

## United States Department of Agriculture Natural Resources Conservation Service

### Ecological Site Description

**Site Name:** Thin Claypan

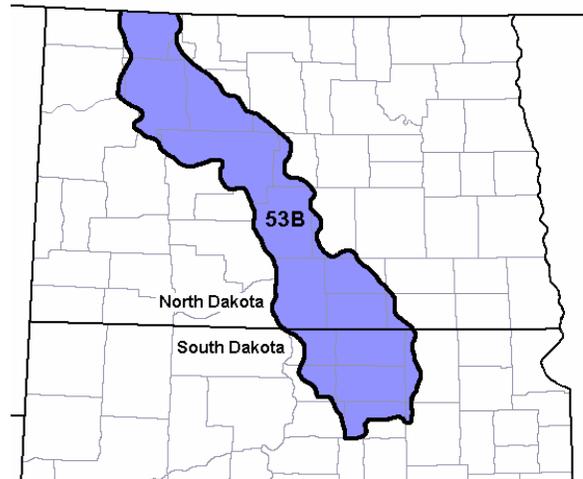
**Site Type:** Rangeland

**Site ID:** R053BY013ND

**Major Land Resource Area (MLRA):** 53B – Central Dark Brown Glaciated Plains

For more information on MLRA's, refer to the following Web site:

[http://www.soilinfo.psu.edu/soil\\_lrr/](http://www.soilinfo.psu.edu/soil_lrr/).



### Physiographic Features

This site occurs on level to gently sloping uplands.

**Landform:** till plain, lake plain, terrace

**Aspect:** NA

	<u>Minimum</u>	<u>Maximum</u>
<b>Elevation (feet):</b>	1600	2000
<b>Slope (percent):</b>	0	9
<b>Water Table Depth (inches):</b>	42	80
<b>Flooding:</b>		
<b>Frequency:</b>	None	None
<b>Duration:</b>	None	None
<b>Ponding:</b>		
<b>Depth (inches):</b>	None	None
<b>Frequency:</b>	None	None
<b>Duration:</b>	None	None
<b>Runoff Class:</b>	High	Very high

### Climatic Features

MLRA 53B 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 15 to 20 inches per year. The normal average annual temperature is about 41°F. January is the coldest month with average temperatures ranging from about 4°F (Powers Lake, North Dakota (ND)), to about 10°F (Pollock, South Dakota (SD)). July is the warmest month with temperatures averaging from about 67°F (Powers Lake, ND), to about 72°F (Pollock, SD). The

range of normal average monthly temperatures between the coldest and warmest months is about 62°F. This large annual range attests to the continental nature of this MLRA's climate. Winds 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.

	<u>Minimum</u>	<u>Maximum</u>
<b>Frost-free period (days):</b>	110	135
<b>Freeze-free period (days):</b>	129	156
<b>Mean Annual Precipitation (inches):</b>	15	20
<b>Average Monthly Precipitation (inches) and Temperature (°F):</b>		

	Precip. Min.	Precip. Max	Temp. Min.	Temp. Max.
January	0.41	0.48	-6.8	21.5
February	0.41	0.57	0.7	28.9
March	0.57	1.09	12.0	39.7
April	1.31	2.01	27.0	57.4
May	1.98	2.92	38.6	70.8
June	3.17	3.80	48.4	79.3
July	2.38	2.84	52.9	86.2
August	1.82	2.17	50.8	85.6
September	1.37	1.67	39.9	74.2
October	0.62	1.30	28.3	61.2
November	0.53	0.74	13.7	41.2
December	0.43	0.43	0.3	27.2

Climate Stations		Period	
Station ID	Location or Name	From	To
ND3376	Garrison 1 NNW	1948	2001
SD4891	Leola	1948	2001
ND6383	New Town 4 W	1952	1985
SD6712	Pollock	1948	2001
ND7281	Powers Lake	1948	2001
SD7277	Roscoe	1948	2001

For local 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

These are moderately deep to very deep, moderately well and well drained, moderately coarse to fine textured soils. The thin surface layer is underlain by a dense sodic subsoil. Saturated hydraulic conductivity is very slow and available water capacity is low. Salinity is moderate to strong at depths of less than 16 inches and sodicity is high. This site is on nearly level to strongly sloping flats and side slopes on terraces, lake plains, and till plains. Slope ranges from zero to nine percent. Wet surface compaction can occur with heavy traffic. Waterflow paths are broken, irregular in appearance

or discontinuous with numerous debris dams or vegetative barriers, and there is a high risk of rills and eventually gullies if vegetative cover is not adequate. Cryptobiotic crusts are present and a moderate pedestalling of plants occur.

