

United States Department of Agriculture Natural Resources Conservation Service

Ecological Site Description

Site Name: Thin Loamy

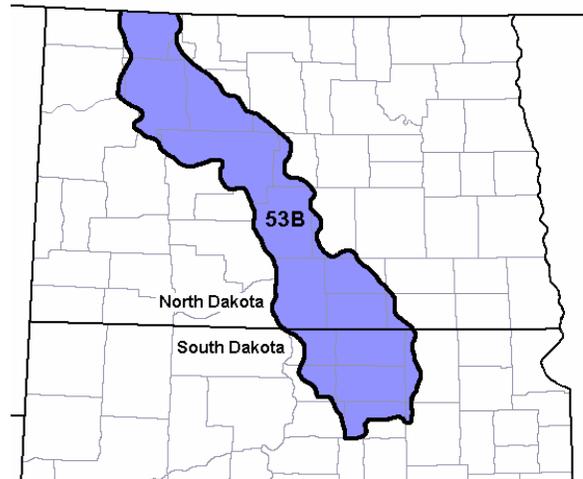
Site Type: Rangeland

Site ID: R053BY015ND

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 moderately steep to steep uplands.

Landform: till plain, moraine, hill

Aspect: NA

	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	1600	2000
Slope (percent):	1	60
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:	Low	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° (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 very deep, well drained, moderately coarse to moderately fine textured soils. These soils have a strongly calcareous subsoil or are calcareous to the surface. Saturated hydraulic conductivity is moderate to moderately slow and available water capacity is high. Salinity is none to very slight and sodicity is none. This site is on side slopes or ridges on nearly level to very steep moraines, hills and till plains. Slope ranges from 1 to 60 percent. It is not uncommon to have some pedestalling of plants due to the inherent instability of the soils. Water flow paths are broken, irregular in

appearance, or discontinuous with numerous debris dams or vegetative barriers, and there is a risk of rills and eventually gullies if vegetative cover is not adequate. Cryptobiotic crusts are present. Sub-surface soil layers are slightly restrictive to water movement and root penetration.

These soils are highly susceptible to water erosion and to a lesser degree wind erosion. The hazard of water erosion increases where vegetative cover is not adequate. 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: till, glaciolacustrine deposits, loess

Parent Material Origin: mixed

Surface Texture: loam, silt loam, silty clay loam

Surface Texture Modifier: none

Subsurface Texture Group: loamy

Surface Fragments ≤3" (% Cover): 0-10

Surface Fragments >3" (%Cover): 0-50

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

Subsurface Fragments >3" (% Volume): 0-10

	<u>Minimum</u>	<u>Maximum</u>
Drainage Class:	well	well
Permeability Class:	moderately slow	moderate
Depth to first restrictive layer (inches):	80	80
Electrical Conductivity (mmhos/cm)*:	0	2
Sodium Absorption Ratio*:	0	3
Soil Reaction (1:1 Water)*:	6.6	8.4
Soil Reaction (0.1M CaCl₂)*:	NA	NA
Available Water Capacity (inches)*:	7	8
Calcium Carbonate Equivalent (percent)*:	0	45

* - 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).

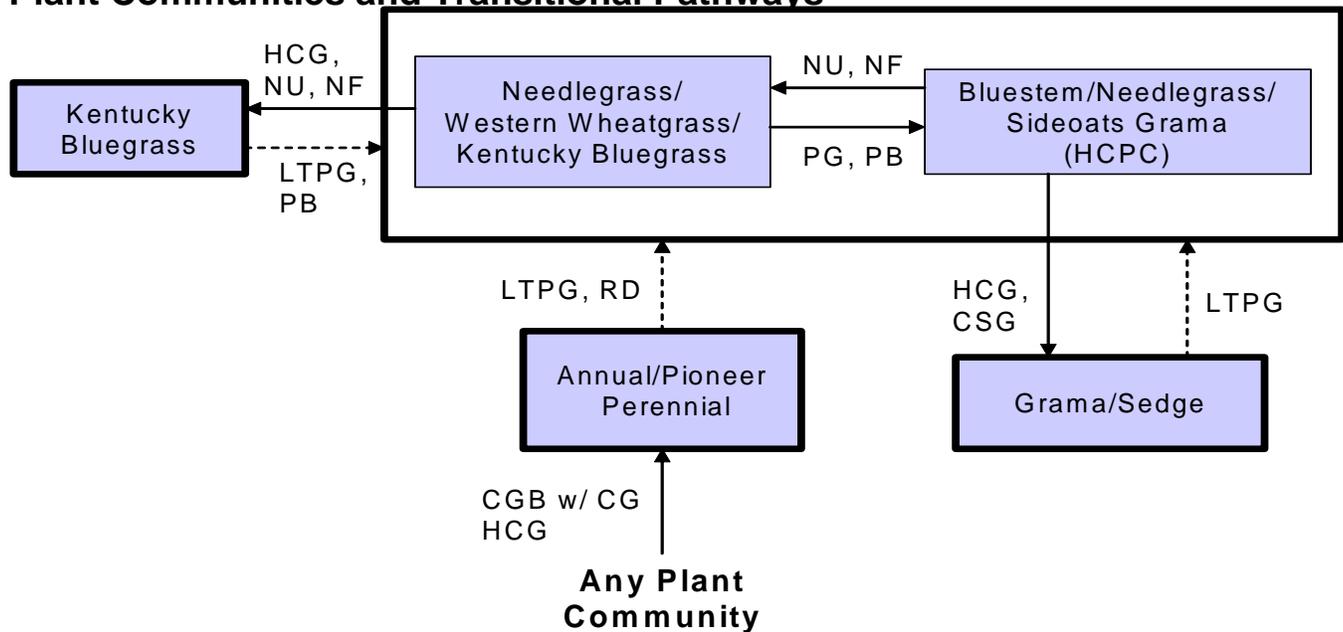
The plant community upon which interpretations are primarily based is the HCPC. The HCPC has been determined by study of rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily grazed 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.

