

## United States Department of Agriculture Natural Resources Conservation Service

### Ecological Site Description

**Site Name:** Sandy Claypan

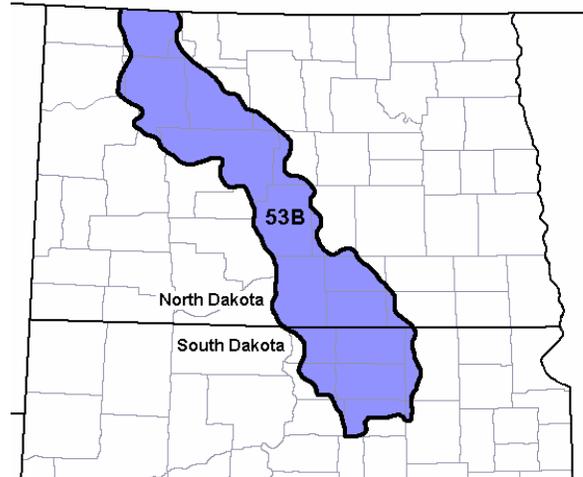
**Site Type:** Rangeland

**Site ID:** R053BY026ND

**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 nearly level to rolling uplands.

**Landform:** outwash plain, till plain, delta plain

**Aspect:** NA

	<u>Minimum</u>	<u>Maximum</u>
<b>Elevation (feet):</b>	1600	2000
<b>Slope (percent):</b>	0	3
<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>	Negligible	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

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

	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

<b>Climate Stations</b>		<b>Period</b>	
<b>Station ID</b>	<b>Location or Name</b>	<b>From</b>	<b>To</b>
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 drained soils. They have moderately coarse to medium textured surface layers underlain by a sodic subsoil. The subsoils are moderately coarse to medium textured and are high in sodium. Saturated hydraulic conductivity is moderate to slow and available water capacity is moderate. Salinity is none to slight and sodicity is high. This site is on nearly level to gently sloping outwash plains, till plains and delta plains. Slope ranges from zero to three percent. 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 with

numerous debris dams or vegetative barriers. The soil surface is stable and intact. Sub-surface soil layers are restrictive to water movement and root penetration.

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:** glaciofluvial deposits, till

**Parent Material Origin:** mixed

**Surface Texture:** 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):** 0-5

**Subsurface Fragments >3" (% Volume):** 0

	<u>Minimum</u>	<u>Maximum</u>
<b>Drainage Class:</b>	moderately well	moderately well
<b>Permeability Class:</b>	slow	moderate
<b>Depth to first restrictive layer (inches):</b>	8	20
<b>Electrical Conductivity (mmhos/cm)*:</b>	0	8
<b>Sodium Absorption Ratio*:</b>	0	15
<b>Soil Reaction (1:1 Water)*:</b>	5.1	9.0
<b>Soil Reaction (0.1M CaCl<sub>2</sub>)*:</b>	NA	NA
<b>Available Water Capacity (inches)*:</b>	2	3
<b>Calcium Carbonate Equivalent (percent)*:</b>	0	20

\* - 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).