These soils are mainly susceptible to water erosion. 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: <http://www.nrcs.usda.gov/technical/efotg/>.

**Parent Material Kind:** lacustrine, alluvium, till  
**Parent Material Origin:** shale, siltstone, mudstone  
**Surface Texture:** loam, silt loam, silty clay loam  
**Surface Texture Modifier:** none  
**Subsurface Texture Group:** loamy  
**Surface Fragments ≤3" (% Cover):** 0  
**Surface Fragments >3" (%Cover):** 0  
**Subsurface Fragments ≤3" (% Volume):** 0-10  
**Subsurface Fragments >3" (% Volume):** 0-5

	<u>Minimum</u>	<u>Maximum</u>
<b>Drainage Class:</b>	moderately well	well
<b>Permeability Class:</b>	very slow	very slow
<b>Depth to first restrictive layer (inches):</b>	3	5
<b>Electrical Conductivity (mmhos/cm)*:</b>	0	16
<b>Sodium Absorption Ratio*:</b>	0	20
<b>Soil Reaction (1:1 Water)*:</b>	5.6	9.0
<b>Soil Reaction (0.1M CaCl<sub>2</sub>)*:</b>	NA	NA
<b>Available Water Capacity (inches)*:</b>	1	3
<b>Calcium Carbonate Equivalent (percent)*:</b>	0	30

\* - 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 management actions and/or climatic conditions. Due to the nature of the soils, the site is considered quit 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).

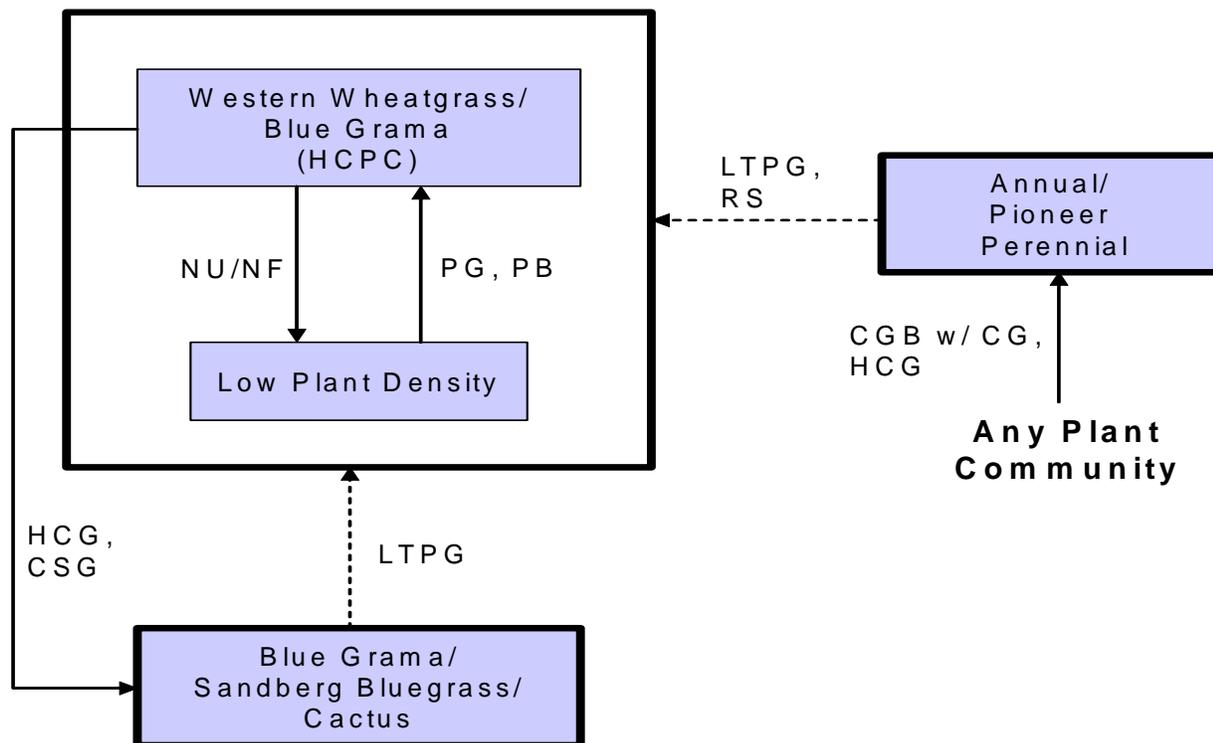
The plant community upon which the interpretations are primarily based is the HCPC. The HCPC has been determined by study of rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily 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 over several years causes this site to depart from the HCPC. Species such as blue grama, Sandberg bluegrass, and inland saltgrass will increase. Western wheatgrass and prairie Junegrass will decrease in frequency and production. In time, heavy continuous grazing will likely cause blue grama to dominate and pioneer perennials and annuals to increase. The resulting plant community is relatively stable and the competitive advantage prevents other species from establishing.

