface Texture Group: loamy
Surface Fragments ≤ 3" (% Cover): 0
Surface Fragments > 3" (%Cover): 0
Subsurface Fragments ≤ 3" (% Volume): 0-20
Subsurface Fragments > 3" (% Volume): 0-10

	Minimum	Maximum
Drainage Class:	poorly	moderately well
Permeability Class:	very slow	moderate
Depth to first restrictive layer (inches):	4	72
Electrical Conductivity (mmhos/cm)*:	8	>16
Sodium Absorption Ratio*:	2	25
Soil Reaction (1:1 Water)*:	6.6	9.0
Soil Reaction (0.1M CaCl2)*:	NA	NA
Available Water Capacity (inches)*:	1	5
Calcium Carbonate Equivalent (percent)*:	1	15

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

Plant Communities

Ecological Dynamics of the Site:
The site developed under Northern Great Plains climatic conditions, and included natural influence of large herbivores and occasional fire. Changes will occur in the plant communities due to climatic conditions and/or management actions. Due to the nature of the soils, the site is considered quite fragile. Under continued adverse impacts, a rapid decline in vegetative vigor and composition will occur. Under favorable vegetative management treatments the site can slowly return to the Historic Climax Plant Community (HCPC).

The plant community upon which interpretations are primarily based is the HCPC. The HCPC has been determined by study of 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 considered. Subclimax plant communities, states, transitional pathways, and thresholds have been determined through similar studies and experience.

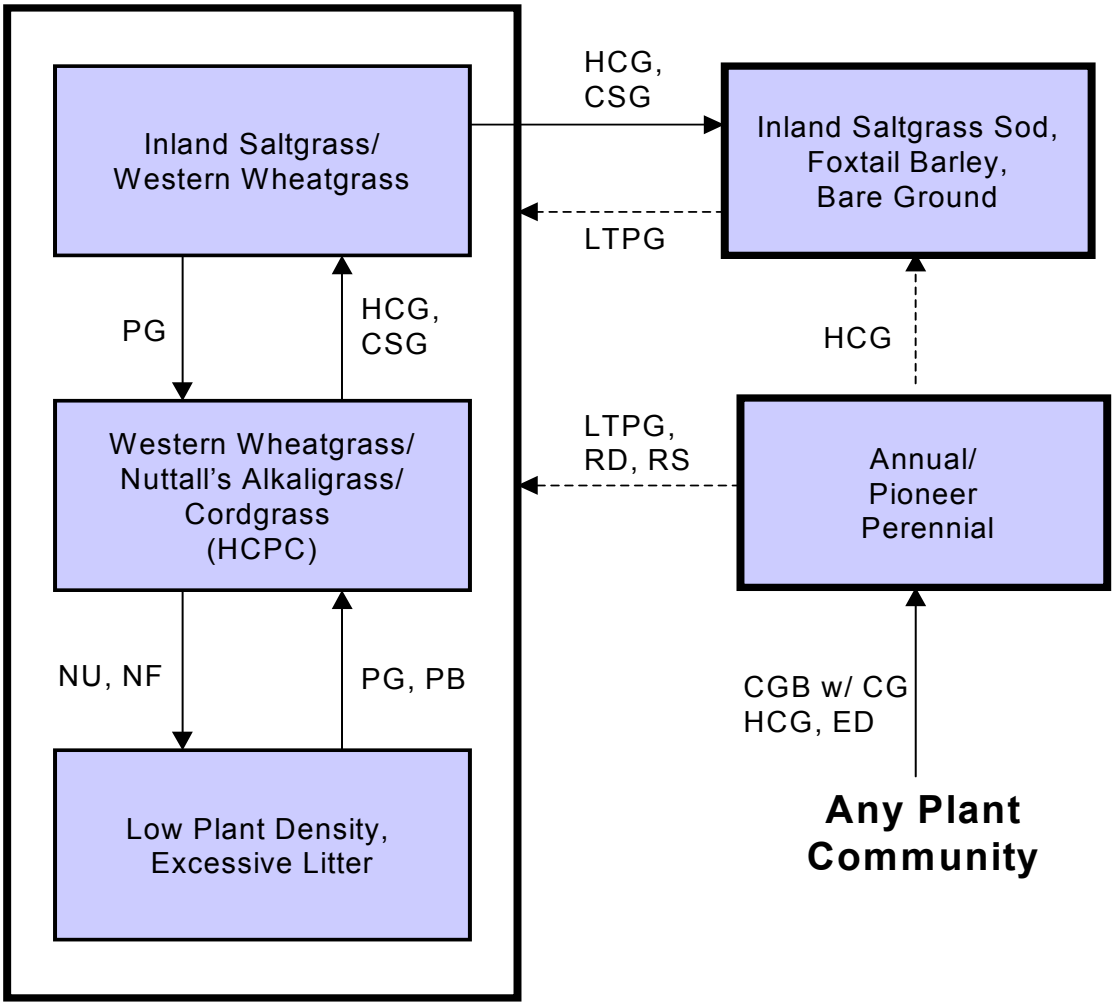
Continuous grazing without adequate recovery periods following each grazing occurrence causes this site to depart from the HCPC. Species such as western wheatgrass and inland saltgrass will initially

