

## United States Department of Agriculture Natural Resources Conservation Service

### Ecological Site Description

**Site Name:** Shallow Loamy

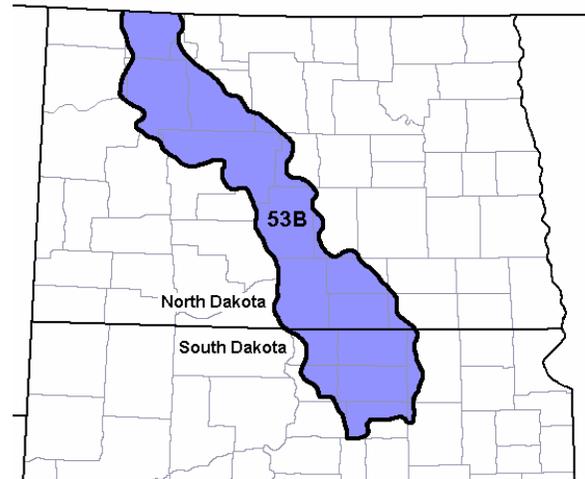
**Site Type:** Rangeland

**Site ID:** R053BY009ND

**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 typically occurs on moderately sloping to very steep uplands.

**Landform:** hill, escarpment, ridge

**Aspect:** NA

	<u>Minimum</u>	<u>Maximum</u>
<b>Elevation (feet):</b>	1600	2000
<b>Slope (percent):</b>	6	60
<b>Water Table Depth (inches):</b>	None	None
<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>	Medium	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 shallow, well drained, medium, and moderately fine textured soils overlying weathered mudstone or siltstone at less than 20 inches. Saturated hydraulic conductivity is moderate or moderately slow and available water capacity is low or very low. Salinity and sodicity are none to slight. This site occurs on hills, escarpments and ridges on nearly level to very steep residual uplands. Slope ranges from 6 to 60 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.

These soils are mainly susceptible to water erosion. The hazard of water erosion increases on slopes greater than about 15 percent. Low available water capacity coupled with high accumulations of lime and slow permeability strongly influences the soil-water-plant relationship. 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:** residuum, colluvium

**Parent Material Origin:** sandstone, shale, sedimentary

**Surface Texture:** loam

**Surface Texture Modifier:** none

**Subsurface Texture Group:** loamy

**Surface Fragments ≤3" (% Cover):** 0-15

**Surface Fragments >3" (%Cover):** 0-5

**Subsurface Fragments ≤3" (% Volume):** 0-15

**Subsurface Fragments >3" (% Volume):** 0-5

	<u>Minimum</u>	<u>Maximum</u>
<b>Drainage Class:</b>	well	well
<b>Permeability Class:</b>	moderate	moderate
<b>Depth to first restrictive layer (inches):</b>	10	20
<b>Electrical Conductivity (mmhos/cm)*:</b>	0	8
<b>Sodium Absorption Ratio*:</b>	0	0
<b>Soil Reaction (1:1 Water)*:</b>	6.6	8.4
<b>Soil Reaction (0.1M CaCl<sub>2</sub>)*:</b>	NA	NA
<b>Available Water Capacity (inches)*:</b>	3	3
<b>Calcium Carbonate Equivalent (percent)*:</b>	0	15

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

## **Plant Communities**

### **Ecological Dynamics of the Site:**

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).