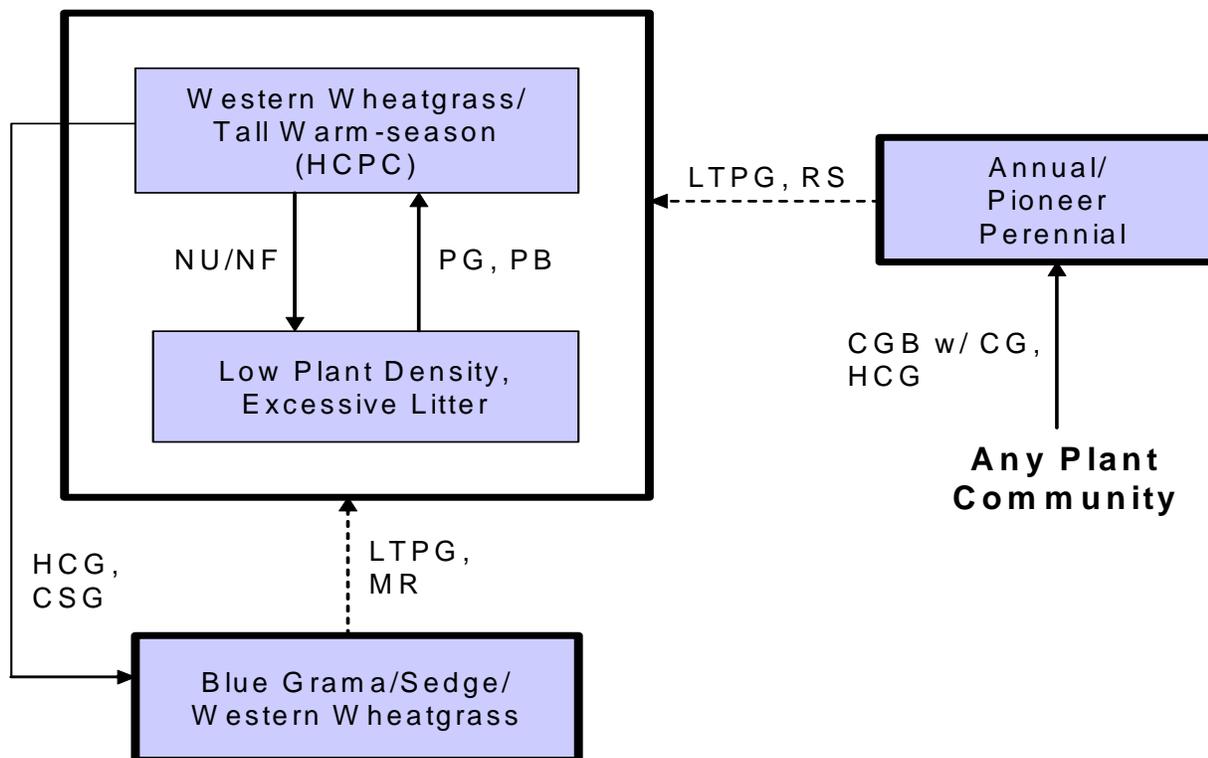
The plant community upon which interpretations are primarily based is the HCPC. The HCPC has been determined by study of rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily grazed to lightly grazed areas, seasonal use pastures, and historical accounts also have been used. 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 western wheatgrass, blue grama, sedges, cudweed sagewort, hairy golden aster, prairie coneflower, scurfpea, and fringed sagewort will initially increase. Prairie sandreed, sand bluestem green needlegrass, false gromwell, vetch, penstemon and leadplant will decrease in frequency and production. In time, heavy continuous grazing will likely cause upland sedges and 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 high litter levels, which favors an increase in Kentucky bluegrass and/or smooth brome grass, and in time, shrubs such as western snowberry will increase.

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; **HCG** – Heavy continuous grazing; **HCPC** – Historic Climax Plant Community; **LTPG** – Long-term prescribed grazing; **MR** – Mechanical renovation with prescribed grazing; **NU/NF** – Extended period of non-use & no fire; **PB** – Prescribed burning, followed by prescribed grazing; **PG** – Prescribed grazing; **RS** – Range seeding with prescribed grazing.

