

United States Department of Agriculture Natural Resources Conservation Service

Ecological Site Description

Site Name: Thin Sands

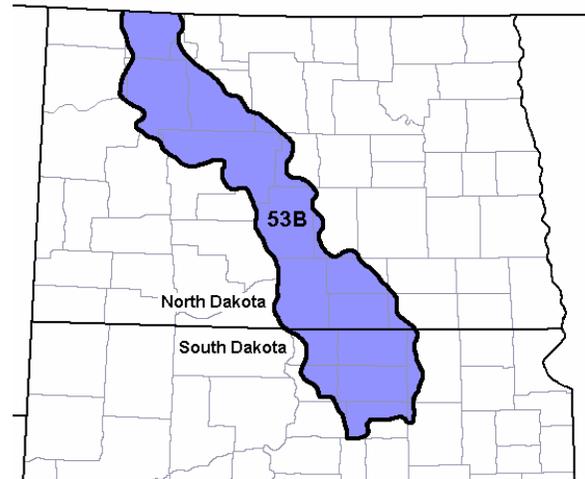
Site Type: Rangeland

Site ID: R053BY014ND

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 gently rolling to strongly sloping uplands.

Landform: outwash plain, terrace

Aspect: NA

	<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	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 and very deep, excessively drained, coarse textured soils that have a thin surface horizon. Saturated hydraulic conductivity is moderately rapid to very rapid and available water capacity is moderate to very low. Salinity and sodicity are none. These soils are highly susceptible to wind erosion. This site is on rises and ridges on nearly level to very steep outwash plains and terraces. Slope ranges from 0 to 25 percent. This site should show slight evidence of wind scoured

areas or pedestalled plants. Water flow paths are not evident. The soil surface is unstable and areas of blow-outs can occur.

These soils are susceptible to 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: outwash, eolian deposits
Parent Material Origin: mixed
Surface Texture: loamy sand, loamy fine sand, fine sand
Surface Texture Modifier: none
Subsurface Texture Group: sandy
Surface Fragments ≤3" (% Cover): 0-5
Surface Fragments >3" (%Cover): 0
Subsurface Fragments ≤3" (% Volume): 0-25
Subsurface Fragments >3" (% Volume): 0-5

	Minimum	Maximum
Drainage Class:	excessively	excessively
Permeability Class:	moderately 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)*:	3	3
Calcium Carbonate Equivalent (percent)*:	0	10

* - 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 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.