increase. Alkali cordgrass and Nuttall's alkaligrass will decrease in frequency and production. Heavy continuous grazing causes foxtail barley, inland saltgrass, mat muhly, and unpalatable forbs such as silverweed cinquefoil and dock species to increase and western wheatgrass to decrease. Inland saltgrass can eventually form into a patchy sod and bare ground will typically increase around the sod patches. Increased surface salts are common due to loss of plant cover.

Excessive rest or non-use and lack of fire will result in a plant community having high litter levels with low plant density with an increase in Nuttall's alkaligrass.

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 will be discussed in more detail in the plant community descriptions following the diagram.

Plant Communities and Transitional Pathways



CGB w/ CG - cropped go-back with continuous grazing; **CSG -** continuous seasonal grazing, **ED** - excessive defoliation; **HCG** - heavy continuous grazing; **HCPC -** Historic Climax Plant Community; **LTPG -** long-term prescribed grazing (>20 years); **NU, NF -** non-use, no-fire; **PB** - prescribed burning followed by prescribed grazing; **PG -** pre-scribed grazing with adequate recovery opportunity; **RD** - removal of disturbance; **RS** - range seeding with prescribed grazing

Plant Community Composition and Group Annual Production

		Western Wheatgrass/Nuttall's Alkaligrass/ Cordgrass (HCPC)		
COMMON/GROUP NAME	**SYMBOL**	**Group**	**lbs./acre**	**% Comp**
GRASSES			*2125 - 2375*	*85 - 95*
WHEATGRASS		**1**	**625 - 875**	**25 - 35**
western wheatgrass	PASM	1	625 - 875	25 - 35
ALKALIGRASS		**2**	**250 - 375**	**10 - 15**
Nuttall's alkaligrass	PUNU2	2	250 - 375	10 - 15
CORDGRASS		**3**	**250 - 375**	**10 - 15**
alkali cordgrass	SPGR	3	250 - 375	10 - 15
prairie cordgrass	SPPE	3	75 - 125	3 - 5
OTHER NATIVE PERENNIAL		**4**	**375 - 500**	**15 - 20**
alkali muhly	MUAS	4	25 - 50	1 - 2
fowl bluegrass	POPA2	4	25 - 50	1 - 2
foxtail barley	HOJU	4	25 - 50	1 - 2
inland saltgrass	DISP	4	175 - 250	7 - 10
little bluestem	SCSC	4	0 - 50	0 - 2
mat muhly	MURI	4	25 - 50	1 - 2
plains bluegrass	POAR3	4	50 - 75	2 - 3
slender wheatgrass	ELTRT	4	75 - 125	3 - 5
other perennial grasses	2GP	4	25 - 125	1 - 5
GRASS-LIKES		*5*	*75 - 125*	*3 - 5*
prairie bulrush	SCMA8	5	0 - 125	0 - 5
rush	JUNCU	5	50 - 75	2 - 3
sedge	CAREX	5	75 - 125	3 - 5
other grass-likes	2GL	5	50 - 75	2 - 3
FORBS		*6*	*75 - 125*	*3 - 5*
alkali plantain	PLER	6	25 - 25	1 - 1
giant sumpweed	IVXA	6	0 - 25	0 - 1
povertyweed	IVAX	6	0 - 25	0 - 1
Pursh seepweed	SUCA2	6	0 - 25	0 - 1
purslane	POOL	6	0 - 25	0 - 1
seepweed	SUAED	6	0 - 25	0 - 1
silverleaf cinquefoil	POAR8	6	25 - 50	1 - 2
western dock	RUAQ	6	50 - 75	2 - 3
other perennial forbs	2FP	6	25 - 50	1 - 2
SHRUBS		*7*	*25 - 125*	*1 - 5*
Nuttall's saltbush	ATNU2	7	0 - 100	0 - 4
other shrubs	2SHRUB	7	25 - 50	1 - 2