Extended periods of non-use and/or lack of fire will result in a plant community having low density, which favors an increase in Sandberg bluegrass, and in time, shrubs such as cactus.

The following diagram illustrates the common plant communities and vegetation states commonly occurring on the site and the transition pathways between communities and states. 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; **HCG** – Heavy continuous grazing; **HCPC** – Historic Climax Plant Community; **LTPG** – Long-term prescribed grazing; **NU/NF** – Extended period of non-use & no fire; **PB** – Prescribed burning; **PG** – Prescribed grazing; **RS** – Range seeding with prescribed grazing.

### Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SYMBOL	Western Wheatgrass/ Blue Grama (HCPC)			
		Group	lbs./acre	% Comp	
<b>GRASSES &amp; GRASS-LIKES</b>			<i>850 - 950</i>	<i>85 - 95</i>	
<b>WHEATGRASS</b>		<b>1</b>	<b>200 - 350</b>	<b>20 - 35</b>	
western wheatgrass	PASM	1	200 - 350	20 - 35	
thickspike wheatgrass	ELLAL	1	0 - 50	0 - 5	
<b>SHORT WARM-SEASON GRASSES</b>		<b>2</b>	<b>200 - 350</b>	<b>20 - 35</b>	
blue grama	BOGR2	2	150 - 250	15 - 25	
buffalograss	BUDA	2	0 - 50	0 - 5	
inland saltgrass	DISP	4	10 - 50	1 - 5	
<b>SHORT COOL-SEASON BUNCHGRASSES</b>		<b>3</b>	<b>10 - 50</b>	<b>1 - 5</b>	
Sandberg bluegrass	POSE	3	0 - 30	0 - 3	
prairie junegrass	KOMA	3	10 - 30	1 - 3	
<b>OTHER NATIVE GRASSES</b>		<b>4</b>	<b>20 - 50</b>	<b>2 - 5</b>	
needleandthread	HECOC8	3	0 - 30	0 - 3	
Nuttall's alkaligrass	PUNU2	4	0 - 20	0 - 2	
tumblegrass	SCPA	4	0 - 20	0 - 2	
other native perennial	2GP	4	10 - 50	1 - 5	
other native annual	2GA	4	0 - 10	0 - 1	
<b>GRASS-LIKES</b>		<b>5</b>	<b>20 - 50</b>	<b>2 - 5</b>	
needleleaf sedge	CADU6	5	10 - 50	1 - 5	
other grass-likes	2GL	5	0 - 30	0 - 3	
<b>FORBS</b>		<b>6</b>	<b>20 - 100</b>	<b>2 - 10</b>	
bladderpod	LESQU	6	0 - 10	0 - 1	
cudweed sagewort	ARLU	6	0 - 10	0 - 1	
heath aster	SYER	6	10 - 20	1 - 2	
Hood's phlox	PHHO	6	0 - 10	0 - 1	
rose pussytoes	ANRO2	6	10 - 20	1 - 2	
rush skeletonweed	LYJU	6	10 - 20	1 - 2	
scarlet globemallow	SPCO	6	10 - 20	1 - 2	
scurfpea	PSORA2	6	10 - 20	1 - 2	
smartweed	POLYG4	6	10 - 20	1 - 2	
wavyleaf thistle	CIUN	6	0 - 10	0 - 1	
western yarrow	ACMI2	6	10 - 20	1 - 2	
wild onion	ALLIU	6	0 - 10	0 - 1	
wild parsley	MUDI	6	10 - 20	1 - 2	
woolly Indianwheat	PLPA2	6	0 - 10	0 - 1	
native annual/biennial forbs	2FORB	6	0 - 20	0 - 2	
native perennial forbs	2FP	6	0 - 20	0 - 2	
<b>SHRUBS</b>		<b>7</b>	<b>10 - 50</b>	<b>1 - 5</b>	
brittle cactus	OPFR	7	10 - 20	1 - 2	
broom snakeweed	GUSA2	7	10 - 10	1 - 1	
fringed sagewort	ARFR4	7	10 - 20	1 - 2	
other shrubs	2SHRUB	7	0 - 20	0 - 2	
<b>Annual Production lbs./acre</b>			<b>LOW</b>	<b>RV</b>	<b>HIGH</b>
<b>GRASSES &amp; GRASS-LIKES</b>			480 -	910	- 1140
<b>FORBS</b>			15 -	60	- 105
<b>SHRUBS</b>			5 -	30	- 55
<b>TOTAL</b>			500 -	1000	- 1300