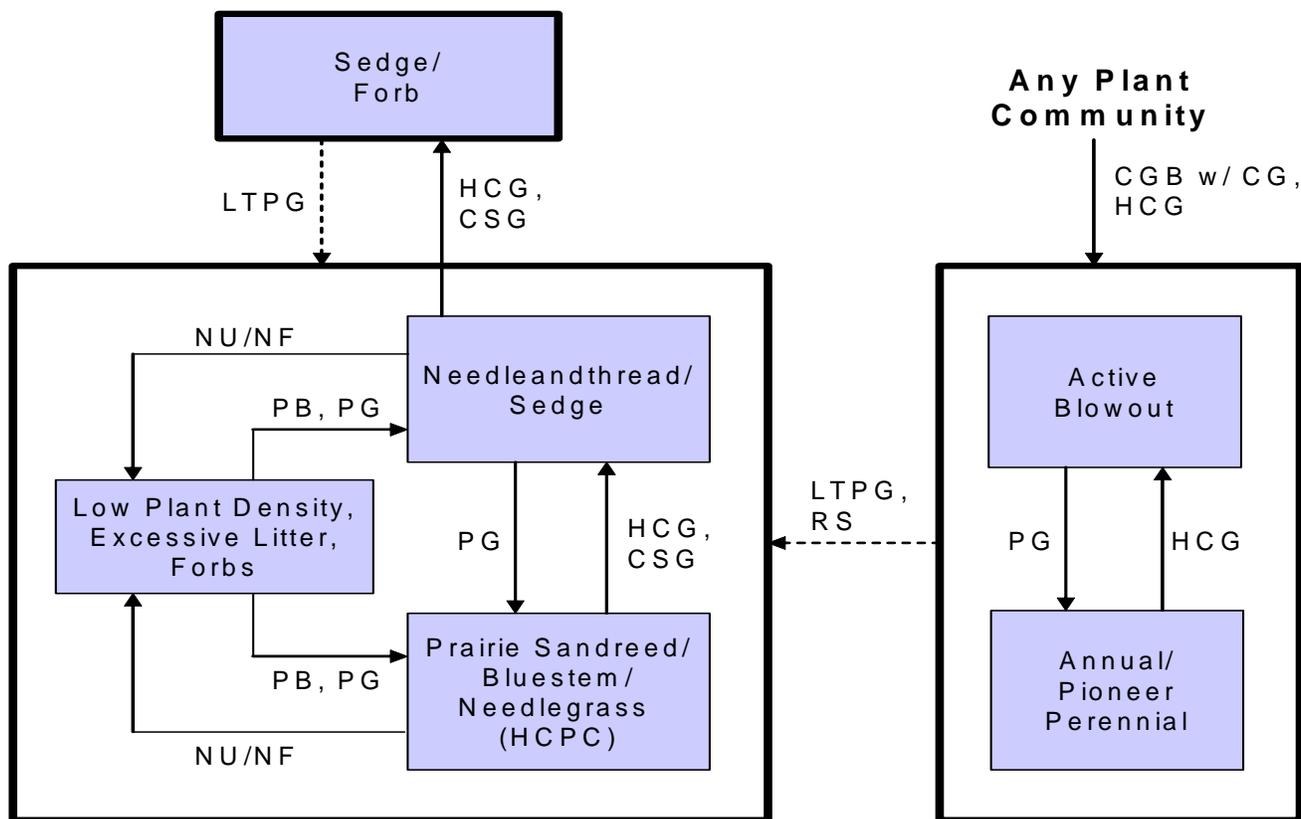
Continuous grazing or continuous seasonal (spring) grazing without adequate recovery opportunities following each grazing event during the growing season will initially cause needleandthread, blue

grama, and threadleaf sedge to increase. Species such as sand bluestem and prairie sandreed decrease in frequency and production. Heavy continuous grazing results in an increased amount of threadleaf sedge and forbs, and elimination of sand bluestem, prairie sandreed and little bluestem.

Non-use (rest) and/or lack of fire will likely cause litter to increase causing decadence, mortality and increased introduced cool-season grasses. Heavy continuous grazing, wildfire, excessive defoliation or any type of physical disturbance can lead to serious erosion problems on these fragile soils (i.e., blowouts).

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; **LTPG** – Long-term prescribed grazing; **NU/NF** – Extended period of non-use & no fire; **PB** – Prescribed burning; **PG** – Prescribed grazing; **RS** – Range seeding with prescribed grazing.

Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SYMBOL	Prairie Sandreed/Bluestem/ Needlegrass (HCPC)			
		Group	lbs./acre	% Comp	
GRASSES & GRASS-LIKES			1445 - 1615	85 - 95	
BLUESTEM		1	255 - 340	15 - 20	
sand bluestem	ANHA	1	255 - 340	15 - 20	
little bluestem	SCSC	1	0 - 85	0 - 5	
OTHER NATIVE TALL GRASSES		2	170 - 340	10 - 20	
prairie sandreed	CALO	2	170 - 340	10 - 20	
NEEDLEGRASS		3	170 - 340	10 - 20	
needleandthread	HECOC8	3	85 - 255	5 - 15	
porcupine grass	HESP11	3	85 - 255	5 - 15	
GRAMA		4	34 - 85	2 - 5	
blue grama	BOGR2	4	17 - 85	1 - 5	
hairy grama	BOHI2	4	0 - 51	0 - 3	
OTHER NATIVE GRASSES		5	85 - 170	5 - 10	
Scribner panicum	DIOLS	5	17 - 34	1 - 2	
western wheatgrass	PASM	5	17 - 85	1 - 5	
sand dropseed	SPCR	5	17 - 34	1 - 2	
prairie junegrass	KOMA	5	17 - 34	1 - 2	
Canada wildrye	ELCA4	5	17 - 34	1 - 2	
other perennial grasses	2GP	5	17 - 34	1 - 2	
GRASS-LIKES		6	85 - 170	5 - 10	
threadleaf sedge	CAFI	6	85 - 119	5 - 7	
Penn sedge	CAPE6	6	34 - 51	2 - 3	
other grass-likes	2GL	6	17 - 34	1 - 2	
FORBS		7	85 - 170	5 - 10	
bracted spiderwort	TRBR	7	34 - 51	2 - 3	
false gromwell	ONMO	7	0 - 17	0 - 1	
gayfeather	LIATR	7	17 - 34	1 - 2	
goldenrod	SOLID	7	17 - 34	1 - 2	
green sagewort	ARDR4	7	34 - 51	2 - 3	
hairy goldaster	HEVI4	7	17 - 34	1 - 2	
horsetail	EQLA	7	17 - 34	1 - 2	
Indian breadroot	PEES	7	0 - 17	0 - 1	
milkvetch	ASTRA	7	0 - 17	0 - 1	
penstemon	PENST	7	34 - 51	2 - 3	
prairie clover	DALEA	7	17 - 34	1 - 2	
prairie coneflower	RACO3	7	0 - 17	0 - 1	
purple coneflower	ECAN2	7	0 - 17	0 - 1	
rush skeletonweed	LYJU	7	17 - 34	1 - 2	
scurfpea	PSORA2	7	17 - 34	1 - 2	
silky prairie clover	DAVI	7	17 - 34	1 - 2	
sunflower	HELIA3	7	17 - 34	1 - 2	
wavyleaf thistle	CIUN	7	0 - 17	0 - 1	
western ragweed	AMPS	7	17 - 17	1 - 1	
western wallflower	ERCAC	7	0 - 17	0 - 1	
other perennial forbs	2FP	7	17 - 51	1 - 3	
SHRUBS		8	34 - 85	2 - 5	
dwarf false indigo	AMNA	8	0 - 17	0 - 1	
fringed sagewort	ARFR4	8	17 - 34	1 - 2	
leadplant	AMCA6	8	34 - 51	2 - 3	
purple pincushion	ESVIV	8	0 - 17	0 - 1	
rose	ROSA5	8	17 - 34	1 - 2	
western sandcherry	PRPUB	8	0 - 17	0 - 1	
yucca	YUGL	8	0 - 51	0 - 3	
other shrubs	2SHRUB	8	0 - 17	0 - 1	
Annual Production lbs./acre			LOW	RV	HIGH
GRASSES & GRASS-LIKES			990	1513	2035
FORBS			80	128	175
SHRUBS			30	60	90
TOTAL			1100	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.

Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SYMBOL	Prairie Sandreed/Bluestem/ Needlegrass (HCPC)			Needleandthread/Sedge			Sedge/Forb			Low Plant Density, Excessive Litter, Forbs		
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp
GRASSES & GRASS-LIKES			1445 - 1615	85 - 95		600 - 680	75 - 85		300 - 350	60 - 70		1050 - 1190	75 - 85
BLUESTEM		1	255 - 340	15 - 20	1	0 - 16	0 - 2	1			1	28 - 140	2 - 10
sand bluestem	ANHA	1	255 - 340	15 - 20	1	0 - 8	0 - 1				1	28 - 140	2 - 10
little bluestem	SCSC	1	0 - 85	0 - 5	1	0 - 16	0 - 2				1	0 - 98	0 - 7
OTHER NATIVE TALL GRASSES		2	170 - 340	10 - 20	2	0 - 40	0 - 5	2			2	42 - 140	3 - 10
prairie sandreed	CALO	2	170 - 340	10 - 20	2	0 - 40	0 - 5				2	42 - 140	3 - 10
NEEDLEGRASS		3	170 - 340	10 - 20	3	80 - 200	10 - 25	3	25 - 50	5 - 10	3	70 - 210	5 - 15
needleandthread	HECOC8	3	85 - 255	5 - 15	3	80 - 200	10 - 25	3	25 - 50	5 - 10	3	70 - 210	5 - 15
porcupine grass	HESP11	3	85 - 255	5 - 15	3	0 - 40	0 - 5				3	0 - 70	0 - 5
GRAMA		4	34 - 85	2 - 5	4	40 - 72	5 - 9	4	5 - 25	1 - 5	4	0 - 42	0 - 3
blue grama	BOGR2	4	17 - 85	1 - 5	4	24 - 64	3 - 8	4	5 - 25	1 - 5	4	0 - 42	0 - 3
hairy grama	BOH12	4	0 - 51	0 - 3	4	8 - 32	1 - 4	4	0 - 20	0 - 4	4	0 - 42	0 - 3
OTHER NATIVE GRASSES		5	85 - 170	5 - 10	5	16 - 56	2 - 7	5	15 - 50	3 - 10	5	42 - 98	3 - 7
Scribner panicum	DIOLS	5	17 - 34	1 - 2	5	8 - 40	1 - 5	5	5 - 10	1 - 2	5	14 - 28	1 - 2
western wheatgrass	PASM	5	17 - 85	1 - 5	5	0 - 8	0 - 1				5	0 - 42	0 - 3
sand dropseed	SPCR	5	17 - 34	1 - 2	5	8 - 40	1 - 5	5	10 - 40	2 - 8	5	14 - 70	1 - 5
prairie junegrass	KOMA	5	17 - 34	1 - 2	5	8 - 16	1 - 2	5	0 - 5	0 - 1	5	14 - 28	1 - 2
Canada wildrye	ELCA4	5	17 - 34	1 - 2							5	0 - 14	0 - 1
sandbur	CEL03				5	0 - 8	0 - 1	5	5 - 15	1 - 3	5	0 - 28	0 - 2
other perennial grasses	2GP	5	17 - 34	1 - 2	5	0 - 24	0 - 3	5	0 - 15	0 - 3	5	0 - 42	0 - 3
GRASS-LIKES		6	85 - 170	5 - 10	6	80 - 200	10 - 25	6	50 - 175	10 - 35	6	70 - 210	5 - 15
threadleaf sedge	CAFI	6	85 - 119	5 - 7	6	80 - 200	10 - 25	6	50 - 175	10 - 35	6	70 - 210	5 - 15
Penn sedge	CAPE6	6	34 - 51	2 - 3	6	0 - 24	0 - 3				6	0 - 56	0 - 4
other grass-likes	2GL	6	17 - 34	1 - 2	6	0 - 40	0 - 5	6	0 - 50	0 - 10	6	0 - 70	0 - 5
NON-NATIVE GRASSES		7			7	0 - 40	0 - 5	7	0 - 15	0 - 3	7	70 - 210	5 - 15
Kentucky bluegrass	POPR				7	0 - 40	0 - 5				7	28 - 210	2 - 15
smooth bromegrass	BRIN2				7	0 - 8	0 - 1				7	0 - 168	0 - 12
cheatgrass	BRTE				7	0 - 24	0 - 3	7	0 - 15	0 - 3	7	0 - 70	0 - 5
FORBS		8	85 - 170	5 - 10	8	40 - 120	5 - 15	8	50 - 125	10 - 25	8	140 - 210	10 - 15
bracted spiderwort	TRBR	8	34 - 51	2 - 3							8	0 - 14	0 - 1
false gromwell	ONMO	8	0 - 17	0 - 1							8	0 - 14	0 - 1