**Plant Community Composition and Group Annual Production**

COMMON/GROUP NAME	SYMBOL	Western Wheatgrass/Tall Warm-Season (HCPC)			
		Group	lbs./acre	% Comp	
<b>GRASSES &amp; GRASS-LIKES</b>			1870 - 2090	85 - 95	
western wheatgrass	PASM	1	330 - 550	15 - 25	
<b>TALL WARM-SEASON GRASSES</b>		<b>2</b>	<b>220 - 330</b>	<b>10 - 15</b>	
prairie sandreed	CALO	2	110 - 220	5 - 10	
sand bluestem	ANHA	2	66 - 154	3 - 7	
big bluestem	ANGE	2	0 - 66	0 - 3	
<b>NEEDLEGRASS</b>		<b>3</b>	<b>220 - 330</b>	<b>10 - 15</b>	
needleandthread	HECOC8	3	220 - 330	10 - 15	
green needlegrass	NAVI4	3	44 - 110	2 - 5	
<b>GRAMA</b>		<b>4</b>	<b>110 - 220</b>	<b>5 - 10</b>	
blue grama	BOGR2	4	110 - 220	5 - 10	
<b>OTHER NATIVE GRASSES</b>		<b>5</b>	<b>110 - 220</b>	<b>5 - 10</b>	
slender wheatgrass	ELTRT	5	44 - 176	2 - 8	
little bluestem	SCSC	5	0 - 66	0 - 3	
prairie junegrass	KOMA	5	22 - 44	1 - 2	
red threeawn	ARPUL	5	44 - 66	2 - 3	
sand dropseed	SPCR	5	0 - 22	0 - 1	
Scribner panicum	DIOLS	5	0 - 22	0 - 1	
other perennial grasses	2GP	5	20 - 40	1 - 2	
<b>GRASS-LIKES</b>		<b>6</b>	<b>100 - 200</b>	<b>5 - 10</b>	
threadleaf sedge	CAFI	6	100 - 160	5 - 8	
sun sedge	CAINH2	6	40 - 100	2 - 5	
other grass-likes	2GL	6	0 - 20	0 - 1	
<b>FORBS</b>		<b>7</b>	<b>100 - 200</b>	<b>5 - 10</b>	
American vetch	VIAM	7	0 - 22	0 - 1	
bracted spiderwort	TRBR	7	0 - 22	0 - 1	
cinquefoil	POTEN	7	0 - 22	0 - 1	
cudweed sagewort	ARLU	7	0 - 22	0 - 1	
false gromwell	ONMO	7	22 - 44	1 - 2	
gayfeather	LIATR	7	0 - 22	0 - 1	
goldenrod	SOLID	7	0 - 22	0 - 1	
green sagewort	ARDR4	7	0 - 22	0 - 1	
groundplum milkvetch	ASCR2	7	0 - 22	0 - 1	
hairy goldaster	HEVI4	7	0 - 22	0 - 1	
heath aster	SYER	7	0 - 22	0 - 1	
Hood's phlox	PHHO	7	0 - 22	0 - 1	
Lambert crazyweed	OXLA3	7	0 - 22	0 - 1	
penstemon	PENST	7	0 - 22	0 - 1	
prairie clover	DALEA	7	0 - 22	0 - 1	
prairie coneflower	RACO3	7	0 - 22	0 - 1	
purple coneflower	ECAN2	7	0 - 22	0 - 1	
rush skeletonweed	LYJU	7	0 - 22	0 - 1	
scarlet gaura	GACO5	7	0 - 22	0 - 1	
scarlet globemallow	SPCO	7	0 - 22	0 - 1	
scurfpea	PSORA2	7	22 - 44	1 - 2	
stiff sunflower	HEPA19	7	22 - 44	1 - 2	
wavyleaf thistle	CIUN	7	0 - 22	0 - 1	
western wallflower	ERCAC	7	0 - 22	0 - 1	
western yarrow	ACMI2	7	22 - 22	1 - 1	
other perennial forbs	2FP	7	0 - 20	0 - 1	
<b>SHRUBS</b>		<b>8</b>	<b>20 - 100</b>	<b>1 - 5</b>	
broom snakeweed	GUSA2	8	0 - 22	0 - 1	
cactus	OPUNT	8	0 - 22	0 - 1	
fringed sagewort	ARFR4	8	22 - 44	1 - 2	
leadplant	AMCA6	8	22 - 44	1 - 2	
rose	ROSA5	8	22 - 44	1 - 2	
western snowberry	SYOC	8	22 - 44	1 - 2	
other shrubs	2SHRUB	8	0 - 40	0 - 2	
<b>Annual Production lbs./acre</b>			LOW	RV	HIGH
<b>GRASSES &amp; GRASS-LIKES</b>			1490 -	1990 -	2490
<b>FORBS</b>			95 -	150 -	205
<b>SHRUBS</b>			15 -	60 -	105
<b>TOTAL</b>			1600 -	2200 -	2800