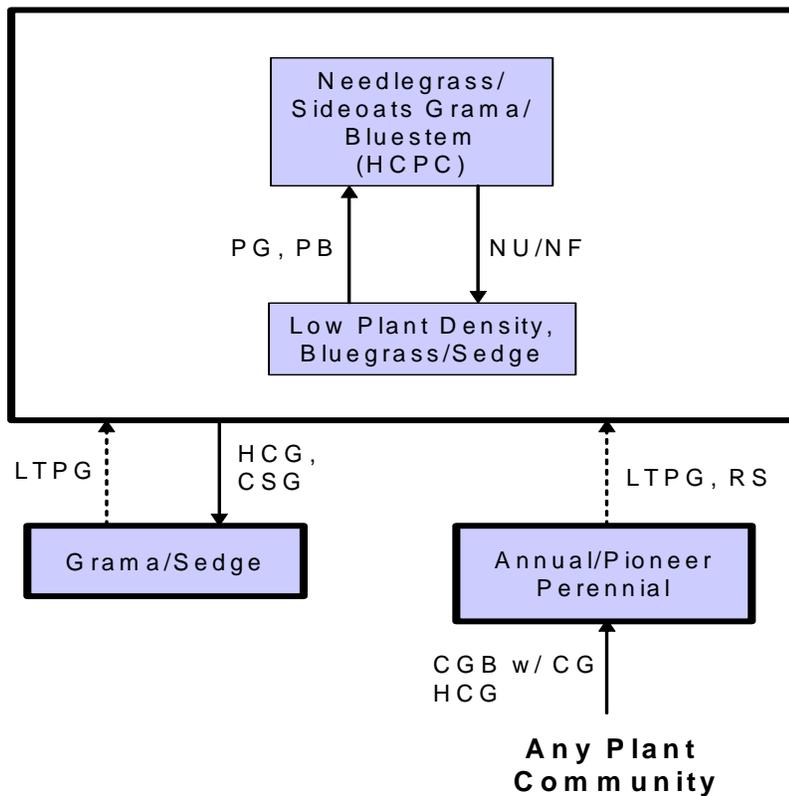
The plant community upon which interpretations are primarily based is the HCPC. The HCPC has been determined by study of rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily grazed 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 over several years causes this site to depart from the HCPC. Species such as little bluestem, needleandthread, threadleaf sedge, and blue grama will initially increase. Porcupine grass, green needlegrass, plains muhly, and sideoats grama will decrease in frequency and production. Heavy continuous grazing causes blue grama and/or threadleaf sedge to increase and eventually dominate and pioneer perennials and annuals to increase. The resulting plant community is relatively stable and the competitive advantage prevents other species from establishing.

Under 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 fringed sagewort and cactus will increase.

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** – Historical 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 followed by prescribed grazing.

**Plant Community Composition and Group Annual Production**

COMMON/GROUP NAME	SYMBOL	Needlegrass/Sideoats Grama/ Bluestem (HCPC)			
		Group	lbs./acre	% Comp	
<b>GRASSES &amp; GRASS-LIKES</b>			1870 - 2090	85 - 95	
<b>NEEDLEGRASSES</b>		<b>1</b>	<b>220 - 440</b>	<b>10 - 20</b>	
green needlegrass	NAVI4	1	110 - 330	5 - 15	
porcupine grass	HESP11	1	110 - 330	5 - 15	
needleandthread	HECOC8	1	44 - 220	2 - 10	
<b>WARM-SEASON MID GRASSES</b>		<b>2</b>	<b>220 - 440</b>	<b>10 - 20</b>	
little bluestem	SCSC	2	110 - 330	5 - 15	
sideoats grama	BOCU	2	110 - 330	5 - 15	
plains muhly	MUCU3	2	44 - 176	2 - 8	
<b>WARM-SEASON TALL GRASSES</b>		<b>3</b>	<b>110 - 330</b>	<b>5 - 15</b>	
big bluestem	ANGE	3	110 - 330	5 - 15	
prairie sandreed	CALO	3	44 - 220	2 - 10	
<b>WHEATGRASS</b>		<b>4</b>	<b>110 - 220</b>	<b>5 - 10</b>	
western wheatgrass	PASM	4	110 - 220	5 - 10	
<b>WARM-SEASON SHORT GRASSES</b>		<b>5</b>	<b>110 - 220</b>	<b>5 - 10</b>	
blue grama	BOGR2	5	110 - 220	5 - 10	
hairy grama	BOHI2	5	44 - 110	2 - 5	
<b>NATIVE GRASSES/GRASS-LIKES</b>		<b>6</b>	<b>110 - 220</b>	<b>5 - 10</b>	
plains reedgrass	CAMO	6	0 - 44	0 - 2	
prairie junegrass	KOMA	6	22 - 66	1 - 3	
threeawn	ARIST	6	22 - 44	1 - 2	
slender wheatgrass	ELTRT	6	0 - 110	0 - 5	
sedge	CAREX	6	44 - 176	2 - 8	
other perennial grasses	2GP	6	0 - 110	0 - 5	
<b>FORBS</b>		<b>7</b>	<b>110 - 220</b>	<b>5 - 10</b>	
American pasqueflower	PUPA5	7	0 - 22	0 - 1	
American vetch	VIAM	7	22 - 44	1 - 2	
cudweed sagewort	ARLU	7	22 - 66	1 - 3	
cutleaf ironplant	MAPI	7	0 - 22	0 - 1	
gayfeather	LIATR	7	22 - 66	1 - 3	
goldenrod	SOLID	7	22 - 44	1 - 2	
green sagewort	ARDR4	7	0 - 44	0 - 2	
groundplum milkvetch	ASCR2	7	0 - 22	0 - 1	
heath aster	SYER	7	22 - 66	1 - 3	
Indian breadroot	PEES	7	0 - 44	0 - 2	
Lambert crazyweed	OXLA3	7	0 - 22	0 - 1	
plains milkvetch	ASG15	7	0 - 22	0 - 1	
prairie clover	DALEA	7	22 - 44	1 - 2	
prairie coneflower	RACO3	7	22 - 44	1 - 2	
purple coneflower	ECAN2	7	22 - 66	1 - 3	
pussytoes	ANTEN	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	22 - 44	1 - 2	
scurfpea	PSORA2	7	22 - 66	1 - 3	
wavyleaf thistle	CIUN	7	0 - 22	0 - 1	
western yarrow	ACMI2	7	0 - 22	0 - 1	
wild onion	ALLIU	7	0 - 22	0 - 1	
other perennial forbs	2FP	7	22 - 110	1 - 5	
other annual forbs	2FA	7	22 - 66	1 - 3	
<b>SHRUBS</b>		<b>8</b>	<b>44 - 110</b>	<b>2 - 5</b>	
cactus	OPUNT	8	0 - 44	0 - 2	
creeping juniper	JUHO2	8	0 - 44	0 - 2	
fringed sagewort	ARFR4	8	22 - 110	1 - 5	
leadplant	AMCA6	8	22 - 110	1 - 5	
rose	ROSA5	8	22 - 110	1 - 5	
skunkbush sumac	RHTR	8	22 - 110	1 - 5	
small soapweed	YUGL	8	0 - 66	0 - 3	
other shrubs	2SHRUB	8	0 - 110	0 - 5	
<b>Annual Production lbs./acre</b>			<b>LOW</b>	<b>RV</b>	<b>HIGH</b>
<b>GRASSES &amp; GRASS-LIKES</b>			1355 -	1958	-2560
<b>FORBS</b>			105 -	165	-225
<b>SHRUBS</b>			40 -	77	-115
<b>TOTAL</b>			1500 -	2200	-2900