gayfeather	LIATR	8	17 - 34	1 - 2	8	8 - 16	1 - 2	8	0 - 5	0 - 1	8	0 - 28	0 - 2
goldenrod	SOLID	8	17 - 34	1 - 2	8	8 - 16	1 - 2	8	0 - 10	0 - 2	8	14 - 56	1 - 4
green sagewort	ARDR4	8	34 - 51	2 - 3	8	8 - 40	1 - 5	8	5 - 40	1 - 8	8	14 - 56	1 - 4
hairy goldaster	HEVI4	8	17 - 34	1 - 2	8	0 - 16	0 - 2				8	0 - 28	0 - 2
horsetail	EQLA	8	17 - 34	1 - 2	8	8 - 16	1 - 2	8	5 - 10	1 - 2	8	14 - 28	1 - 2
Indian breadroot	PEES	8	0 - 17	0 - 1									
milkvetch	ASTRA	8	0 - 17	0 - 1	8	0 - 8	0 - 1	8	0 - 5	0 - 1	8	0 - 14	0 - 1
penstemon	PENST	8	34 - 51	2 - 3	8	8 - 16	1 - 2				8	14 - 28	1 - 2
prairie clover	DALEA	8	17 - 34	1 - 2	8	8 - 16	1 - 2	8	5 - 10	1 - 2	8	14 - 28	1 - 2
prairie coneflower	RAC03	8	0 - 17	0 - 1	8	8 - 16	1 - 2	8	0 - 5	0 - 1	8	14 - 28	1 - 2
purple coneflower	ECAN2	8	0 - 17	0 - 1	8	0 - 8	0 - 1				8	0 - 14	0 - 1
rush skeletonweed	LYJU	8	17 - 34	1 - 2	8	8 - 16	1 - 2	8	0 - 5	0 - 1	8	0 - 14	0 - 1
scurfpea	PSORA2	8	17 - 34	1 - 2	8	8 - 24	1 - 3	8	5 - 20	1 - 4	8	14 - 28	1 - 2
silky prairie clover	DAVI	8	17 - 34	1 - 2							8	0 - 14	0 - 1
sunflower	HELIA3	8	17 - 34	1 - 2	8	8 - 32	1 - 4	8	0 - 20	0 - 4	8	14 - 42	1 - 3
sweetclover	MELIL				8	0 - 80	0 - 10	8	0 - 75	0 - 15	8	0 - 140	0 - 10
wavyleaf thistle	CIUN	8	0 - 17	0 - 1	8	0 - 16	0 - 2	8	0 - 10	0 - 2	8	0 - 28	0 - 2
western ragweed	AMPS	8	17 - 34	1 - 2	8	8 - 32	1 - 4	8	5 - 25	1 - 5	8	14 - 56	1 - 4
western wallflower	ERCAC	8	0 - 17	0 - 1	8	0 - 8	0 - 1				8	0 - 14	0 - 1
other perennial forbs	2FP	8	17 - 51	1 - 3	8	8 - 40	1 - 5	8	5 - 40	1 - 8	8	14 - 70	1 - 5
other annual forbs	2FA				8	8 - 40	1 - 5	8	5 - 40	1 - 8	8	14 - 70	1 - 5
SHRUBS		9	34 - 85	2 - 5	9	16 - 56	2 - 7	9	25 - 60	5 - 12	9	70 - 140	5 - 10
dwarf false indigo	AMNA	9	0 - 17	0 - 1	9	0 - 16	0 - 2				9	0 - 28	0 - 2
fringed sagewort	ARFR4	9	17 - 34	1 - 2	9	8 - 40	1 - 5	9	5 - 40	1 - 8	9	14 - 70	1 - 5
leadplant	AMCA6	9	34 - 51	2 - 3	9	0 - 8	0 - 1				9	0 - 14	0 - 1
purple pincushion	ESVIV	9	0 - 17	0 - 1	9	0 - 8	0 - 1	9	0 - 5	0 - 1	9	0 - 14	0 - 1
rose	ROSA5	9	17 - 34	1 - 2	9	8 - 24	1 - 3	9	5 - 30	1 - 6	9	14 - 42	1 - 3
western sandcherry	PRPUB	9	0 - 17	0 - 1									
yucca	YUGL	9	0 - 51	0 - 3	9	0 - 24	0 - 3	9	0 - 25	0 - 5	9	0 - 56	0 - 4
other shrubs	2SHRUB	9	0 - 17	0 - 1	9	0 - 8	0 - 1	9	0 - 10	0 - 2	9	0 - 42	0 - 3
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			990 - 1513 - 2035		350 - 684 - 1215		135 - 370 - 705		600 - 1120 - 1640				
FORBS			80 - 128 - 175		35 - 80 - 125		45 - 88 - 130		135 - 175 - 215				
SHRUBS			30 - 60 - 90		15 - 36 - 60		20 - 43 - 65		65 - 105 - 145				
TOTAL			1100 - 1700 - 2300		400 - 800 - 1400		200 - 500 - 900		800 - 1400 - 2000				