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/Tall Warm-season (HCPC)			Blue Grama/Sedge/Western Wheatgrass			Low Plant Density, Excessive Litter		
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp
<b>GRASSES &amp; GRASS-LIKES</b>			1870 - 2090	85 - 95		960 - 1080	80 - 90		1360 - 1530	80 - 90
western wheatgrass	PASM	1	330 - 550	15 - 25	1	60 - 180	5 - 15	1	85 - 170	5 - 10
<b>TALL WARM-SEASON GRASSES</b>		2	220 - 330	10 - 15	2	12 - 60	1 - 5	2	17 - 85	1 - 5
prairie sandreed	CALO	2	110 - 220	5 - 10	2	12 - 60	1 - 5	2	17 - 85	1 - 5
sand bluestem	ANHA	2	66 - 154	3 - 7				2	0 - 17	0 - 1
big bluestem	ANGE	2	0 - 66	0 - 3						
<b>NEEDLEGRASS</b>		3	220 - 330	10 - 15	3	24 - 96	2 - 8	3	34 - 170	2 - 10
needleandthread	HECOC8	3	220 - 330	10 - 15	3	24 - 96	2 - 8	3	34 - 170	2 - 10
green needlegrass	NAVI4	3	44 - 110	2 - 5	3	0 - 12	0 - 1	3	0 - 85	0 - 5
<b>GRAMA</b>		4	110 - 220	5 - 10	4	120 - 240	10 - 20	4	17 - 85	1 - 5
blue grama	BOGR2	4	110 - 220	5 - 10	4	120 - 240	10 - 20	4	17 - 85	1 - 5
<b>OTHER NATIVE GRASSES</b>		5	110 - 220	5 - 10	5	36 - 144	3 - 12	5	85 - 255	5 - 15
slender wheatgrass	ELTR7	5	44 - 176	2 - 8	5	0 - 36	0 - 3	5	17 - 119	1 - 7
little bluestem	SCSC	5	0 - 66	0 - 3				5	0 - 17	0 - 1
prairie junegrass	KOMA	5	22 - 44	1 - 2	5	12 - 24	1 - 2	5	17 - 34	1 - 2
red threeawn	ARPUL	5	0 - 66	0 - 3	5	12 - 60	1 - 5	5	17 - 85	1 - 5
sand dropseed	SPCR	5	0 - 22	0 - 1	5	12 - 48	1 - 4	5	17 - 85	1 - 5
Scribner panicum	DIOLS	5	0 - 22	0 - 1	5	12 - 24	1 - 2	5	17 - 34	1 - 2
other perennial grasses	2GP	5	22 - 44	1 - 2	5	0 - 48	0 - 4	5	0 - 68	0 - 4
<b>GRASS-LIKES</b>		6	110 - 220	5 - 10	6	60 - 180	5 - 15	6	51 - 170	3 - 10
threadleaf sedge	CAFI	6	110 - 176	5 - 8	6	60 - 180	5 - 15	6	34 - 170	2 - 10
sun sedge	CAINH2	6	44 - 110	2 - 5	6	24 - 60	2 - 5	6	17 - 51	1 - 3
other grass-likes	2GL	6	0 - 22	0 - 1	6	0 - 36	0 - 3	6	0 - 51	0 - 3
<b>NON-NATIVE GRASSES</b>		7			7	12 - 60	1 - 5	7	255 - 425	15 - 25
Kentucky bluegrass	POPR				7	12 - 60	1 - 5	7	85 - 340	5 - 20
smooth bromegrass	BRIN2				7	0 - 60	0 - 5	7	34 - 255	2 - 15
crested wheatgrass	AGCR				7	0 - 36	0 - 3	7	0 - 85	0 - 5
cheatgrass	B RTE				7	0 - 48	0 - 4	7	17 - 170	1 - 10
<b>FORBS</b>		8	110 - 220	5 - 10	8	60 - 120	5 - 10	8	85 - 170	5 - 10
American vetch	VIAM	8	0 - 22	0 - 1						
bracted spiderwort	TRBR	8	0 - 22	0 - 1						