Annual Production lbs./acre	LOW	RV	HIGH
GRASSES	1840 -	2225	- 2610
GRASS-LIKES	70 -	100	- 130
FORBS	70 -	100	- 130
SHRUBS	20 -	75	- 130
TOTAL	2000 -	2500	- 3000

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

		Western Wheatgrass/Nuttall's Alkaligrass/Cordgrass (HCPC)			Inland Saltgrass/ Western Wheatgrass			Low Plant Density, Excessive Litter			Inland Saltgrass Sod, Foxtail Barley, Bare Ground		
COMMON/GROUP NAME	**SYMBOL**	**Grp**	**lbs./acre**	**% Comp**	**Grp**	**lbs./acre**	**% Comp**	**Grp**	**lbs./acre**	**% Comp**	**Grp**	**lbs./acre**	**% Comp**
GRASSES			*2125 - 2375*	*85 - 95*		*1440 - 1620*	*80 - 90*		*1500 - 1700*	*75 - 85*		*935 - 1045*	*85 - 95*
WHEATGRASS		**1**	**625 - 875**	**25 - 35**	**1**	**630 - 810**	**35 - 45**	**1**	**300 - 400**	**15 - 20**	**1**	**55 - 110**	**5 - 10**
western wheatgrass	PASM	1	625 - 875	25 - 35	1	630 - 810	35 - 45	1	300 - 400	15 - 20	1	55 - 110	5 - 10
ALKALIGRASS		**2**	**250 - 375**	**10 - 15**	**2**	**36 - 90**	**2 - 5**	**2**	**100 - 200**	**5 - 10**	**2**	**22 - 55**	**2 - 5**
Nuttall's alkaligrass	PUNU2	2	250 - 375	10 - 15	2	36 - 90	2 - 5	2	100 - 200	5 - 10	2	22 - 55	2 - 5
CORDGRASS		**3**	**250 - 375**	**10 - 15**	**3**	**0 - 18**	**0 - 1**	**3**	**100 - 200**	**5 - 10**	**3**		
cordgrass	SPART	3	250 - 375	10 - 15	3	0 - 18	0 - 1	3	100 - 200	5 - 10			
OTHER NATIVE PERENNIAL		**4**	**375 - 500**	**15 - 20**	**4**	**360 - 450**	**20 - 25**	**4**	**400 - 500**	**20 - 25**	**4**	**660 - 770**	**60 - 70**
alkali muhly	MUAS	4	25 - 50	1 - 2				4	40 - 100	2 - 5			
fowl bluegrass	POPA2	4	25 - 50	1 - 2	4	90 - 180	5 - 10	4	100 - 200	5 - 10	4	22 - 55	2 - 5
foxtail barley	HOJU	4	25 - 50	1 - 2	4	90 - 180	5 - 10	4	100 - 200	5 - 10	4	330 - 550	30 - 50
inland saltgrass	DISP	4	175 - 250	7 - 10	4	270 - 360	15 - 20	4	40 - 100	2 - 5	4	330 - 550	30 - 50
little bluestem	SCSC	4	0 - 50	0 - 2				4	0 - 20	0 - 1			
mat muhly	MURI	4	25 - 50	1 - 2	4	54 - 90	3 - 5	4	20 - 40	1 - 2	4	11 - 22	1 - 2
plains bluegrass	POAR3	4	50 - 75	2 - 3	4	36 - 54	2 - 3	4	100 - 200	5 - 10	4	0 - 11	0 - 1
slender wheatgrass	ELTRT	4	75 - 125	3 - 5	4	0 - 18	0 - 1	4	60 - 120	3 - 6	4	0 - 11	0 - 1
other perennial grasses	2GP	4	25 - 125	1 - 5	4	18 - 54	1 - 3	4	40 - 100	2 - 5	4	0 - 11	0 - 1
