

United States Department of Agriculture Natural Resources Conservation Service

Ecological Site Description

Site Name: Sands

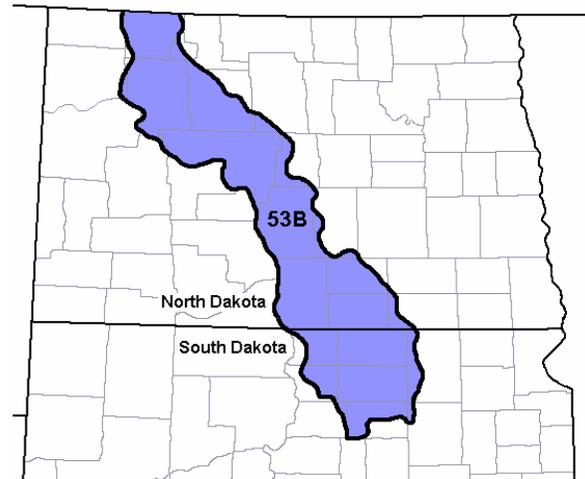
Site Type: Rangeland

Site ID: R053BY007ND

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/.



Physiographic Features

This site typically occurs on nearly level to moderately steep uplands.

Landform: dune, till plain, stream terrace

Aspect: N/A

	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	1600	2000
Slope (percent):	0	25
Water Table Depth (inches):	80	80
Flooding:		
Frequency:	None	None
Duration:	None	None
Ponding:		
Depth (inches):	None	None
Frequency:	None	None
Duration:	None	None
Runoff Class:	Negligible	Very low

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>
Frost-free period (days):	110	135
Freeze-free period (days):	129	156
Mean Annual Precipitation (inches):	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

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 deep to very deep, well to excessively drained, coarse textured soils. Saturated hydraulic conductivity is rapid to very rapid and available water capacity is moderate to very low. Salinity and sodicity are none. Soils on this site are highly susceptible to wind erosion. This site is on nearly level to steep outwash plains, terraces, and till plains. Slope ranges from 0 to 25 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 susceptible to water and wind 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: alluvium, glaciofluvial deposits, and eolian deposits

Parent Material Origin: mixed

Surface Texture: loamy fine sand, loamy sand

Surface Texture Modifier: none

Subsurface Texture Group: sandy

Surface Fragments ≤3" (% Cover): 0-15

Surface Fragments >3" (%Cover): 0-1

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

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

	<u>Minimum</u>	<u>Maximum</u>
Drainage Class:	well	excessively
Permeability Class:	rapid	very rapid
Depth to first restrictive layer (inches):	80	80
Electrical Conductivity (mmhos/cm)*:	0	2
Sodium Absorption Ratio*:	0	0
Soil Reaction (1:1 Water)*:	6.1	8.4
Soil Reaction (0.1M CaCl₂)*:	NA	NA
Available Water Capacity (inches)*:	4	5
Calcium Carbonate Equivalent (percent)*:	0	15

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

Plant Communities

Ecological Dynamics of the Site:

This site developed under Northern Great Plains climatic conditions 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 moderately resilient. Under continued adverse impacts, a slow decline in vegetative vigor and composition will occur. Under favorable vegetative management treatments, the site can readily 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.