cudweed sagewort	ARLU	8	0 - 22	0 - 1	8	12 - 36	1 - 3	8	17 - 85	1 - 5
false gromwell	ONMO	8	22 - 44	1 - 2						
gayfeather	LIATR	8	0 - 22	0 - 1	8	12 - 24	1 - 2	8	17 - 34	1 - 2
goldenrod	SOLID	8	0 - 22	0 - 1	8	12 - 36	1 - 3	8	17 - 51	1 - 3
green sagewort	ARDR4	8	0 - 22	0 - 1	8	12 - 36	1 - 3	8	17 - 68	1 - 4
hairy goldaster	HEVI4	8	0 - 22	0 - 1						
heath aster	SYER	8	0 - 22	0 - 1	8	12 - 24	1 - 2	8	17 - 51	1 - 3
Hood's phlox	PHHO	8	0 - 22	0 - 1	8	0 - 12	0 - 1			
Lambert crazyweed	OXLA3	8	0 - 22	0 - 1	8	0 - 12	0 - 1	8	0 - 17	0 - 1
milkvetch	ASTRA	8	0 - 22	0 - 1	8	0 - 12	0 - 1	8	0 - 17	0 - 1
penstemon	PENST	8	0 - 22	0 - 1	8	0 - 12	0 - 1	8	0 - 17	0 - 1
prairie clover	DALEA	8	0 - 22	0 - 1	8	12 - 24	1 - 2	8	17 - 34	1 - 2
prairie coneflower	RACO3	8	0 - 22	0 - 1	8	12 - 24	1 - 2	8	17 - 34	1 - 2
purple coneflower	ECAN2	8	0 - 22	0 - 1				8	0 - 17	0 - 1
rush skeletonweed	LYJU	8	0 - 22	0 - 1	8	0 - 12	0 - 1	8	0 - 17	0 - 1
scarlet gaura	GACO5	8	0 - 22	0 - 1				8	0 - 17	0 - 1
scarlet globemallow	SPCO	8	0 - 22	0 - 1	8	0 - 12	0 - 1	8	0 - 17	0 - 1
scurfpea	PSORA2	8	22 - 44	1 - 2	8	12 - 36	1 - 3	8	17 - 51	1 - 3
stiff sunflower	HEPA19	8	22 - 44	1 - 2						
wavyleaf thistle	CIUN	8	0 - 22	0 - 1	8	0 - 12	0 - 1	8	0 - 17	0 - 1
western wallflower	ERCAC	8	0 - 22	0 - 1	8	0 - 12	0 - 1	8	0 - 17	0 - 1
western yarrow	ACMIO	8	22 - 44	1 - 2	8	12 - 24	1 - 2	8	17 - 34	1 - 2
other perennial forbs	2FP	8	0 - 66	0 - 3	8	0 - 60	0 - 5	8	0 - 136	0 - 8
other annual forbs	2FA				8	0 - 60	0 - 5	8	0 - 85	0 - 5
<b>SHRUBS</b>		9	22 - 110	1 - 5	9	60 - 120	5 - 10	9	85 - 170	5 - 10
cactus	OPUNT	9	0 - 22	0 - 1	9	0 - 36	0 - 3	9	0 - 17	0 - 1
fringed sagewort	ARFR4	9	22 - 44	1 - 2	9	12 - 60	1 - 5	9	17 - 85	1 - 5
leadplant	AMCA6	9	22 - 44	1 - 2						
rose	ROSA5	9	22 - 44	1 - 2	9	12 - 48	1 - 4	9	17 - 85	1 - 5
western snowberry	SYOC	9	22 - 44	1 - 2	9	12 - 36	1 - 3	9	17 - 85	1 - 5
other shrubs	2SHRUB	9	0 - 44	0 - 2	9	0 - 36	0 - 3	9	0 - 34	0 - 2
<b>Annual Production lbs./acre</b>			LOW RV HIGH		LOW RV HIGH		LOW RV HIGH		LOW RV HIGH	
<b>GRASSES &amp; GRASS-LIKES</b>			1475 - 1969 - 2460		490 - 1020 - 1550		1040 - 1445 - 1950			
<b>FORBS</b>			105 - 165 - 225		55 - 90 - 125		80 - 128 - 175			
<b>SHRUBS</b>			20 - 66 - 115		55 - 90 - 125		80 - 128 - 175			
<b>TOTAL</b>			1600 - 2200 - 2800		600 - 1200 - 1800		1200 - 1700 - 2300			