NON-NATIVE GRASSES		**5**			**5**	**18 - 36**	**1 - 2**	**5**	**100 - 200**	**5 - 10**	**5**		
Kentucky bluegrass	POPR				5	18 - 36	1 - 2	5	100 - 200	5 - 10			
other grasses	2GRAM				5	0 - 18	0 - 1	5	0 - 40	0 - 2			
GRASS-LIKES		*6*	*75 - 125*	*3 - 5*	*6*	*90 - 180*	*5 - 10*	*6*	*60 - 100*	*3 - 5*	*6*	*22 - 44*	*2 - 4*
prairie bulrush	SCMA8	6	0 - 125	0 - 5	6	0 - 90	0 - 5	6	0 - 60	0 - 3	6	0 - 11	0 - 1
rush	JUNCU	6	50 - 75	2 - 3	6	54 - 90	3 - 5	6	20 - 40	1 - 2	6	22 - 44	2 - 4
sedge	CAREX	6	75 - 125	3 - 5	6	36 - 54	2 - 3	6	40 - 80	2 - 4	6	0 - 11	0 - 1
other grass-likes	2GL	6	50 - 75	2 - 3	6	18 - 36	1 - 2	6	20 - 40	1 - 2	6	0 - 22	0 - 2
FORBS		*7*	*75 - 125*	*3 - 5*	*7*	*90 - 162*	*5 - 9*	*7*	*200 - 300*	*10 - 15*	*7*	*55 - 110*	*5 - 10*
alkali plantain	PLER	7	25 - 25	1 - 1	7	0 - 18	0 - 1	7	20 - 20	1 - 1	7	0 - 11	0 - 1
cocklebur	XANTH2				7	0 - 36	0 - 2	7	0 - 40	0 - 2	7	0 - 22	0 - 2
curly dock	RUCR				7	72 - 144	4 - 8	7	100 - 200	5 - 10	7	0 - 55	0 - 5
curlycup gumweed	GRSQ				7	0 - 36	0 - 2	7	0 - 20	0 - 1	7	0 - 55	0 - 5
giant sumpweed	IVXA	7	0 - 25	0 - 1	7	0 - 54	0 - 3	7	0 - 40	0 - 2	7	0 - 55	0 - 5
lambsquarters	CHAL7				7	18 - 36	1 - 2	7	40 - 60	2 - 3	7	22 - 55	2 - 5
pepperweed	LEPID				7	18 - 36	1 - 2	7	20 - 40	1 - 2	7	22 - 55	2 - 5
povertyweed	IVAX	7	0 - 25	0 - 1	7	36 - 54	2 - 3	7	20 - 20	1 - 1	7	22 - 55	2 - 5
Pursh seepweed	SUCA2	7	0 - 25	0 - 1				7	0 - 40	0 - 2			
purslane	POOL	7	0 - 25	0 - 1	7	0 - 36	0 - 2	7	0 - 40	0 - 2	7	22 - 33	2 - 3
seepweed	SUAED	7	0 - 25	0 - 1	7	0 - 54	0 - 3	7	0 - 40	0 - 2	7	11 - 44	1 - 4
silverleaf cinquefoil	POAR8	7	25 - 50	1 - 2	7	0 - 18	0 - 1	7	60 - 80	3 - 4	7	22 - 33	2 - 3
slender cinquefoil	POGRF2				7	18 - 36	1 - 2	7	40 - 60	2 - 3	7	11 - 22	1 - 2
western dock	RUAQ	7	50 - 75	2 - 3	7	18 - 36	1 - 2	7	60 - 80	3 - 4	7	11 - 22	1 - 2
other perennial forbs	2FP	7	25 - 50	1 - 2	7	0 - 18	0 - 1	7	20 - 40	1 - 2	7	0 - 11	0 - 1
non-native forbs	2FORB				7	0 - 90	0 - 5	7	20 - 40	1 - 2	7	0 - 55	0 - 5
SHRUBS		*8*	*25 - 125*	*1 - 5*	*8*	*18 - 54*	*1 - 3*	*8*	*20 - 100*	*1 - 5*	*8*	*0 - 11*	*0 - 1*
Nuttall's saltbush	ATNU2	8	0 - 100	0 - 4	8	18 - 36	1 - 2	8	20 - 80	1 - 4	8	0 - 11	0 - 1
other shrubs	2SHRUB	8	25 - 50	1 - 2	8	0 - 18	0 - 1	8	20 - 40	1 - 2	8	0 - 11	0 - 1