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	Needlegrass/Sideoats Grama/ Bluestem (HCPC)			Grama/Sedge			Low Plant Density, Bluegrass/Sedge		
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp
<b>GRASSES &amp; GRASS-LIKES</b>			1870 - 2090	85 - 95		600 - 720	75 - 90		1275 - 1530	75 - 90
<b>NEEDLEGRASSES</b>		1	220 - 440	10 - 20	1	8 - 40	1 - 5	1	85 - 255	5 - 15
green needlegrass	NAVI4	1	110 - 330	5 - 15	1	0 - 16	0 - 2	1	34 - 170	2 - 10
porcupine grass	HESP11	1	110 - 330	5 - 15				1	0 - 51	0 - 3
needleandthread	HECOC8	1	44 - 220	2 - 10	1	8 - 40	1 - 5	1	34 - 170	2 - 10
<b>WARM-SEASON MID GRASSES</b>		2	220 - 440	10 - 20	2	16 - 80	2 - 10	2	51 - 170	3 - 10
little bluestem	SCSC	2	110 - 330	5 - 15	2	16 - 80	2 - 10	2	17 - 170	1 - 10
sideoats grama	BOGR2	2	110 - 330	5 - 15	2	0 - 16	0 - 2	2	17 - 34	1 - 2
plains muhly	MUCU3	2	44 - 176	2 - 8				2	17 - 68	1 - 4
<b>WARM-SEASON TALL GRASSES</b>		3	110 - 330	5 - 15	3	0 - 16	0 - 2	3	17 - 85	1 - 5
big bluestem	ANGE	3	110 - 330	5 - 15				3	0 - 85	0 - 5
prairie sandreed	CALO	3	44 - 220	2 - 10	3	0 - 16	0 - 2	3	17 - 85	1 - 5
<b>WHEATGRASS</b>		4	110 - 220	5 - 10	4	8 - 56	1 - 7	4	34 - 170	2 - 10
western wheatgrass	PASM	4	44 - 220	2 - 10	4	8 - 56	1 - 7	4	34 - 170	2 - 10
slender wheatgrass	ELTR7	4	44 - 220	2 - 10	4	0 - 40	0 - 5	4	34 - 170	2 - 10
<b>WARM-SEASON SHORT GRASSES</b>		5	110 - 220	5 - 10	5	80 - 160	10 - 20	5	17 - 85	1 - 5
blue grama	BOGR2	5	110 - 220	5 - 10	5	80 - 160	10 - 20	5	17 - 85	1 - 5
hairy grama	BOHI2	5	0 - 110	0 - 5	5	0 - 80	0 - 10	5	0 - 51	0 - 3
<b>NATIVE GRASSES/GRASS-LIKES</b>		6	110 - 220	5 - 10	6	80 - 200	10 - 25	6	85 - 204	5 - 12
plains reedgrass	CAMO	6	0 - 44	0 - 2	6	0 - 8	0 - 1	6	0 - 17	0 - 1
prairie junegrass	KOMA	6	22 - 66	1 - 3	6	8 - 16	1 - 2	6	17 - 34	1 - 2
threeawn	ARIST	6	22 - 44	1 - 2	6	8 - 40	1 - 5	6	17 - 85	1 - 5
sedge	CAREX	6	44 - 176	2 - 8	6	40 - 160	5 - 20	6	34 - 170	2 - 10
other perennial grasses	ZGP	6	0 - 110	0 - 5	6	0 - 40	0 - 5	6	0 - 85	0 - 5
<b>NON-NATIVE GRASSES</b>		7			7	8 - 48	1 - 6	7	85 - 306	5 - 18
Kentucky bluegrass	POPR				7	8 - 48	1 - 6	7	34 - 306	2 - 18
smooth bromegrass	BRIN2				7	0 - 40	0 - 5	7	17 - 170	1 - 10
crested wheatgrass	AGCR				7	0 - 16	0 - 2	7	0 - 85	0 - 5
cheatgrass	BRTE				7	0 - 32	0 - 4	7	0 - 136	0 - 8
<b>FORBS</b>		8	110 - 220	5 - 10	8	40 - 120	5 - 15	8	85 - 255	5 - 15
American pasqueflower	PUPA5	8	0 - 22	0 - 1	8	0 - 24	0 - 3	8	0 - 17	0 - 1
American vetch	VIAM	8	22 - 44	1 - 2				8	0 - 17	0 - 1
common dandelion	TAOF				8	8 - 24	1 - 3	8	17 - 68	1 - 4