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/Tall Warm-Season Plant Community

This is the interpretive plant community and is considered to be the HCPC. This community evolved with grazing by large herbivores and occasional prairie fire. It is well suited for grazing by domestic livestock and can be found on areas that are properly managed with prescribed grazing that allows for proper utilization, changes in season of use and adequate recovery periods following each grazing event.

The potential vegetation is about 85 percent grasses or grass-like plants, 10 percent forbs, and 5 percent shrubs. Cool-season and tall warm-season grasses dominate the plant community. The co-dominant grasses include western wheatgrass and prairie sandreed. Other grasses and grass-like plants occurring on the site include needleandthread, green needlegrass, blue grama, sand bluestem, prairie Junegrass, and sedges. Significant forbs include stiff sunflower, false gromwell, silverleaf scurfpea, western yarrow, and goldenrod. In many areas, western snowberry is the principle shrub and occurs in patchy mosaic. Other shrubs include prairie rose, leadplant, 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 very little movement offsite and natural plant mortality is very low. The diversity in plant species allows for high drought tolerance. Low available water capacity coupled with high accumulations of sodium and slow permeability strongly influences the soil-water-plant relationship.

The following growth curve is an estimate of the monthly percentages of the annual growth of the dormant species expected during the 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, Excessive Litter Plant Community*.
- Heavy, continuous grazing or continuous seasonal grazing will convert the plant community to the *Blue Grama/Sedge/Western Wheatgrass Plant Community*.

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

### Blue Grama/Sedge/Western Wheatgrass 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 grass-likes and forbs increase to dominate the site and annual production decreases dramatically. Lack of litter and reduced plant vigor result in higher soil temperatures, poor water infiltration rates, and high evapotranspiration, which gives blue grama and sedges 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, sedges, and western wheatgrass are the dominant species. Other grasses that may be present include red threeawn, needleandthread, prairie Junegrass, and annual grasses. Forbs such as hairy goldaster, cudweed sagewort, heath aster, Lambert crazyweed, prairie coneflower, scurfpea, and western yarrow may also be present. There is usually less than 10 percent bare ground.

This plant community is relatively stable. 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.

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:

- Long-term prescribed grazing that includes changing season of use and allowing adequate recovery periods to enhance cool season grasses may lead this plant community back to the *Western Wheatgrass/Tall Warm-Season Plant Community (HCPC)*.
- Heavy, continuous grazing may cause further deterioration resulting in a shift to the *Annual/Pioneer Perennial Plant Community*.
- Mechanical renovation can create more favorable hydrologic conditions, which will increase production and lead to a plant community resembling the *Western Wheatgrass/Tall Warm-Season Plant Community (HCPC)*. Improved grazing management will be necessary to prevent degradation to a short-grass dominated situation after renovation.
- Cropped go-back land with continuous grazing will convert this plant community to the *Annual/Pioneer Perennial Plant Community*.

### Low Plant Density, Excessive Litter Plant Community

This plant community develops after an extended period of 15 or more years of non-use by herbivores and exclusion of fire. This plant community can be 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 accumulates in large amounts as this community develops. Litter buildup reduces plant vigor and density, and seedling recruitment declines. Eventually, litter levels become abundant enough to crowd out living plants and reduce plant density. Annual and/or biennial forbs and annual grasses commonly fill these interspaces.

Due to a lack of tiller stimulation and sunlight, native bunchgrasses typically develop dead centers and native rhizomatous grasses are limited to small colonies. Heavy 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.

Nonnative grasses, such as Kentucky bluegrass, crested wheatgrass, smooth brome, and cheatgrass tend to dominate this plant community. Other grasses that may be present include western wheatgrass, needleandthread, green needlegrass, and Sandberg bluegrass. The common forbs include sweetclover, green sagewort, cudweed sagewort, and heath aster. Fringed sagewort and snowberry are the principal shrubs and tend to increase in density and cover.

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. Compared to the HCPC, infiltration is reduced to the lower root zone. Runoff is similar to the HCPC. This plant community tends to be moisture loving and usually tends to utilize the spring moisture quickly causing forage base to become dry and not very palatable early in the summer. Once this plant community is reached, time and external resources will be needed to see any immediate 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 a normal year:

Growth curve number: ND5301

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

Growth curve description: Cool-season 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:

- With prescribed grazing and/or prescribed burning followed by prescribed grazing, this plant community will move toward the *Western Wheatgrass/Tall Warm-Season Plant Community*. This would require long-term management with prescribed grazing and/or prescribed burning under controlled conditions.
- 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 red threeawn, smooth brome, crested wheatgrass, annual brome, needleandthread, prairie Junegrass, and western wheatgrass. The dominant forbs include curlycup gumweed, marehail, salsify, kochia, field bindweed, thistles, western ragweed, pussytoes, prostrate verbena, and other early successional species. Shrubs that may be present include prairie rose, fringed sagewort, and broom snakeweed. 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. Many annual and perennial forbs, including non-native species, have invaded the site.