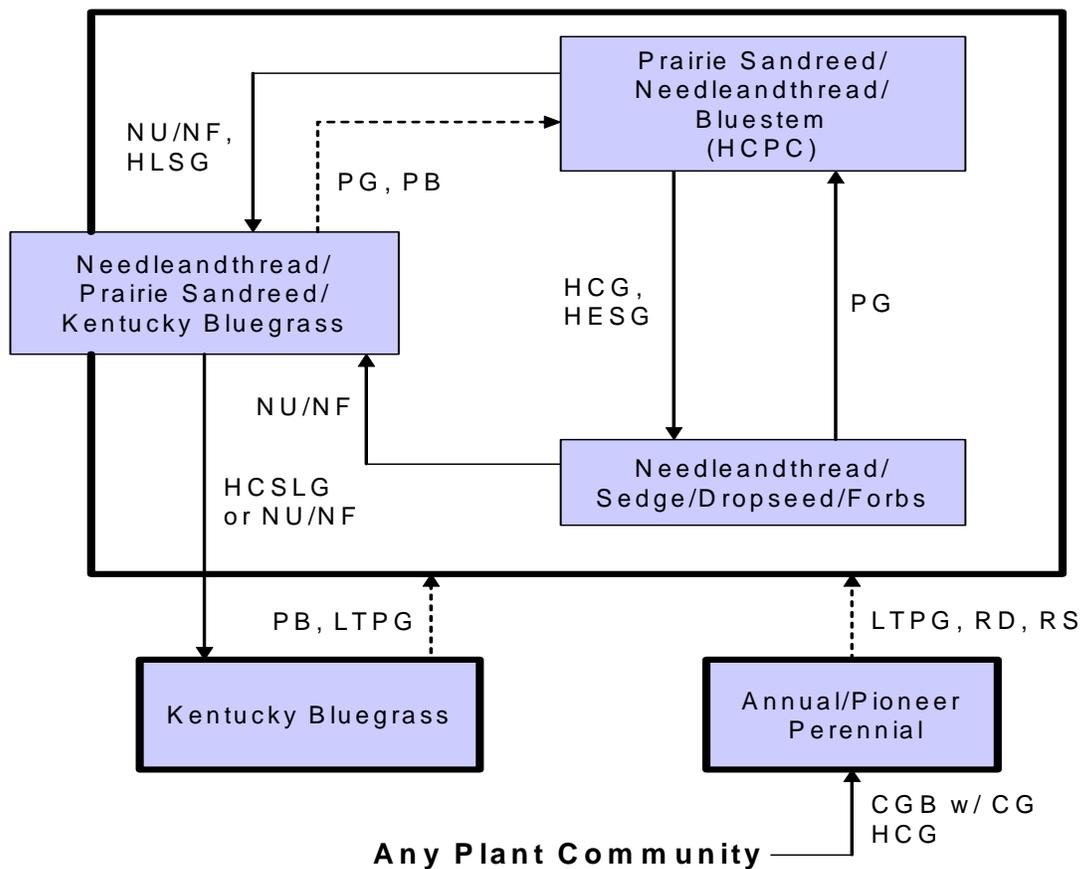
Heavy continuous grazing or continuous seasonal grazing, without adequate recovery opportunities following each grazing event during the growing season, will initially cause needleandthread, blue

grama, and threadleaf sedge to increase. Species such as sand bluestem and prairie sandreed decrease in frequency and production. In time, heavy continuous grazing will likely cause blue grama and threadleaf sedge to dominate and other pioneer perennials and annuals to increase. In this case, runoff will increase and infiltration will decrease. Soil erosion will be minimal.

This site if heavily disturbed through improper grazing, wildfire, excessive defoliation, or any type of physical disturbance can lead to serious erosion problems (blowout) on these fragile soils. 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. In time, shrubs such as yucca and cactus will likely become a major feature on this site.

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** – Historical Climax Plant Community; **HCSLG** – Heavy continuous season-long grazing; **HESG** – Heavy early seasonal grazing; **HLSG** – Heavy late seasonal grazing; **LTPG** – Long-term prescribed grazing; **NU/NF** – Extended period of non-use & no fire; **PB** – Prescribed burning, followed by prescribed grazing; **PG** – Prescribed grazing; **RD** – Removal of disturbance; **RS** – Range seeding with prescribed grazing.