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/Bluestem/Needlegrass 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. Warm season grasses such as sand bluestem and prairie sandreed dominate the plant community. Other grasses and grass-like plants occurring on the site include needleandthread, little bluestem, blue grama, hairy grama, western wheatgrass, and sedges. Significant forbs include penstemon, green sagewort, stiff sunflower, and spiderwort. Leadplant, rose, and yucca 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. Waterflow patterns may not be present, but there is a very high risk of wind erosion and eventually blowouts if vegetative cover is not adequate. Cryptogamic crusts can be present, but typically only cover one to two percent of the soil surface. Some pedestalling of plants occurs, but it is not very evident on casual observation and occurs on less than five percent of the plants. Overall, this site (the interpretive plant community) has the appearance of being stable and productive.

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 *Low Plant Density, Excessive Litter, Forbs Plant Community*.

- Heavy, continuous grazing or continuous seasonal (spring) grazing will convert the plant community to the *Needleandthread/Sedge Plant Community*.
- Cropped go-back land with continuous grazing will convert this plant community to the *Annual/Pioneer Perennial Plant Community* or an *Active Blowout*.

Needleandthread/Sedge Plant Community

This plant community can quickly develop from the adverse effects of long-term, heavy continuous grazing. Sand bluestem and prairie sandreed have been greatly reduced. Needleandthread and threadleaf sedge have increased and are the dominant species. Other grasses include western wheatgrass, blue grama, red threeawn, sand dropseed, blowout grass, and prairie Junegrass. Forbs such as western ragweed, green sagewort, hairy goldaster, lemon scurfpea, and sweet clover may also be present. Yucca, rose, fringed sagewort, and cactus have also increased.

Annual production, and consequently, litter amounts, have 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 and/or continuous seasonal (spring) grazing may cause further deterioration resulting in a shift to the *Sedge/Forb Plant Community*.
- Non-use and no fire over an extended period of time may lead this plant community to the *Low Plant Density, Excessive Litter, Forbs Plant Community*.
- Prescribed grazing that includes changing season of use and allowing adequate recovery periods to enhance cool season grasses will lead this plant community back to the *Prairie Sandreed/Bluestem/Needlegrass Plant Community (HCPC)*.
- Cropped go-back land with continuous grazing will convert this plant community to the *Annual/Pioneer Perennial Plant Community* or an *Active Blowout*.

Low Plant Density, Excessive Litter, Forbs Plant Community

This plant community develops after an extended period of 10 or more years of non-use by herbivores or exclusion of fire. Nonnative grasses, such as Kentucky bluegrass and cheatgrass, tend to invade and may dominate this plant community. Other grasses and grass-likes present include sand bluestem, prairie sandreed, little bluestem, Canada wildrye, western wheatgrass, and threadleaf sedge. The common forbs include green sagewort, goldenrod, western wallflower, prairie coneflower, western ragweed, and sweet clover. Yucca and fringed sagewort 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: 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:

- Prescribed grazing or prescribed burning followed by prescribed grazing will move this plant community toward the *Prairie Sandreed/Bluestem/Needlegrass Plant Community* or the *Needleandthread/Sedge Plant Community*. Which plant community it moves to depends on how long the lack of fire and non-use existed prior to the influence of grazing and/or fire.
- Cropped go-back land with continuous grazing will convert this plant community to the *Annual/Pioneer Perennial Plant Community* or an *Active Blowout*.