cudweed sagewort	ARLU	8	22 - 66	1 - 3	8	8 - 32	1 - 4	8	17 - 51	1 - 3
cutleaf ironplant	MAPI	8	0 - 22	0 - 1	8	0 - 16	0 - 2	8	0 - 17	0 - 1
gayfeather	LIATR	8	22 - 66	1 - 3	8	8 - 16	1 - 2	8	17 - 34	1 - 2
goldenrod	SOLID	8	22 - 44	1 - 2	8	8 - 24	1 - 3	8	17 - 68	1 - 4
green sagewort	ARDR4	8	0 - 44	0 - 2	8	8 - 24	1 - 3	8	17 - 68	1 - 4
groundplum milkvetch	ASCR2	8	0 - 22	0 - 1				8	0 - 17	0 - 1
heath aster	SYER	8	22 - 66	1 - 3	8	8 - 32	1 - 4	8	17 - 85	1 - 5
Indian breadroot	PEES	8	0 - 44	0 - 2						
Lambert crazyweed	OXLA3	8	0 - 22	0 - 1	8	0 - 8	0 - 1	8	0 - 17	0 - 1
plains milkvetch	ASG15	8	0 - 22	0 - 1	8	0 - 8	0 - 1	8	0 - 17	0 - 1
prairie clover	DALEA	8	22 - 44	1 - 2	8	0 - 8	0 - 1	8	0 - 34	0 - 2
prairie coneflower	RAC03	8	22 - 44	1 - 2	8	8 - 16	1 - 2	8	17 - 34	1 - 2
purple coneflower	ECAN2	8	22 - 66	1 - 3	8	0 - 16	0 - 2	8	0 - 34	0 - 2
pussytoes	ANTEN	8	0 - 22	0 - 1	8	0 - 16	0 - 2	8	0 - 17	0 - 1
rush skeletonweed	LYJU	8	0 - 22	0 - 1	8	0 - 8	0 - 1	8	0 - 17	0 - 1
scarlet gaura	GACO5	8	0 - 22	0 - 1				8	0 - 17	0 - 1
scarlet globemallow	SPCO	8	22 - 66	1 - 3	8	8 - 24	1 - 3	8	17 - 34	1 - 2
scurfpea	PSORA2	8	0 - 22	0 - 1	8	8 - 24	1 - 3	8	17 - 51	1 - 3
sweetclover	MELIL				8	0 - 40	0 - 5	8	0 - 136	0 - 8
wavyleaf thistle	CIUN	8	0 - 22	0 - 1	8	0 - 8	0 - 1	8	0 - 17	0 - 1
western salsify	TRDU				8	0 - 32	0 - 4	8	0 - 68	0 - 4
western yarrow	ACMIO	8	0 - 22	0 - 1	8	0 - 16	0 - 2	8	0 - 34	0 - 2
wild onion	ALLIU	8	0 - 22	0 - 1	8	0 - 8	0 - 1	8	0 - 17	0 - 1
other perennial forbs	ZFP	8	22 - 110	1 - 5	8	8 - 40	1 - 5	8	17 - 85	1 - 5
other annual forbs	ZFA	8	22 - 66	1 - 3	8	8 - 32	1 - 4	8	17 - 85	1 - 5
<b>SHRUBS</b>		9	44 - 110	2 - 5	9	24 - 80	3 - 10	9	34 - 170	2 - 10
cactus	OPUNT	9	0 - 44	0 - 2	9	8 - 16	1 - 2	9	0 - 17	0 - 1
creeping juniper	JUHO2	9	0 - 44	0 - 2	9	0 - 16	0 - 2	9	0 - 34	0 - 2
fringed sagewort	ARFR4	9	22 - 110	1 - 5	9	8 - 40	1 - 5	9	17 - 85	1 - 5
leadplant	AMCA6	9	22 - 110	1 - 5				9	0 - 34	0 - 2
rose	ROSA5	9	22 - 110	1 - 5	9	8 - 40	1 - 5	9	17 - 85	1 - 5
skunkbush sumac	RHTR	9	22 - 110	1 - 5	9	8 - 40	1 - 5	9	17 - 68	1 - 4
yucca	YUGL	9	0 - 66	0 - 3	9	0 - 40	0 - 5	9	0 - 51	0 - 3
other shrubs	ZSHRUB	9	0 - 110	0 - 5	9	0 - 40	0 - 5	9	0 - 85	0 - 5
<b>Annual Production lbs./acre</b>			LOW RV HIGH		LOW RV HIGH		LOW RV HIGH		LOW RV HIGH	
<b>GRASSES &amp; GRASS-LIKES</b>			1355 - 1958 - 2560		345 - 668 - 1190		1090 - 1428 - 1750			
<b>FORBS</b>			105 - 165 - 225		35 - 80 - 125		80 - 170 - 275			
<b>SHRUBS</b>			40 - 77 - 115		20 - 52 - 85		30 - 102 - 175			
<b>TOTAL</b>			1500 - 2200 - 2900		400 - 800 - 1400		1200 - 1700 - 2200			