Plant Community Composition and Group Annual Production

		Prairie Sandreed/Needleandthread/ Bluestem (HCPC)			
COMMON/GROUP NAME	SYMBOL	Group	lbs./acre	% Comp	
GRASSES & GRASS-LIKES			2000 - 2125	80 - 85	
TALL & MID WARM SEASON GRASSES		1	500 - 925	20 - 37	
prairie sandreed	CALO	1	375 - 750	15 - 30	
sand bluestem	ANHA	1	125 - 375	5 - 15	
little bluestem	SCSC	1	25 - 250	1 - 10	
NEEDLEGRASS		3	125 - 375	5 - 15	
needleandthread	HECOC8	3	125 - 375	5 - 15	
porcupine grass	HESP11	3	25 - 75	1 - 3	
OTHER NATIVE GRASSES		5	125 - 375	5 - 15	
Scribner panicum	DIOLS	5	0 - 25	0 - 1	
switchgrass	PAVI2	5	0 - 125	0 - 5	
blue grama	BOGR2	5	50 - 125	2 - 5	
hairy grama	BOHI2	5	0 - 75	0 - 3	
western wheatgrass	PASM	5	0 - 125	0 - 5	
sand dropseed	SPCR	5	0 - 50	0 - 2	
prairie junegrass	KOMA	5	25 - 50	1 - 2	
other perennial grasses	2GP	5	25 - 75	1 - 3	
GRASS-LIKES		6	125 - 250	5 - 10	
threadleaf sedge	CAFI	6	75 - 175	3 - 7	
sun sedge	CAINH2	6	25 - 75	1 - 3	
other grass-likes	2GL	6	25 - 50	1 - 2	
FORBS		7	125 - 375	5 - 15	
bracted spiderwort	TRBR	7	0 - 25	0 - 1	
catclaw sensitive briar	MINU6	7	0 - 25	0 - 1	
false gromwell	ONMO	7	0 - 50	0 - 2	
gayfeather	LIATR	7	0 - 50	0 - 2	
goldenrod	SOLID	7	25 - 75	1 - 3	
green sagewort	ARDR4	7	25 - 100	1 - 4	
hairy goldaster	HEVI4	7	25 - 50	1 - 2	
Indian breadroot	PEES	7	0 - 25	0 - 1	
penstemon	PENST	7	25 - 50	1 - 2	
milkvetch	ASTRA	7	0 - 25	0 - 1	
prairie clover	DALEA	7	25 - 50	1 - 2	
cutweed sagewort	ARLU	7	25 - 75	1 - 3	
prairie coneflower	RACO3	7	25 - 50	1 - 2	
purple coneflower	ECAN2	7	25 - 50	1 - 2	
rush skeletonweed	LYJU	7	25 - 50	1 - 2	
scurfpea	PSORA2	7	25 - 50	1 - 2	
sunflower	HELIA3	7	25 - 75	1 - 3	
wavyleaf thistle	CIUN	7	0 - 25	0 - 1	
western ragweed	AMPS	7	25 - 75	1 - 3	
western wallflower	ERCAC	7	25 - 50	1 - 2	
other perennial forbs	2FP	7	0 - 25	0 - 1	
SHRUBS		8	50 - 200	2 - 8	
purple pincushion	ESVIV	8	0 - 25	0 - 1	
dwarf false indigo	AMNA	8	0 - 25	0 - 1	
fringed sagewort	ARFR4	8	25 - 50	1 - 2	
leadplant	AMCA6	8	25 - 100	1 - 4	
serrate eveningprimrose	CASE12	8	25 - 50	1 - 2	
rose	ROSA5	8	25 - 50	1 - 2	
western snowberry	SYOC	8	25 - 75	1 - 3	
other shrubs	2SHRUB	8	0 - 25	0 - 1	
Annual Production lbs./acre			LOW	RV	HIGH
GRASSES & GRASS-LIKES			1435 -	2125	-2795
FORBS			120 -	250	-400
SHRUBS			45 -	125	-205
TOTAL			1600 -	2500	-3400

This list of plants and their relative proportions are based on near normal years. Fluctuations in species composition and relative production may change from year to year dependent upon precipitation or other climatic factors. RV = Representative Value.

Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SYMBOL	Prairie Sandreed/Needleand- thread/Bluestem (HCPC)			Needleandthread/Prairie Sandreed/Kentucky Bluegrass			Needleandthread/Sedge/ Dropseed/Forbs			Kentucky Bluegrass		
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp
GRASSES & GRASS-LIKES			1875 - 2250	75 - 90		1760 - 2090	80 - 95		630 - 765	70 - 85		1280 - 1520	80 - 95
TALL & MID WARM-SEASON		1	500 - 925	20 - 37	1	220 - 440	10 - 20	1	0 - 45	0 - 5	1	0 - 32	0 - 2
prairie sandreed	CALO	1	375 - 750	15 - 30	1	220 - 440	10 - 20	1	0 - 45	0 - 5	1	0 - 32	0 - 2
sand bluestem	ANHA	1	125 - 375	5 - 15	1	0 - 110	0 - 5						
little bluestem	SCSC	1	25 - 250	1 - 10	1	22 - 110	1 - 5	1	0 - 27	0 - 3	1	0 - 16	0 - 1
NEELDEGRASS		2	125 - 375	5 - 15	2	220 - 440	10 - 20	2	45 - 225	5 - 25	2	16 - 128	1 - 8
needleandthread	HECO08	2	125 - 375	5 - 15	2	220 - 440	10 - 20	2	45 - 225	5 - 25	2	16 - 128	1 - 8
porcupine grass	HESP11	2	25 - 125	1 - 5	2	0 - 66	0 - 3						
OTHER NATIVE GRASSES		3	125 - 375	5 - 15	3	110 - 220	5 - 10	3	45 - 180	5 - 20	3	32 - 160	2 - 10
Scribner panicum	DIOLS	3	0 - 25	0 - 1	3	22 - 66	1 - 3	3	9 - 45	1 - 5	3	0 - 48	0 - 3
switchgrass	PAV12	3	0 - 125	0 - 5	3	0 - 22	0 - 1						
blue grama	BOGR2	3	50 - 125	2 - 5	3	22 - 88	1 - 4	3	9 - 45	1 - 5	3	0 - 48	0 - 3
hairy grama	BOH12	3	0 - 75	0 - 3	3	0 - 44	0 - 2	3	0 - 45	0 - 5	3	0 - 32	0 - 2
western wheatgrass	PASM	3	0 - 125	0 - 5	3	0 - 110	0 - 5	3	0 - 27	0 - 3	3	0 - 80	0 - 5
sand dropseed	SPCR	3	0 - 50	0 - 2	3	22 - 110	1 - 5	3	18 - 135	2 - 15	3	16 - 80	1 - 5
prairie junegrass	KOMA	3	25 - 50	1 - 2	3	22 - 66	1 - 3	3	0 - 18	0 - 2	3	16 - 48	1 - 3
other perennial grasses	2GP	3	25 - 75	1 - 3	3	0 - 110	0 - 5	3	0 - 45	0 - 5	3	0 - 48	0 - 3
GRASS-LIKES		4	125 - 250	5 - 10	4	110 - 220	5 - 10	4	45 - 135	5 - 15	4	0 - 80	0 - 5
threadleaf sedge	CAFI	4	75 - 175	3 - 7	4	66 - 220	3 - 10	4	45 - 135	5 - 15	4	0 - 80	0 - 5
sun sedge	CAINH2	4	25 - 75	1 - 3	4	22 - 110	1 - 5	4	9 - 63	1 - 7	4	0 - 48	0 - 3
other grass-likes	2GL	4	25 - 50	1 - 2	4	0 - 66	0 - 3	4	0 - 45	0 - 5	4	0 - 32	0 - 2
NON-NATIVE GRASSES		5			5	110 - 440	5 - 20	5	0 - 45	0 - 5	5	480 - 880	30 - 55
Kentucky bluegrass	POPR				5	110 - 330	5 - 15	5	0 - 45	0 - 5	5	240 - 720	15 - 45
smooth bromegrass	BRIN2				5	44 - 220	2 - 10	5	0 - 27	0 - 3	5	80 - 480	5 - 30
crested wheatgrass	AGCR				5	0 - 110	0 - 5				5	0 - 160	0 - 10
cheatgrass	BRTE				5	0 - 110	0 - 5	5	0 - 27	0 - 3	5	0 - 160	0 - 10
FORBS		6	125 - 375	5 - 15	6	44 - 220	2 - 10	6	45 - 180	5 - 20	6	80 - 240	5 - 15
bracted spiderwort	TRBR	6	0 - 25	0 - 1									
catclaw sensitive briar	MINU6	6	0 - 25	0 - 1									
cudweed sagewort	ARLU	6	25 - 75	1 - 3	6	22 - 110	1 - 5	6	9 - 45	1 - 5	6	16 - 80	1 - 5