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/ Blue Grama (HCPC)			Blue Grama/Sandberg Bluegrass/Cactus			Low Plant Density					
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp			
<b>GRASSES &amp; GRASS-LIKES</b>													
<b>WHEATGRASS</b>													
		1	850 - 950	85 - 95	1	300 - 340	75 - 85	1	680 - 760	85 - 95			
		1	200 - 350	20 - 35	1	20 - 60	5 - 15	1	120 - 200	15 - 25			
western wheatgrass	PASM	1	200 - 350	20 - 35	1	20 - 60	5 - 15	1	80 - 200	10 - 25			
thickspike wheatgrass	ELLAL	1	0 - 50	0 - 5	1	0 - 12	0 - 3	1	0 - 40	0 - 5			
<b>SHORT WARM-SEASON</b>													
		2	200 - 350	20 - 35	2	80 - 160	20 - 40	2	80 - 160	10 - 20			
blue grama	BOGR2	2	150 - 250	15 - 25	2	60 - 140	15 - 35	2	80 - 160	10 - 20			
buffalograss	BUDA	2	0 - 50	0 - 5	2	8 - 40	2 - 10	2	0 - 64	0 - 8			
inland saltgrass	DISP	2	10 - 50	1 - 5	2	4 - 28	1 - 7	2	0 - 40	0 - 5			
<b>SHORT COOL-SEASON</b>													
		3	10 - 50	1 - 5	3	20 - 80	5 - 20	3	40 - 80	5 - 10			
Sandberg bluegrass	POSE	3	0 - 30	0 - 3	3	20 - 80	5 - 20	3	40 - 80	5 - 10			
prairie junegrass	KOMA	3	10 - 30	1 - 3	3	4 - 20	1 - 5	3	8 - 24	1 - 3			
<b>OTHER NATIVE GRASSES</b>													
		4	20 - 50	2 - 5	4	0 - 16	0 - 4	4	24 - 80	3 - 10			
needleandthread	HECOC8	4	0 - 30	0 - 3	4	0 - 4	0 - 1	4	16 - 80	2 - 10			
Nuttall's alkaligrass	PUNU2	4	0 - 20	0 - 2				4	0 - 24	0 - 3			
tumblegrass	SCPA	4	0 - 20	0 - 2	4	0 - 8	0 - 2	4	0 - 24	0 - 3			
other grasses	2GRAM	4	10 - 50	1 - 5	4	0 - 12	0 - 3	4	8 - 40	1 - 5			
<b>GRASS-LIKES</b>													
		5	20 - 50	2 - 5	5	0 - 4	0 - 1	5	16 - 64	2 - 8			
needleleaf sedge	CADU6	5	10 - 50	1 - 5	5	0 - 4	0 - 1	5	16 - 64	2 - 8			
other grass-likes	2GL	5	0 - 30	0 - 3	5	0 - 4	0 - 1	5	0 - 40	0 - 5			
<b>NON-NATIVE GRASSES</b>													
		6			6			6	40 - 96	5 - 12			
Kentucky bluegrass	POPR							6	16 - 80	2 - 10			
smooth brome	BRIN2							6	0 - 40	0 - 5			
crested wheatgrass	AGCR							6	0 - 16	0 - 2			
cheatgrass	BRTS							6	0 - 40	0 - 5			
<b>FORBS</b>													
		7	20 - 100	2 - 10	7	20 - 40	5 - 10	7	40 - 80	5 - 10			