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.

#### Needlegrass/Sideoats Grama/Bluestem 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. A mix of cool-season and warm-season grasses dominates this plant community. The major grasses include green needlegrass, porcupine grass, sideoats grama, little bluestem, big bluestem, plains muhly, and western wheatgrass. Other grasses occurring on the site include prairie junegrass, red threeawns, and blue grama. The significant forbs include gayfeather, purple coneflower, prairie clover, and cutleaf ironplant. Significant shrubs may include fringed sagewort, leadplant, and rose.

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.

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, Bluegrass/Sedge Plant Community*.
- Heavy, continuous grazing or continuous seasonal grazing (spring) will convert the plant community to the *Grama/Sedge Plant Community*.

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

### Low Plant Density, Bluegrass/Sedge 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 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 and annual grasses commonly fill interspaces once occupied by desirable species.

Kentucky bluegrass, crested wheatgrass, smooth brome grass, cheatgrass, and sweet clover tend to invade and may dominate this plant community. Other grasses present include western wheatgrass, needleandthread, and green needlegrass. The common forbs include green sagewort, cudweed, and heath aster. Fringed sagewort and brome snakeweed are the principal shrubs.

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 favor early cool-season plant species which are moisture loving and usually tends to utilize the spring moisture quickly causing the forage base to become dry and not very palatable 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 represents monthly percentages of total annual growth of the dominant species 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 *Needlegrass/Sideoats Grama/Bluestem Plant Community*. This would require long-term management with prescribed grazing and/or prescribed burning under controlled conditions.