Annual Production lbs./acre	LOW RV HIGH	LOW RV HIGH	LOW RV HIGH	LOW RV HIGH
GRASSES	1840 - 2225 - 2610	1115 - 1503 - 1895	1435 - 1610 - 1865	830 - 979 - 1225
GRASS-LIKES	70 - 100 - 130	85 - 135 - 185	55 - 80 - 105	20 - 33 - 45
FORBS	70 - 100 - 130	85 - 126 - 165	195 - 250 - 325	50 - 83 - 115
SHRUBS	20 - 75 - 130	15 - 36 - 55	15 - 60 - 105	0 - 6 - 15
TOTAL	2000 - 2500 - 3000	1300 - 1800 - 2300	1700 - 2000 - 2400	900 - 1100 - 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 temperature, precipitation, grazing intensity, and management.

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 data are collected, some of these plant communities may be revised or removed, and new ones may be added. None of these plant communities should necessarily be thought of as “Desired Plant Communities” (DPC). According to the USDA NRCS National Range and Pasture Handbook, DPC’s 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/Nuttall's Alkaligrass/Cordgrass Plant Community

This is the interpretive plant community and is considered to be the HCPC. This community evolved with grazing by large herbivores, occasional prairie fires, and periodic flooding events and can be found on areas that are properly managed with grazing and/or prescribed burning, and sometimes on areas receiving occasional short periods of rest.

The potential vegetation is about 90 percent grasses and grass-like plants, 5 percent forbs, and 5 percent shrubs. The major grasses include western wheatgrass, Nuttall's alkaligrass and alkali, and prairie cordgrass. Other grasses present include slender wheatgrass, inland saltgrass, and foxtail barley. Salt tolerant forbs such as alkali plantain, western dock, and seepweed are common. The shrub that may occur on this site is Nuttall's saltbush.

This plant community is diverse, stable, productive, and well adapted to both saline soils and the Northern Great Plains climatic conditions. Community dynamics, nutrient cycle, water cycle, and energy flow are functioning properly. Litter is properly distributed with very little movement offsite and natural plant mortality is very low. This community is resistant to many disturbances except continuous grazing, tillage and/or development into urban or other uses. The diversity in plant species allows for both the fluctuation of flooding as well as large variations in climate.

The following growth curve is an estimate of the monthly percentages of total annual growth of the dominant species expected during a normal year:
Growth curve number: ND5401
Growth curve name: Missouri Slope, native grasslands, cool-season dominant.
Growth curve description: Cool-season, mid-grass dominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	8	24	45	10	3	5	2	0	0

Transitional pathways and/or community pathways leading to other plant communities are as follows:

- Heavy, continuous grazing will convert the plant community to the *Inland Saltgrass/Western Wheatgrass Plant Community*.
- Continuous seasonal (i.e., spring) grazing will convert the plant community to the *Inland Saltgrass/Western Wheatgrass Plant Community*.
- Excessive defoliation (i.e., areas of heavy animal concentration,) will convert the plant community to the *Annual/Pioneer Perennial Plant Community*.
- Cropped go-back land with continuous grazing will convert this plant community to the *Annual/Pioneer Perennial Plant Community*.
- Non-use and no fire will move this plant community to the *Low Plant Density, Excessive Litter Plant Community*.

Inland Saltgrass, Western Wheatgrass Plant Community

This community develops with short-term heavy use, longer term continuous grazing with lack of adequate recovery periods during the growing season, and/or annual, early spring seasonal grazing. Lack of litter and reduced plant heights result in higher soil temperatures, poor water infiltration rates, high evapotranspiration, 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.