false gromwell	ONMO	6	0 - 50	0 - 2	6	0 - 22	0 - 1						
gayfeather	LIATR	6	0 - 50	0 - 2	6	22 - 66	1 - 3	6	9 - 27	1 - 3	6	16 - 32	1 - 2
goldenrod	SOLID	6	25 - 75	1 - 3	6	22 - 66	1 - 3	6	9 - 36	1 - 4	6	16 - 48	1 - 3
green sagewort	ARDR4	6	25 - 100	1 - 4	6	22 - 110	1 - 5	6	18 - 90	2 - 10	6	16 - 80	1 - 5
hairy goldaster	HEVI4	6	25 - 50	1 - 2	6	0 - 22	0 - 1						
Indian breadroot	PEES	6	0 - 25	0 - 1									
milkvetch	ASTRA	6	0 - 25	0 - 1	6	0 - 22	0 - 1				6	0 - 16	0 - 1
penstemon	PENST	6	25 - 50	1 - 2	6	0 - 22	0 - 1						
prairie clover	DALEA	6	25 - 50	1 - 2	6	22 - 44	1 - 2	6	0 - 18	0 - 2	6	0 - 32	0 - 2
prairie coneflower	RACO3	6	25 - 50	1 - 2	6	22 - 44	1 - 2	6	9 - 18	1 - 2	6	16 - 32	1 - 2
purple coneflower	ECAN2	6	25 - 50	1 - 2	6	0 - 22	0 - 1				6	0 - 16	0 - 1
rush skeletonweed	LYJU	6	25 - 50	1 - 2	6	0 - 22	0 - 1	6	0 - 9	0 - 1			
scurfpea	PSORA2	6	25 - 50	1 - 2	6	22 - 66	1 - 3	6	9 - 36	1 - 4	6	16 - 48	1 - 3
serrate eveningprimrose	CASE12	6	25 - 50	1 - 2	6	0 - 22	0 - 1						
sunflower	HELIA3	6	25 - 75	1 - 3	6	22 - 110	1 - 5	6	9 - 72	1 - 8	6	16 - 80	1 - 5
sweetclover	MELIL				6	0 - 110	0 - 5	6	0 - 90	0 - 10	6	0 - 160	0 - 10
wavyleaf thistle	CIUN	6	0 - 25	0 - 1	6	0 - 22	0 - 1	6	0 - 9	0 - 1	6	0 - 16	0 - 1
western ragweed	AMPS	6	25 - 75	1 - 3	6	22 - 110	1 - 5	6	18 - 72	2 - 8	6	16 - 80	1 - 5
western wallflower	ERCAC	6	25 - 50	1 - 2	6	0 - 44	0 - 2	6	0 - 18	0 - 2	6	0 - 32	0 - 2
other perennial forbs	2FP	6	0 - 25	0 - 1	6	0 - 66	0 - 3	6	0 - 45	0 - 5	6	0 - 80	0 - 5
other annual forbs	2FA				6	0 - 66	0 - 3	6	0 - 45	0 - 5	6	0 - 80	0 - 5
SHRUBS		7	50 - 200	2 - 8	7	44 - 220	2 - 10	7	18 - 90	2 - 10	7	32 - 80	2 - 5
dwarf false indigo	AMNA	7	0 - 25	0 - 1									
fringed sagewort	ARFR4	7	25 - 50	1 - 2	7	22 - 110	1 - 5	7	18 - 90	2 - 10	7	16 - 80	1 - 5
leadplant	AMCA6	7	25 - 100	1 - 4	7	0 - 22	0 - 1						
purple pincushion	ESVIV	7	0 - 25	0 - 1	7	0 - 22	0 - 1	7	0 - 9	0 - 1			
rose	ROSA5	7	25 - 50	1 - 2	7	22 - 110	1 - 5	7	9 - 72	1 - 8	7	16 - 48	1 - 3
western snowberry	SYOC	7	25 - 75	1 - 3	7	22 - 88	1 - 4	7	9 - 36	1 - 4	7	0 - 32	0 - 2
other shrubs	2SHRUB	7	0 - 25	0 - 1	7	0 - 44	0 - 2	7	0 - 18	0 - 2	7	0 - 32	0 - 2
Annual Production lbs./acre			LOW RV HIGH		LOW RV HIGH		LOW RV HIGH		LOW RV HIGH		LOW RV HIGH		LOW RV HIGH
GRASSES & GRASS-LIKES			1435 - 2125 - 2795		1320 - 1936 - 2550		345 - 734 - 1320		895 - 1384 - 1865				
FORBS			120 - 250 - 400		40 - 132 - 225		40 - 113 - 185		75 - 160 - 250				
SHRUBS			45 - 125 - 205		40 - 132 - 225		15 - 54 - 95		30 - 56 - 85				
TOTAL			1600 - 2500 - 3400		1400 - 2200 - 3000		400 - 900 - 1600		1000 - 1600 - 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.