### Grama/Sedge Plant Community

This plant community is the result of long-term, heavy, continuous grazing and/or continuous seasonal grazing (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 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 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 threadleaf sedge are the dominant grass/grass-like species. Other grasses include western wheatgrass, needleandthread, little bluestem, prairie Junegrass, and red threeawn. Significant forbs include American pasqueflower, cutleaf ironplant, groundplum milkvetch, prairie coneflower, and scarlet globemallow. There is usually less than 10 percent bare ground. The significant shrubs include broom snakeweed and fringed sagewort.

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.

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: ND5304

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

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

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:

- Long-term prescribed grazing that includes changing season of use and allowing adequate recovery periods to enhance cool season grasses will slowly lead this plant community back to the *Needlegrass/Sideoats Grama/Bluestem Plant Community*.
- Heavy, continuous grazing will cause further deterioration resulting in a shift 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*.

### **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 red threeawn, sixweeks fescue, smooth brome, crested wheatgrass, annual brome, needleandthread, green needlegrass, prairie Junegrass, western wheatgrass, and little bluestem. The dominant forbs include curlycup gumweed, maretail, salsify, kochia, field bindweed, thistles, western ragweed, pussytoes, prostrate verbena, and other early successional species. Shrubs that may be present include prairie rose and broom snakeweed. Plant species from adjacent ecological sites may become minor components of this plant community. The community also is susceptible to invasion by non-native species due to severe soil disturbances and relatively high percent of bare ground. Compared to the HCPC, most of the native perennial grasses have been eliminated or occur in very small amounts. 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.

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 1,500 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 a plant community resembling the *Needlegrass/Sideoats Grama/Bluestem Plant Community (HCPC)*. This process will likely take a long period of time (50+ years). Depending on the slope, aspect, and size, and if adequate perennial plants exist, this change can occur more rapidly.
- Range seeding with deferment and prescribed grazing can convert this to a plant community closely resembling the *Needlegrass/Sideoats Grama/Bluestem Plant Community (HCPC)*.

## **Ecological Site Interpretations**

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

-- Under Development --

**Needlegrass/Sideoats Grama/Bluestem Plant Community:**

**Grampa/Sedge Plant Community:**

**Low Plant Density, Bluegrass/Sedge Plant Community:**

**Annual/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>							
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
hairy 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
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
plains 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
plains reedgrass	U D U U	N D N N	U D U U	N D N N	N D N N	U D U U	U D U U
porcupine grass	U P U D	N D N U	U P U D	N D N U	N D N U	U P U D	U P 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
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
sideoats grama	U D P U	U P D U	U D P U	U P D U	U P D U	U D P U	U D P 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
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
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 pasqueflower	N N N N	N U N N	N N N N	N U N N	N U N N	N N N N	N N N N
American vetch	U D P U	U P P U	U D P U	U P P U	U P P U	U D P U	U P P U
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
cutleaf ironplant	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
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
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
Indian breadroot	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 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
plains milkvetch	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
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
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 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
wavyleaf thistle	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N
western yarrow	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
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
<b>Shrubs</b>							
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
creeping juniper	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 N 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
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
skunkbush sumac	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 U D
small soapweed	D N N D	D U U D	D N N D	D U U D	D U U D	D N N D	D 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 groups C and D. Infiltration varies from slow to moderately rapid and runoff potential varies from medium to high for this site depending on soil hydrologic group, slope and ground cover. In many cases, areas with greater than 75 percent ground cover have the greatest potential for high infiltration and lower runoff. An exception would be where 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

(053BY011ND) – Loamy

(053BY008ND) – Sandy

(053BY015ND) – Thin Loamy

(053BY017ND) – Very Shallow

### Similar Sites

(053BY015ND) – Thin Loamy (TLo)

[Deep and moderately deep entisols, usually calcareous within four inches to the surface, found on knobs and/or sideslopes of hills and buttes. Will form a ribbon greater than one inch but not more than two inches. Up slope of Loamy site. Indicator species: little bluestem, western wheatgrass, plains muhly, porcupinegrass, and sideoats grama, with Missouri goldenrod, dotted gayfeather, pasqueflower, purple coneflower, and purple prairie clover, and shrubs like prairie rose. This site has similar species but more little bluestem more production, deeper soils, no restrictive layer above 20 inches.]

(053BY017ND) – 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 blue grama, sideoats grama, purple coneflower, pasqueflower, and creeping juniper. This site has similar species but more needleandthread, blue grama, and less plains muhly, green needlegrass, western wheatgrass, restrictive layer above 10 inches is scoria or gravels, less 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	1	1969	ND	Emmons

## 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**

**Shallow Loamy**  
**R053BY009ND**

## **Site Description Approval**

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

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