Nuttall's alkaligrass, slender wheatgrass, alkali cordgrass have decreased while western wheatgrass and inland saltgrass will initially increase in composition. Mat muhly, foxtail barley, silverleaf cinquefoil, dock, and plantain will also increase in composition.

As long as the herbaceous component remains intact, the plant community tends to be resilient. However, species composition can be further altered through long-term heavy continuous grazing. With loss of Nuttall alkaligrass, cordgrasses, slender wheatgrass and much of the western wheatgrass, inland saltgrass becomes the dominant species.

This plant community is relatively stable and well adapted to increased salinity. Plant vigor, litter, plant density, and production have decreased. The biological integrity, water, and nutrient cycles of this plant community are becoming impaired.

The following growth curve is an estimate of the monthly percentages of total annual growth of the dominant species expected during a normal year:
Growth curve number: ND5404
Growth curve name: Missouri Slope, Warm-season Dominant, Cool-season Subdominant.
Growth curve description: Short warm-season dominant, mid cool-season subdominant and club moss.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	1	5	20	38	25	8	3	0	0	0

Transitional pathways and/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 *Inland Saltgrass Sod, Foxtail Barley, Bare Ground Plant Community*.

- Continuous seasonal (i.e. spring) grazing will convert the plant community to the *Inland Saltgrass Sod, Foxtail Barley, Bare Ground Plant Community*.

- Cropped go-back land with continuous grazing will convert this plant community to the *Annual/Pioneer Perennial Plant Community*.

- Prescribed grazing that includes changing season of use and allowing adequate recovery periods following each grazing event and proper stocking will shift this plant community back to the *Western Wheatgrass/Nuttall's Alkaligrass/Cordgrass Plant Community (HCPC)*.

Low Plant Density, Excessive Litter Plant Community

This plant community occurs when grazing is removed for long periods of time (rest) in the absence of fire. Plant composition is similar to the HCPC, however, individual species production and frequency will be lower. Much of the nutrients are tied up in excessive litter. Standing dead plant residues that are not in contact with a moist soil surface results in a slow nutrient recycling process. Aboveground litter also limits sunlight from reaching plant crowns. Tall warm-season grasses (cordgrasses) die off or reduce in density and vigor and typically develop into small but dense colonies. Thick litter and absence of grazing animals (animal impact) or fire reduces seed germination and establishment. This plant community develops after an extended period of 10 or more years of non-use by herbivores and exclusion of fire.

This plant community is resistant to change without prescribed grazing or fire. The combination of both grazing and fire is most effective in moving this plant community towards the HCPC. Soil erosion is low. Runoff is similar to the HCPC. Once this plant community is reached, time and external resources will be needed to see any immediate recovery in diversity.

The following growth curve is an estimate of the monthly percentages of total annual growth of the dominant species expected during a normal year:
Growth curve number: ND5406
Growth curve name: Missouri Slope, Introduced Cool-season Grasses.
Growth curve description: Introduced cool-season grasses.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	10	35	35	5	2	8	2	0	0

Transitional pathways and/or community pathways leading to other plant communities are as follows:

- Prescribed grazing or prescribed burning followed by prescribed grazing, will move this plant community toward the Western Wheatgrass/Nuttall's Alkaligrass/Cordgrass (*HCPC)*. This would require long-term management with prescribed grazing and/or prescribed burning under controlled conditions.

Inland Saltgrass Sod, Foxtail Barley, Bare Ground 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 is well distributed throughout the community. Nuttall's alkaligrass and western wheatgrass have been greatly reduced and may persist in remnant amounts, reduced in vigor. Bare ground may develop in micro lows where salt concentrations are highest. A white salt crust is common on the surface. Only a few very salt tolerant annuals, such as glasswort and seepweed, can survive.

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 HCPC. Loss of key cool-season grasses and increased bare ground has 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 HCPC 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 a normal year:
Growth curve number: ND5405
Growth curve name: Missouri Slope, Warm-season Short Grass.
Growth curve description: Warm season, short grass dominant, and some sedge.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	1	7	18	33	26	10	4	1	0	0

Transitional pathways and/or community pathways leading to other plant communities are as follows:

- Long-term prescribed grazing with adequate recovery periods between grazing events and proper stocking will shift this plant community toward the *Inland Saltgrass/Western Wheatgrass Plant Community*, and eventually to the *HCPC* or associated successional plant community stages assuming an adequate seed/vegetative source is available. This transition may take up to 40 years or more to accomplish depending on the degree of degradation.