Sedge/Forb Plant Community

This plant community developed from heavy continuous grazing without adequate recovery periods between grazing events or continuous seasonal (spring) grazing. An increased amount of threadleaf sedge and forbs characterize this plant community. Sand bluestem and prairie sandreed have been reduced to negligible amounts. Other grasses and grass-likes present include sand dropseed, red threeawn, needleandthread, prairie Junegrass, and sandbur. Forbs commonly found in this plant community include green sagewort, lemon scurfpea, western ragweed, buffalo bur, and hairy goldaster. Shrubs present include fringed sagewort, rose, and possibly yucca.

Species diversity has shifted from a grass-dominated community to a forb dominated community. Production has been significantly decreased due to reduction of tall and mid-grass species. Energy flow, water cycle, and mineral cycle have been negatively affected. Litter levels are very low and unevenly distributed. Soil erosion may be a concern on steeper slopes and exposed areas.

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

- Heavy, continuous grazing and/or cropped go-back land with continuous grazing will cause this plant community to move toward the *Annual/Pioneer Perennial Plant Community* or an *Active Blowout*.
- Long-term prescribed grazing with adequate recovery periods following each grazing event and proper stocking over long periods of time may move this plant community toward the *Needleandthread/Sedge Plant Community*. Eventually the plant community may return to the *HCPC* or associated successional plant community stages assuming an adequate seed/vegetative source is available. This process may take greater than 20 years.

Active Blowout

Heavy continuous grazing, disturbance (tillage, etc.), and/or wildfire brings about this condition. Continuous grazing will only increase the size of the blowouts. This condition is not stable. It consists of bare areas that are continually eroded by wind.

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

- Prescribed grazing and concentrated animal impact (such as feeding hay on the blowout) will begin to heal the blowout and provide an opportunity for the *Annual/Pioneer Perennial Plant Community* to establish.
- Removal of disturbance followed by range seeding, which can include mulching, followed by long-term prescribed grazing can be used to convert this plant community to one that may resemble the *HCPC*.

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, crested wheatgrass, annual brome, needleandthread, sand dropseed, blowout grass, sandbur, Scribner's Panicum, and little bluestem. The dominant forbs include curlycup gumweed, maretail, salsify, kochia, thistles, western ragweed, pussytoes, prostrate verbena, and other early successional species. Shrubs that may be present include 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 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:

- Heavy, continuous grazing will cause this plant community to move toward an *Active Blowout* condition.
- Long-term prescribed grazing, including adequate rest periods, will move this community through the successional stages, and may eventually lead to a plant community resembling the *Prairie Sandreed/Bluestem/Needlegrass 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 (50+ years).
- Range seeding followed with prescribed grazing can be used to convert this plant community to one that may resemble the *HCPC*.

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

-- Under Development --

Prairie Sandreed/Bluestem/Needlegrass Plant Community:

Needleandthread/Sedge Plant Community:

Sedge/Forb Plant Community:

Low Plant Density, Excessive Litter, Forbs Plant Community:

Annual/Pioneer Perennial Plant Community:

Active Blowout:

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
Canada wildrye	U D U U	N U N N	U D U U	N U N N	N U N N	U D U U	U D U 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
Penn sedge	U P U D	U P N D	U P U D	U D U D	U D U D	U P U D	U P 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
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
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
horsetail	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
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
silky 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
sunflower	U U D U	U D U U	U U D U	U D U U	U D U U	U U D U	U D U 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
western sandcherry	D P P D	D U U D	D P P D	P U D P	D U U D	D P P D	P U U P
yucca	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

[†] 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 A. Infiltration varies from rapid to very rapid and runoff potential varies from negligible to very 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. 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

(053BY007ND) – Sands

(053BY008ND) – Sandy

Similar Sites

(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 has more production, thicker “A” horizon and a mollic epipedon, lime deeper than six inches from the surface, less little bluestem and sand bluestem, less production.]

(054XY025ND) – Sands (Sa)

[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, Sandy, and Clayey sites. Won't form a ribbon; indicator species are sand bluestem and prairie sandreed evenly mixed, some Canada wildrye, penstemon, leadplant and western snowberry. This site has more production, thicker “A” horizon and a mollic epipedon, less needleandthread, less 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