Prairie Sandreed/Needleandthread/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 77 percent grasses or grass-like plants, 15 percent forbs, and 8 percent shrubs. The plant community is dominated by prairie sandreed, sand bluestem, and needleandthread. Other grasses and grass-like plants occurring include little bluestem, blue grama, western wheatgrass, threadleaf, and sun sedge. Significant forbs include penstemon, green sagewort, scurfpea, and spiderwort. Leadplant, rose, and fringed sagewort are the principal shrubs.

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. This is a sustainable plant community in terms of soil stability, watershed function, and biologic integrity.

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:

- Non-use and no fire for extended periods of time will convert this plant community to the *Needleandthread/Prairie Sandreed/Kentucky Bluegrass Plant Community*.
- Heavy, continuous grazing and/or heavy early seasonal grazing will convert the plant community to the *Needleandthread/Sedge/Dropseed/Forbs Plant Community*.
- Cropped go-back land with continuous grazing will convert this plant community to the *Annual/Pioneer Perennial Plant Community*.

Needleandthread/Sedge/Dropseed/Forbs Plant Community

This plant community is the result of long-term, heavy continuous grazing and/or heavy early seasonal grazing. Sand bluestem has been removed and prairie sandreed has been greatly reduced. Threadleaf sedge, blue grama, and needleandthread have increased and are the dominant species. Other grasses include western wheatgrass, red threeawn, sand dropseed, and prairie Junegrass. Forbs present include western ragweed, green sagewort, hairy goldaster, cudweed sagewort, scarlet globemallow, and sweet clover. Fringed sagewort and cactus have also increased.

Annual production and consequently litter amounts, has been reduced substantially. Nutrient cycle, water cycle, and energy flow are becoming impaired. This plant community is at risk of losing all tall warm-season grasses. Wind scoured areas may exist where cover has been reduced or eliminated.

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:

- Heavy, continuous grazing will cause further deterioration resulting in a shift to the *Annual/Pioneer Perennial Community*.
- Non-use and no fire over an extended period of time will shift this plant community to the *Needleandthread/Prairie Sandreed/Kentucky Bluegrass Plant Community*.
- Prescribed grazing that includes changing season of use and allowing adequate recovery periods between grazing events, will move this plant community back to the *Prairie Sandreed/Needleandthread/Bluestem Plant Community (HCPC)*.
- Cropped go-back land with continuous grazing will convert this plant community to the *Annual/Pioneer Perennial Plant Community*.

Needleandthread/Prairie Sandreed/Kentucky Bluegrass Plant Community

This plant community develops after an extended period of 10 or more years of non-use by herbivores and exclusion of fire. A similar plant community may develop with heavy late seasonal grazing (every year at the same time of year), except the litter levels will not be as high. Non-native grasses, such as Kentucky bluegrass, crested wheatgrass, and smooth brome grass tend to invade and may dominate this plant community. Other grasses present may include sand bluestem, prairie sandreed, little bluestem, western wheatgrass, and prairie Junegrass. The common forbs include green sagewort, goldenrod, western wallflower, western ragweed, and sweetclover. Fringed sagewort and prairie rose are the principal shrubs.

Litter buildup reduces plant vigor and density, and native seedling recruitment declines. Due to a lack of tiller stimulation and sunlight, native bunchgrasses typically develop dead centers and native rhizomatous grasses are limited to small colonies. 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.

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

The following growth curve is an estimate of the monthly percentages of total annual growth of the dominant species expected during a normal year.

Growth curve number: 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 and/or prescribed burning will move this plant community toward the *Prairie Sandreed/Needleandthread/Bluestem Plant Community (HCPC)* or the *Needleandthread/Sedge/Dropseed/Forbs Plant Community*. This would require long-term management with prescribed grazing and/or prescribed burning under favorable climatic conditions.
- Cropped go-back land with continuous grazing will convert this plant community to the *Annual/Pioneer Perennial Plant Community*.