Annual/Pioneer Perennial Plant Community

This plant community develops under severe disturbance and/or excessive defoliation. This can result from heavy livestock or wildlife concentration, and cropping abandonment (go-back land). The dominant vegetation includes pioneer annual grasses, forbs, invaders, and early successional biennial and perennial species. Grasses may include foxtail barley, which will dominate along with fowl

bluegrass, Nuttall's alkaligrass, annual brome, and western wheatgrass. The dominant forbs include curly dock, kochia, and other early successional salt tolerant species. Plant species from adjacent ecological sites may become minor components of this plant community. The community is susceptible to invasion of nonnative species due to severe soil disturbances and relatively high percent of bare ground.

This plant community is resistant to change, as long as soil disturbance or severe vegetation defoliation persists, thus holding back secondary plant succession. Soil erosion is potentially high in this plant community. Reduced surface cover, low plant density, low plant vigor, loss of root biomass, and soil compaction, all contribute to decreased water infiltration, increased runoff, and accelerated erosion rates.

Significant economic inputs, management time would be required to move this plant community toward a higher successional stage and a more productive plant community. Secondary succession is highly variable, depending upon availability and diversity of a viable seed bank of higher successional species within the existing plant community and neighboring plant communities. This plant community can be renovated to improve the production capability, but management changes would be needed to maintain the new plant community.

Transitional pathways and/or community pathways leading to other plant communities are as follows:

- Under long-term prescribed grazing and/or removal of disturbance, including adequate rest periods, this plant community will move through the successional stages, and may eventually lead to a plant community resembling the (HCPC) *Western Wheatgrass/Nuttall's Alkaligrass/Cordgrass Plant Community*. This process will take a long period of time (25+ years).

- Heavy, continuous grazing will result in a shift towards the *Inland Saltgrass Sod, Foxtail Barley, Bare Ground Plant Community*.

- Range seeding into mulch followed with prescribed grazing can be used to convert this plant community to one that may resemble the *HCPC*.

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

-- Under Development --

Western Wheatgrass/Nuttall's Alkaligrass/Cordgrass Plant Community:

Inland Saltgrass/Western Wheatgrass Plant Community:

Inland Saltgrass Sod, Foxtail Barley, Bare Ground Plant Community:

Low Plant Density, Excessive Litter Plant Community:

Annual/Pioneer Perennial Plant Community:

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

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
Grasses & Grass-likes							
alkali cordgrass	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
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
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
Kentucky bluegrass	U D U U	U P N D	U D U U	U P N D	U P N D	U D U U	U D U U
little bluestem	U D D U	N D N N	U D D U	N D N N	N D N N	U D D U	U D D U
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
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
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
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
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							
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
giant sumpweed	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 N U 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
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
purslane	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
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
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
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
Shrubs							
Nuttall's 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

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

The following table lists suggested initial stocking rates for cattle under continuous grazing (year long grazing or growing season long grazing) under normal growing conditions; however, *continuous grazing is not recommended.* These are conservative estimates that should be used only as guidelines in the initial stages of the conservation planning process and may need to be adjusted due to diet preferences of other types or kinds of livestock and/or other factors. Often, the current plant composition does not entirely match any particular plant community (as described in this ecological site description). Because of this, a field visit is recommended, in all cases, to document plant composition and production. More precise carrying capacity estimates should eventually be calculated using the following stocking rate information along with animal preference data, particularly when grazers other than cattle are involved. With consultation of the land manager, more intensive grazing management may result in improved harvest efficiencies and increased carrying capacity.