bladderpod	LESQU	7	0 - 10	0 - 1	7	4 - 8	1 - 2	7	0 - 8	0 - 1			
cutweed sagewort	ARLU	7	0 - 10	0 - 1	7	4 - 8	1 - 2	7	8 - 16	1 - 2			
curlycup gumweed	GRSQ				7	0 - 8	0 - 2	7	0 - 8	0 - 1			
heath aster	SYER	7	10 - 20	1 - 2	7	4 - 8	1 - 2	7	8 - 24	1 - 3			
Hood's phlox	PHHO	7	0 - 10	0 - 1	7	0 - 4	0 - 1	7	0 - 8	0 - 1			
pussytoes	ANTEN	7	10 - 20	1 - 2	7	4 - 8	1 - 2	7	0 - 8	0 - 1			
rush skeletonweed	LYJU	7	10 - 20	1 - 2	7	0 - 4	0 - 1	7	0 - 8	0 - 1			
scarlet globemallow	SPCO	7	10 - 20	1 - 2	7	4 - 8	1 - 2	7	8 - 16	1 - 2			
scurfpea	PSORA2	7	10 - 20	1 - 2	7	4 - 8	1 - 2	7	8 - 24	1 - 3			
smartweed	POLYG4	7	10 - 20	1 - 2	7	4 - 12	1 - 3	7	8 - 16	1 - 2			
wavyleaf thistle	CIUN	7	0 - 10	0 - 1	7	0 - 4	0 - 1	7	0 - 8	0 - 1			
western salsify	TRDU				7	0 - 8	0 - 2	7	0 - 24	0 - 3			
western yarrow	ACMIO	7	10 - 20	1 - 2	7	4 - 8	1 - 2	7	0 - 16	0 - 2			
wild onion	ALLIU	7	0 - 10	0 - 1	7	0 - 4	0 - 1	7	0 - 8	0 - 1			
wild parsley	MUDI	7	10 - 20	1 - 2	7	0 - 4	0 - 1	7	0 - 8	0 - 1			
woolly Indianwheat	PLPA2	7	0 - 10	0 - 1	7	4 - 8	1 - 2	7	0 - 8	0 - 1			
native annual/biennial forbs	2FORB	7	0 - 20	0 - 2	7	4 - 12	1 - 3	7	0 - 16	0 - 2			
native perennial forbs	2FP	7	0 - 20	0 - 2	7	0 - 8	0 - 2	7	0 - 16	0 - 2			
non-native forbs	2FORB				7	0 - 16	0 - 4	7	0 - 32	0 - 4			
<b>SHRUBS</b>													
		8	10 - 50	1 - 5	8	20 - 40	5 - 10	8	16 - 40	2 - 5			
brittle cactus	OPFR	8	10 - 20	1 - 2	8	12 - 40	3 - 10	8	8 - 40	1 - 5			
broom snakeweed	GUSA2	8	0 - 10	0 - 1	8	0 - 20	0 - 5	8	0 - 24	0 - 3			
fringed sagewort	ARFR4	8	10 - 20	1 - 2	8	4 - 20	1 - 5	8	8 - 40	1 - 5			
plains pricklypear	OPPO	8	0 - 20	0 - 2	8	4 - 32	1 - 8	8	0 - 24	0 - 3			
other shrubs	2SHRUB	8	0 - 20	0 - 2	8	0 - 8	0 - 2	8	0 - 16	0 - 2			
<b>Annual Production lbs./acre</b>			LOW	RV	HIGH		LOW	RV	HIGH		LOW	RV	HIGH
<b>GRASSES &amp; GRASS-LIKES</b>			480	910	-1140		170	340	-510		350	712	-1070
<b>FORBS</b>			15	60	-105		15	30	-45		35	60	-85
<b>SHRUBS</b>			5	30	-55		15	30	-45		15	28	-45
<b>TOTAL</b>			500	1000	-1300		200	400	-600		400	800	-1200