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 vegetation state. 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 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. The total annual production ranges from 300 to 1,100 lbs./ac. (air-dry weight) depending upon growing conditions.

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

- Under long-term prescribed grazing, including adequate rest periods, this plant community will move through the successional stages, and may eventually lead to the *Western Wheatgrass/Tall Warm-Season Plant Community*. Depending on the slope, aspect, and size, and if adequate perennial plants exist, this change can occur more rapidly. This process will likely take a long period of time (50+ years).
- Range seeding with deferment and long-term prescribed grazing can convert this to a plant community resembling the *Western Wheatgrass/Tall Warm-Season Plant Community*.

## **Ecological Site Interpretations**

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

-- Under Development --

**Western Wheatgrass/Tall Warm-Season Plant Community:**

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

**Low Plant Density, Excessive Litter Plant Community:**

**Annual/Pioneer Perennial Plant Community:**

**Site Type: Rangeland**  
**MLRA: 53B – Central Dark Brown Glaciated Plains**  
**Animal Preferences (Quarterly – 1,2,3,4†)**

**Sandy Claypan**  
**R053BY026ND**

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
<b>Grasses &amp; Grass-likes</b>							
big bluestem	U D P D	U D U U	U D P D	U D U U	U D U U	U D P D	U D P D
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
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
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
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
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
prairie sandreed	U D D U	U D U U	U D D U	U U D U	U U D U	U D D U	U D D U
red threeawn	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
sand bluestem	U D P D	U D U U	U D P D	U D U U	U D U U	U D P D	U D P D
sand 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
Scribner panicum	U U D U	N U N N	U U D U	N U N N	N U N N	U U D U	U U D U
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
sun 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
threadleaf 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
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>							
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
bracted spiderwort	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
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
false gromwell	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
gayfeather	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
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
green sagewort	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
groundplum milkvetch	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
hairy goldaster	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
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
Lambert crazyweed	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T
penstemon	U U U U	U P P U	U U U U	U P P U	U P P U	U U U U	U P P U
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
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 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
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 gaura	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
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
stiff 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
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 wallflower	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
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
<b>Shrubs</b>							
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
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
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
leadplant	U P D U	U P D U	U P D U	U P D U	U P D U	U P D U	U P D U
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
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

**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

### 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 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 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 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 present on the site.

### Other Products

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

## Supporting Information

### Associated Sites

(053BY013ND) – Thin Claypan  
(053BY008ND) – Sandy

(053BY007ND) – Sands

### Similar Sites

(053BY002ND) – Claypan (Cp)

[Well drained soils on uplands or terraces that don't receive extra moisture with a dense sodic subsoil below 6 inches with salts below 16 inches. Indicator species are western wheatgrass, blue grama, heath aster, western yarrow, and fringed sagewort. This site has less production, no prairie sandreed, and little threadleaf sedge, more blue grama and Sandberg's bluegrass, soil texture is finer but with similar sodic subsoils layer.]

(053BY008ND) – Sandy (Sy)

[Does not receive additional moisture. Found on dry uplands upslope from Loamy Overflow site, down slope from Thin Upland or Shallow Loamy sites. Similar landscape position as Loamy, Sands, Clayey sites; will ribbon up to one inch. Indicator species are prairie sandreed with western wheatgrass and green needlegrass intermixed. This site doesn't have dense sodic subsoil below 6 inches with salts below 16 inches, far less western wheatgrass, blue grama, more prairie sandreed, and sand bluestem, more production.]

### 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.

<u>Data Source</u>	<u>Number of Records</u>	<u>Sample Period</u>	<u>State</u>	<u>County</u>
SCS-RANGE-417 Ocular Estimate	1	2003	SD	McPherson

## 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 Type: Rangeland**  
**MLRA: 53B – Central Dark Brown Glaciated Plains**

**Sandy Claypan**  
**R053BY026ND**

## **Site Description Approval**

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

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