Kentucky Bluegrass Plant Community

This plant community developed from continued heavy continuous season-long grazing without adequate recovery periods between grazing events or from continued non-use and no fire for extended periods of time. Kentucky bluegrass will tend to dominate this plant community; however, other non-native species such as smooth brome grass and crested wheatgrass may also become prevalent. Sand bluestem and prairie sandreed are absent or nearly so, and other grasses and grass-like species present include sand dropseed, red threeawn, needleandthread, prairie Junegrass, and sun sedge. Forbs commonly found in this plant community include green sagewort, scurfpea, and sweetclover.

When this plant community is reached through extended periods of non-use and no fire, litter buildup reduces native plant vigor and density severely, and native seedling recruitment is rare. Due to a lack of tiller stimulation and sunlight, native bunchgrasses typically develop dead centers and native rhizomatous grasses are limited to small colonies. This plant community can be dispersed throughout the pasture, encircling spot grazed areas, and areas distant from water sources. This is a sometimes found in properly stocked pastures grazed season-long.

The following growth curve represents monthly percentages of total annual growth of the dominant species 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:

- Long-term prescribed grazing and/or prescribed burning followed by prescribed grazing may eventually move this plant community through successional stages leading towards the *Prairie Sandreed/Needleandthread/Bluestem Plant Community (HCPC)*. This would require long-term management under favorable climatic conditions.
- Cropped go-back land with continuous grazing will convert this plant community to the *Annual/Pioneer Perennial Plant Community*.
- Heavy continuous grazing will likely shift 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, smooth brome, crested wheatgrass, annual brome, needleandthread, sand dropseed, sandbur, and Scribner panicum. 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, fringed sagewort, and broom snakeweed. Plant species from adjacent ecological sites may become minor components of this plant community. The community also is susceptible to invasion of non-native species due to severe soil disturbances and relatively high percent of bare ground.

This plant community is resistant to change, as long as soil disturbance or severe vegetation defoliation persists, thus holding back secondary plant succession. Soil erosion is potentially high. 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.

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

- Removal of disturbance followed by long-term prescribed grazing, including adequate rest periods, will move this community through the successional stages, and may eventually lead to the *Prairie Sandreed/Needleandthread/Bluestem Plant Community (HCPC)* or associated successional plant communities assuming an adequate seed/vegetative source exists. This process will likely take a long period of time (25+ years).
- Range seeding followed by long-term prescribed grazing can be used to convert this plant community to one that may resemble the *HCPC*.

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

-- Under Development --

Prairie Sandreed/Needleandthread/Bluestem Plant Community:

Needleandthread/Sedge/Dropseed/Forbs Plant Community:

Needleandthread/Prairie Sandreed/Kentucky Bluegrass Plant Community:

Kentucky Bluegrass Plant Community:

Annual/Pioneer Perennial Plant Community:

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

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
Grasses & Grass-likes							
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
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
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
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
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
switchgrass	U D D U	U D U U	U D D U	N N N N	N N N N	U D D U	U D D U
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
Forbs							
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
catclaw sensitive briar	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
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
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
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
milkvetch	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
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
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
sunflower	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
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 ragweed	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
Shrubs							
dwarf false indigo	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
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
purple pincushion	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
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
serrate eveningprimrose	U U D U	U D P U	U U D U	U D P U	U D P U	U U D U	U D P 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 groups A and B. Infiltration varies from very rapid to rapid and runoff potential varies from negligible to low 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

(053BY008ND) – Sandy

(053BY009ND) – Shallow Loamy

Similar Sites

(053BY008ND) – Sandy (Sy)

[Does not receive additional moisture. Found on dry uplands upslope from Loamy Overflow sites, down slope from Shallow Loamy sites. Similar landscape position as Loamy, Sands, and Clayey sites will ribbon up to one inch. Indicator species are prairie sandreed with western wheatgrass and green needlegrass intermixed. This site has less sand bluestem, needleandthread, and sedges, more blue grama, green needlegrass, and western wheatgrass, slightly less production, similar landscape position.]

(053BY014ND) – Thin Sands (TSa)

[Deep entisol found on knobs and ridges of level to choppy sand blown plains; will not ribbon, found upslope from Sands sites; won't ribbon. Indicator species: Sand bluestem, prairie sandreed, and needleandthread evenly mixed, some Canada wildrye, penstemon, lemon scurfpea western ragweed, yucca, silky prairie clover, and leadplant. This site has far less production, thin "A" horizon, no mollic epipedon, more needleandthread, choppy landscape.]

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