This list of plants and their relative proportions are based on near normal years. Fluctuations in species composition and relative production may change from year to year dependent upon precipitation or other climatic factors. RV = Representative value. Refer to PLANTS database for scientific names and codes: <http://plants.usda.gov>

### Plant Community and Vegetation State Narratives

Following are the narratives for each of the described plant communities. These plant communities may not represent every possibility, but they are the most prevalent and repeatable plant communities. The plant composition tables shown above have been developed from the best available knowledge at the time of this revision. As more 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/Blue Grama Plant Community

This is the interpretive plant community for this site, and it is also considered the HCPC. This site evolved with grazing by large herbivores and occasional prairie fires. This plant community can be found on areas having a history of proper grazing management, including adequate recovery periods between grazing events. The potential vegetation is about 85 percent grasses or grass-like plants, 10 percent forbs, and 5 percent shrubs. Cool season grasses dominate the site, but warm season short grasses are also prevalent. The co-dominant grasses are western wheatgrass and blue grama. Other grasses and grass-like plants occurring on the site include needleandthread, buffalograss, Sandberg bluegrass, and sedges. Significant forbs may include prairie coneflower, scarlet globemallow, Lambert’s crazyweed, and western yarrow. Shrubs include broom snakeweed, brittle cactus, and fringed sagewort.

This plant community is well adapted to the Northern Great Plains climatic conditions. Individual species can vary greatly in production depending on growing conditions (timing and amount of precipitation and temperature). Community dynamics, nutrient cycle, water cycle, and energy flow are functioning properly. Plant litter is properly distributed with some movement offsite and natural plant mortality is low. The diversity in plant species allows for some drought tolerance. This is a fragile, but sustainable plant community. Low to moderate available water capacity coupled with high accumulations of sodium and slow permeability strongly influences the soil-water-plant relationships.

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: ND5303

Growth curve name: Missouri Coteau, cool-season/warm-season co-dominant.

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

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	2	6	21	40	20	6	4	1	0	0

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

- Non-use and no fire for extended periods of time will convert this plant community to the *Low Plant Density Plant Community*.
- Heavy, continuous grazing or continuous seasonal grazing (annual, early spring) will convert the plant community to the *Blue Grama/Sandberg Bluegrass/Cactus Plant Community*.
- Go-back land with continuous grazing will convert this plant community to the *Annual/Pioneer Perennial Plant Community*.

### Blue Grama/Sandberg Bluegrass/Cactus Plant Community

This plant community can quickly develop from the adverse effects of heavy continuous grazing and/or annual, early spring seasonal grazing. Annual grazing too early in the spring depletes stored carbohydrates, resulting in weakening and eventual death of the cool-season mid-grasses. Short grasses and forbs increase to dominate the site and annual production decreases dramatically. Lack of litter and reduced vigor result in higher soil temperatures, poor water infiltration rates, and high evapotranspiration, which gives blue grama a competitive advantage over cool season mid-grasses. This plant community can occur throughout the pasture, on spot grazed areas, and around water sources where season-long grazing patterns occur.

Blue grama and buffalograss are the dominant species with the balance being a few species of cool-season grasses and warm-season grasses including buffalograss, inland saltgrass, needleandthread, prairie Junegrass, and annual grasses. Forbs and shrubs such as broom snakeweed, cudweed sagewort, heath aster, brittle cactus, and western yarrow may also be present. There is usually more than 25 percent bare ground.

This plant community is quite resilient. The thick sod and competitive advantage prevents other species from establishing. This plant community is less productive than the HCPC. Runoff increases and infiltration will decrease. Soil erosion will be minimal due to the sod forming habit of blue grama and buffalograss.

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: ND5305

Growth curve name: Missouri Coteau, warm-season dominant.

Growth curve description: Warm-season dominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	1	4	18	36	29	10	2	0	0	0

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

- Long-term prescribed grazing that includes changing season of use and allowing adequate recovery periods to enhance cool season grasses can slowly shift this plant community back towards the *Western Wheatgrass/Blue Grama Plant Community*.
- Heavy, continuous grazing may cause further deterioration resulting in a shift to the *Annual/Pioneer Perennial Plant Community*.