Plant Community	Production (lbs./acre)	Carrying Capacity[1] (AUM/acre)
Western Wheatgrass, Nuttall's Alkaligrass, Cordgrass	2500	0.79 [2]
Inland Saltgrass/Western Wheatgrass	1800	0.57 [2]
Low Plant Density, Excessive Litter	2000	0.63 [2]
Inland Saltgrass Sod, Foxtail Barley, Bare Ground	1100	0.35 [2]
Annual/Pioneer Perennial[3]	-- [3]	-- [3]

[1] Continuous season-long grazing by cattle under average growing conditions.
[2] Stocking rates may need to be adjusted due to palatability and/or availability of forage.
[3] Highly variable; stocking rate needs to be determined onsite.

Hydrology Functions

Available water is the principal factor limiting forage production on this site. Inherent soil salinity indirectly influences the availability of water to plants growing on the site. This site is dominated by soils in hydrologic group D with localized areas in hydrologic groups B or C. Infiltration varies from moderately slow to slow and runoff potential varies from medium to high depending on soil hydrologic group 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 short grasses form a strong sod and dominate the site. Areas where ground cover is less than 50 percent have the greatest potential to have reduced infiltration and higher runoff.

Recreational Uses

This site offers open space and opportunity for intermittent viewing and/or hunting of a few wildlife species.

Wood Products

No appreciable wood products are present on the site.

Other Products

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

Supporting Information

Associated Sites

(054XY021ND) – Claypan
(054XY032ND) – Subirrigated
(054XY033ND) – Thin Claypan
(054XY037ND) – Wet Meadow
(054XY036ND) – Wet Land

Similar Sites

(054XY022ND) – Closed Depression (CD)
[Poorly drained clayey soils with sodic subsoils and with noticeable redoximorphic features within depressions. Ponds periodically with no apparent water table. Indicator species: dominated by western wheatgrass with alkaligrass and foxtail barley intermixed, forb indicator is western dock, no shrubs. This site has more western wheatgrass, more dock and smartweed, slightly higher production, no water table, and a sodic restrictive layer.]

(054XY037ND) – Wet Meadow (WM)
[Poorly drained soils found adjacent to streams or in depressions, with water table at the surface or within one and one-half feet from the surface with no evidence of salts, noticeable redoximorphic features within six inches or just below the organic soil layer. Found upslope from wetlands and downslope of subirrigated or overflow sites; can be located within the listed associated sites. Indicator species are prairie cordgrass, northern reedgrass, and no shrub. This site has more production, far less western wheatgrass and far more prairie cordgrass, and a water table without a restrictive sodic layer or evidence of salts within the soil profile.]

Inventory Data References

Information presented here has been derived from NRCS clipping and other inventory data. Also, field knowledge of range-trained personnel was used. All descriptions were peer reviewed and/or field tested by various private, state, and federal agency specialists.

Those involved in developing this site description include: Dennis Froemke, NRCS Range Management Specialist; Dean Chamrad, NRCS State Range Management Specialist; Jeff Printz, NRCS State Range Management Specialist; L. Michael Stirling, NRCS Range Management Specialist; Stan Boltz, NRCS Range Management Specialist; Josh Saunders, NRCS Range Management Specialist; Darrell Vanderbusch, NRCS Resource Soil Scientist; Michael D. Brand, State Land Dept. Director Surface Management; David Dewald, NRCS State Biologist; and Brad Podoll, NRCS Biologist.

Data Source	Number of Records	Sample Period	State	County
SCS-RANGE-417	0			
Ocular estimates	4	1993 – 2001	ND	Dunn, Morton

State Correlation

This site has been correlated with North Dakota and South Dakota in MLRA 54.

Field Offices

Baker, MT	Buffalo, SD	Faith, SD	Mott, ND
Beach, ND	Carson, ND	Hettinger, ND	Selfridge, ND
Beulah, ND	Culbertson, MT	Killdeer, ND	Sidney, MT
Bison, SD	Dickinson, ND	Mandan, ND	Watford City, ND
Bowman, ND	Dupree, SD	McIntosh, SD	Wibaux, MT

Relationship to Other Established Classifications

Level IV Ecoregions of the Conterminous United States: 43a – Missouri Plateau.

Other References

High Plains Regional Climate Center, University of Nebraska, 830728 Chase Hall, Lincoln, NE 68583-0728. (http://hpccsun.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

_____ _____
State Range Management Specialist Date

_____ _____
State Range Management Specialist Date

_____ _____
State Range Management Specialist Date