### Low Plant Density Plant Community

This plant community develops after an extended period of 20 or more years of non-use by herbivores and exclusion of fire. This plant community is dispersed throughout the pasture, encircling spot grazed areas, and areas distant from water sources. This is a typical pattern found in properly stocked pastures grazed season-long. Plant litter may accumulate as this plant community first develops. Due to a lack of tiller stimulation and sunlight, native bunchgrasses typically develop dead centers and native rhizomatous grasses are limited to colonies. Standing decadent plants and moderate litter covers shorter understory species (i.e. short grasses and sedges), restricting their ability to capture adequate sunlight for photosynthesis. Vigor and diversity of native plants are reduced. Annual and/or biennial forbs, annual grasses, and cryptogams commonly fill interspaces once occupied by desirable species.

Cheatgrass and sweet clover tend to invade this plant community only when moisture conditions are favorable for these species. Sandberg bluegrass tends to increase along with needleandthread, prairie Junegrass, and shrubs like broom snakeweed and brittle cactus. Other grasses present include western wheatgrass and sedges with lesser amounts of blue grama and inland saltgrass. The common forbs include Missouri goldenrod, prairie coneflower, silverleaf scurfpea, western yarrow, and heath aster. Fringed sagewort, brittle cactus, and broom snakeweed may be the principal shrubs.

This plant community is resistant to change without prescribed grazing or fire. Prescribed grazing is most effective in moving this plant community towards the HCPC. Soil erosion is low. Compared to the HCPC, infiltration is reduced to the lower root zone. Runoff is similar to the HCPC. This plant community tends to favor early cool season plant species which are moisture loving and usually tends to utilize the spring moisture quickly causing the soil to become dry and not very productive early in the summer. Once this plant community is reached, any of the preferred treatments can readily return the diversity and production of the site.

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: ND5302

Growth curve name: Missouri Coteau, cool-season dominant, warm-season sub-dominant.

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

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	7	23	42	15	5	4	1	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/Blue Grama Plant Community (HCPC)*.
- Cropped go-back land with continuous grazing will convert this plant community to the *Annual/Pioneer Perennial Plant Community*.

### **Annual/Pioneer Perennial Plant Community**

This plant community develops under severe disturbance. 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 sixweeks fescue, cheatgrass, needleandthread, prairie Junegrass, and western wheatgrass. The dominant forbs include curlycup gumweed, kochia, pussytoes, and other early successional species. Shrubs that may be present include fringed sagewort and broom snakeweed. The community is susceptible to invasion of nonnative annual and perennial forbs due to severe soil disturbances and relatively high percent of bare ground. Compared to the HCPC, western wheatgrass, green needlegrass, needleandthread, and blue grama have decreased.

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 and 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 neighboring plant communities and availability and diversity of a viable seed bank of higher successional species within the existing plant community. The total annual production ranges from 100 to 500 lbs./ac. (air-dry weight) depending upon growing conditions.

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

- Range seeding with deferment and prescribed grazing can convert this to a plant community resembling the *Western Wheatgrass/Blue Grama Plant Community (HCPC)*.
- Under long-term prescribed grazing, including adequate rest periods, this plant community will move through the successional stages, and may eventually lead to a plant community resembling the *Western Wheatgrass/Blue Grama Plant Community (HCPC)*.

## **Ecological Site Interpretations**

### **Animal Community – Wildlife Interpretations**

-- Under Development --

**Western Wheatgrass/Blue Grama Plant Community:**

**Blue Grama/Sandberg Bluegrass/Buffalograss Plant Community:**

**Low Plant Density Community:**

**Annuals/Pioneer Perennial Plant Community**

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

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
<b>Grasses &amp; Grass-likes</b>							
blue grama	U D P U	D P P D	U D P U	D P P D	D P P D	U D P U	U D P U
buffalograss	U U D U	N U D U	U U D U	N U D U	N U D U	U U D U	U U D U
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
needleandthread	U D U D	N D N U	U D U D	N D N U	N D N U	U D U D	U D U D
needleleaf sedge	U D U D	U P N D	U D U D	U D U D	U D U D	U D U D	U D U D
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
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
Sandberg bluegrass	N U N N	N D N N	N U N N	N D N N	N D N N	N U N N	N U N N
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
tumblegrass	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
western wheatgrass	U P D U	N D N N	U P D U	N D N N	N D N N	U P D U	U P D U
<b>Forbs</b>							
bladderpod	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
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
heath aster	U U D U	U U P U	U U D U	U U P U	U U P U	U U D U	U U P U
Hood's phlox	U D U U	U P P U	U D U U	U P P U	U P P U	U D U U	U P P U
rose pussytoes	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U
rush skeletonweed	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N
scarlet globemallow	U U D U	U D D U	U U D U	U D D U	U D D U	U U D U	U D D U
scurfpea	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
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
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
wild onion	U D U U	U D D U	U D U U	U D D U	U D D U	U D U U	U D D U
wild parsley	U D U U	U D D U	U D U U	U D D U	U D D U	U D U U	U D D U
woolly Indianwheat	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
<b>Shrubs</b>							
brittle cactus	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
broom snakeweed	N N N N	U U U U	N N N N	U U U U	U U U U	N N N N	U U U U
fringed sagewort	U U U U	U U U U	U U U U	U D D U	U P P D	U U U U	U U U D

**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

### Hydrology Functions

Water is the principal factor limiting herbage production on this site. The site is dominated by soils in hydrologic group D. Infiltration varies from moderate to very slow and runoff potential varies from medium to very 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 dense 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 (refer to Section 4, NRCS National Engineering Handbook, for runoff and hydrologic curves).

## **Recreational Uses**

This site provides hunting opportunities for upland game species.

## **Wood Products**

No appreciable wood products are present on the site.

## **Other Products**

None noted.

## **Supporting Information**

### **Associated Sites**

(053BY001ND) – Clayey

(053BY002ND) – Claypan

(053BY008ND) – Sandy

(053BY011ND) – Loamy

(053BY003ND) – Closed Depression

### **Similar Sites**

(054XY021ND) – Claypan (Cp)

[Well drained soils on uplands or terraces that don't receive extra moisture; dense sodic subsoil below 6 inches with salts below 16 inches. Indicator species are western wheatgrass with an understory of blue grama, heath aster, and western yarrow along with fringed sagewort. This site has a deeper sodic subsoil layer, more production, similar species, less blue grama, more needleandthread and green needlegrass.]

(054XY035ND) – Very Shallow (VS)

[Excessively well drained soils less than 10 inches to scoria, gravels, shales, siltstone, or sandstone bedrock that restricts root penetration, upslope of Shallow loamy site. Indicator species are little bluestem, sideoats grama, blue grama, purple coneflower, pasqueflower, and creeping juniper. There is more little bluestem, similar production, and a different restrictive layer.]

## **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: Stan Boltz, NRCS Range Management Specialist; Michael D. Brand, State Land Dept., Director Surface Management; David Dewald, NRCS State Biologist; Paul Drayton, NRCS District Conservationist; Jody Forman, NRCS Range Management Specialist; Dennis Froemke, NRCS Range Management Specialist; Jeff Printz, NRCS State Range Management Specialist; Josh Saunders, NRCS Range Management Specialist; Kevin Sedivec, Extension Rangeland Management Specialist; Darrell Vanderbusch, NRCS Resource Soil Scientist; and Lee Voigt, NRCS Range Management Specialist.

## **State Correlation**

This site has been correlated with North Dakota and South Dakota in MLRA 53B.

## Field Offices

Aberdeen, SD	Gettysburg, SD	Minot, ND	Steele, ND
Ashley, ND	Ipswich, SD	Mohall, ND	Towner, ND
Bismarck, ND	Jamestown, ND	Mound City, SD	Turtle Lake, ND
Bowbells, ND	LaMoure, ND	Napoleon, ND	Watford City, ND
Ellendale, ND	Leola, SD	Redfield, SD	Williston, ND
Faulkton, SD	Linton, ND	Selby, SD	
Garrison, ND	McClusky, ND	Stanley, ND	

## Relationship to Other Established Classifications

Level IV Ecoregions of the Conterminous United States: 42a – Missouri Coteau; 42b – Collapsed Glacial Outwash; 42c – Missouri Coteau Slope; 42d – Northern Missouri Coteau; 42f – Southern Missouri Coteau Slope; 42g – Ponca Plains; and 42h – Southern River Breaks.

## 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://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

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

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