Several years of continuous grazing without adequate recovery periods, following each grazing occurrence will likely cause this site to depart from the HCPC. Species such as western wheatgrass and blue grama will initially increase while little bluestem will sustain. Porcupine grass and/or green needlegrass, plains muhly and sideoats grama will decrease in frequency and production. Heavy continuous grazing causes blue grama to increase and eventually dominates with eroded gaps between while little bluestem stays in wolf plant colonies. In time, heavy continuous grazing will likely cause upland sedges and blue grama to dominate and pioneer perennials, and annuals to increase.

Extended periods of non-use and/or lack of fire will result in excessive litter, which favors an increase in Kentucky bluegrass, smooth bromegrass and/or crested wheatgrass. In many areas, shrubs such as western snowberry and fringed sagewort will also increase.

The following is a diagram that illustrates the common plant communities that can occur on the site and the transition pathways between communities. The ecological processes will be discussed in more detail in the plant community descriptions following the diagram.

Plant Communities and Transitional Pathways



CGB w/ CG – Cropped go-back with continuous grazing; **CSG** – Continuous seasonal grazing; **HCG** – Heavy continuous grazing; **HCPC** – Historical Climax Plant Community; **LTPG** – Long-term prescribed grazing; **NU/NF** – Extended period of non-use & no fire; **PB** – Prescribed burning; **PG** – Prescribed grazing; **RD** – Removal of disturbance.

Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SYMBOL	Group	Bluestem/Needlegrass/ Sideoats Grama (HCPC)		
			lbs./acre	% Comp	
GRASSES & GRASS-LIKES			1615 - 1710	85 - 90	
little bluestem	SCSC	1	380 - 570	20 - 30	
plains muhly	MUCU3	2	95 - 190	5 - 10	
sideoats grama	BOCU	3	95 - 190	5 - 10	
NEEDLEGRASS			190 - 380	10 - 20	
porcupine grass	HESP11	4	95 - 380	5 - 20	
green needlegrass	NAVI4	4	95 - 285	5 - 15	
needleandthread	HECOC8	4	38 - 190	2 - 10	
Canadian needlegrass	HECU9	4	0 - 190	0 - 10	
SHORT WARM-SEASON			38 - 95	2 - 5	
blue grama	BOGR2	5	38 - 95	2 - 5	
OTHER NATIVE GRASSES			95 - 190	5 - 10	
prairie junegrass	KOMA	6	19 - 38	1 - 2	
western wheatgrass	PASM	6	38 - 95	2 - 5	
bearded wheatgrass	ELTRS	6	0 - 38	0 - 2	
spikeoat	HEHO8	6	0 - 38	0 - 2	
red threeawn	ARPUL	6	0 - 38	0 - 2	
prairie sandreed	CALO	6	0 - 95	0 - 5	
plains reedgrass	CAMO	6	0 - 19	0 - 1	
big bluestem	ANGE	6	0 - 95	0 - 5	
other perennial grasses	2GP	6	0 - 95	0 - 5	
GRASS-LIKES			57 - 152	3 - 8	
threadleaf sedge	CAFI	7	57 - 152	3 - 8	
Penn sedge	CAPE6	7	0 - 95	0 - 5	
sun sedge	CAINH2	7	0 - 95	0 - 5	
other grass-likes	2GL	7	0 - 38	0 - 2	
FORBS			95 - 190	5 - 10	
American pasqueflower	PUPA5	8	19 - 38	1 - 2	
American vetch	VIAM	8	19 - 19	1 - 1	
cutleaf ironplant	MAPI	8	19 - 19	1 - 1	
gayfeather	LIATR	8	19 - 38	1 - 2	
goldenrod	SOLID	8	19 - 38	1 - 2	
green sagewort	ARDR4	8	0 - 19	0 - 1	
milkvetch	ASTRA	8	0 - 19	0 - 1	
heath aster	SYER	8	0 - 19	0 - 1	
Hood's phlox	PHHO	8	0 - 19	0 - 1	
Indian breadroot	PEES	8	0 - 19	0 - 1	
Lewis' flax	LILE3	8	0 - 19	0 - 1	
prairie clover	DALEA	8	19 - 19	1 - 1	
prairie coneflower	RACO3	8	19 - 19	1 - 1	
purple coneflower	ECAN2	8	19 - 19	1 - 1	
pussytoes	ANTEN	8	0 - 19	0 - 1	
rush skeletonweed	LYJU	8	0 - 19	0 - 1	
scarlet globemallow	SPCO	8	0 - 19	0 - 1	
scurfpea	PSORA2	8	19 - 38	1 - 2	
stiff sunflower	HEPA19	8	19 - 19	1 - 1	
wavyleaf thistle	CIUN	8	0 - 19	0 - 1	
western yarrow	ACMI2	8	19 - 19	1 - 1	
wild onion	ALLIU	8	0 - 19	0 - 1	
other perennial forbs	2FP	8	0 - 19	0 - 1	
other annual forbs	2FA	8	0 - 19	0 - 1	
SHRUBS			38 - 95	2 - 5	
cactus	OPUNT	9	0 - 19	0 - 1	
dwarf false indigo	AMNA	9	0 - 19	0 - 1	
fringed sagewort	ARFR4	9	19 - 38	1 - 2	
juneberry	AMAL2	9	0 - 19	0 - 1	
leadplant	AMCA6	9	19 - 57	1 - 3	
rose	ROSA5	9	19 - 38	1 - 2	
silverberry	ELCO	9	0 - 38	0 - 2	
western snowberry	SYOC	9	0 - 38	0 - 2	
other shrubs	2SHRUB	9	0 - 57	0 - 3	
Annual Production lbs./acre			LOW	RV	HIGH
GRASSES & GRASS-LIKES			1275 -	1691 -	2105
FORBS			90 -	143 -	195
SHRUBS			35 -	67 -	100
TOTAL			1400 -	1900 -	2400

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 = Relative value.

Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SYMBOL	Bluestem/Needlegrass/ Sideoats Grama (HCPC)			Needlegrass/Western Wheatgrass/Kentucky Bluegrass			Gramma/Sedge			Kentucky Bluegrass		
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp
GRASSES & GRASS-LIKES													
little bluestem	SCSC	1	285 - 475	15 - 25	1	30 - 180	2 - 12	1	0 - 45	0 - 5	1	0 - 22	0 - 2
plains muhly	MUCU3	2	95 - 190	5 - 10	2	0 - 45	0 - 3	2			2		
sideoats grama	BOCU	3	95 - 190	5 - 10	3	0 - 30	0 - 2	3	0 - 45	0 - 5	3		
NEEDLEGRASS													
porcupine grass	HESP11	4	95 - 380	5 - 20	4	0 - 75	0 - 5						
green needlegrass	NAVI4	4	95 - 285	5 - 15	4	0 - 75	0 - 5	4	0 - 9	0 - 1	4	0 - 55	0 - 5
needleandthread	HECOC8	4	38 - 190	2 - 10	4	75 - 225	5 - 15	4	0 - 45	0 - 5	4	11 - 55	1 - 5
Canadian needlegrass	HECU9	4	0 - 190	0 - 10	4	0 - 75	0 - 5	4	0 - 9	0 - 1	4	0 - 33	0 - 3
SHORT WARM-SEASON													
blue grama	BOGR2	5	38 - 95	2 - 5	5	0 - 45	0 - 3	5	135 - 225	15 - 25	5	0 - 22	0 - 2
OTHER NATIVE GRASSES													
prairie junegrass	KOMA	6	19 - 38	1 - 2	6	15 - 45	1 - 3	6	9 - 18	1 - 2	6	11 - 22	1 - 2
western wheatgrass	PASM	6	38 - 95	2 - 5	6	75 - 225	5 - 15	6	9 - 45	1 - 5	6	11 - 55	1 - 5
slender wheatgrass	ELTR7	6	19 - 95	1 - 5	6	30 - 120	2 - 8				6	0 - 22	0 - 2
spikeoat	HEHO8	6	0 - 38	0 - 2									
red threeawn	ARPUL	6	0 - 38	0 - 2	6	0 - 75	0 - 5	6	18 - 90	2 - 10	6	22 - 110	2 - 10
prairie sandreed	CALO	6	0 - 95	0 - 5									
plains reedgrass	CAMO	6	0 - 19	0 - 1									
big bluestem	ANGE	6	0 - 95	0 - 5	6	0 - 15	0 - 1						
other perennial grasses	2GP	6	0 - 95	0 - 5	6	0 - 75	0 - 5	6	0 - 45	0 - 5	6	0 - 55	0 - 5
GRASS-LIKES													
threadleaf sedge	CAF1	7	38 - 95	2 - 5	7	0 - 45	0 - 3	7	90 - 180	10 - 20	7	11 - 55	1 - 5
Penn sedge	CAPE6	7	0 - 95	0 - 5				7	0 - 45	0 - 5			
sun sedge	CAINH2	7	0 - 95	0 - 5	7	0 - 30	0 - 2	7	0 - 45	0 - 5			
other grass-likes	2GL	7	0 - 38	0 - 2	7	0 - 30	0 - 2	7	0 - 45	0 - 5	7	0 - 22	0 - 2
NON-NATIVE GRASSES													
Kentucky bluegrass	POPR				8	45 - 180	3 - 12	8	0 - 9	0 - 1	8	110 - 440	10 - 40
smooth bromegrass	BRIN2				8	0 - 120	0 - 8				8	0 - 275	0 - 25
cheatgrass	BRTE				8	15 - 75	1 - 5	8	0 - 9	0 - 1	8	11 - 88	1 - 8
FORBS													
American pasqueflower	PUPA5	9	19 - 38	1 - 2	9	0 - 15	0 - 1	9	45 - 90	5 - 10	9	110 - 220	10 - 20
American vetch	VIAM	9	19 - 38	1 - 2	9	0 - 15	0 - 1						
cutleaf ironplant	MAPI	9	19 - 38	1 - 2	9	0 - 30	0 - 2	9	9 - 18	1 - 2			
gayfeather	LIATR	9	19 - 38	1 - 2	9	15 - 30	1 - 2	9	9 - 18	1 - 2	9	11 - 22	1 - 2
goldenrod	SOLID	9	19 - 38	1 - 2	9	15 - 45	1 - 3	9	9 - 18	1 - 2	9	11 - 55	1 - 5
green sagewort	ARDR4	9	0 - 19	0 - 1	9	15 - 60	1 - 4	9	9 - 45	1 - 5	9	11 - 77	1 - 7
heath aster	SYER	9	0 - 19	0 - 1	9	15 - 60	1 - 4	9	9 - 18	1 - 2	9	11 - 55	1 - 5
Hood's phlox	PHHO	9	0 - 19	0 - 1				9	0 - 9	0 - 1			
Indian breadroot	PEES	9	0 - 19	0 - 1									
milkvetch	ASTRA	9	0 - 19	0 - 1	9	0 - 15	0 - 1	9	0 - 9	0 - 1	9	0 - 11	0 - 1
prairie clover	DALEA	9	19 - 38	1 - 2	9	15 - 30	1 - 2	9	9 - 18	1 - 2	9	11 - 22	1 - 2
prairie coneflower	RACO3	9	19 - 38	1 - 2	9	15 - 30	1 - 2	9	9 - 18	1 - 2	9	11 - 22	1 - 2
pussytoes	ANTEN	9	0 - 19	0 - 1				9	0 - 9	0 - 1			
rush skeletonweed	LYJU	9	0 - 19	0 - 1	9	0 - 15	0 - 1	9	0 - 9	0 - 1	9	0 - 11	0 - 1
scarlet globemallow	SPCO	9	0 - 19	0 - 1	9	0 - 15	0 - 1	9	0 - 9	0 - 1	9	0 - 11	0 - 1
scurfpea	PSORA2	9	19 - 38	1 - 2	9	15 - 45	1 - 3	9	9 - 18	1 - 2	9	11 - 33	1 - 3
stiff sunflower	HEPA19	9	19 - 38	1 - 2	9	0 - 15	0 - 1						
sweetclover	MELIL				9	0 - 150	0 - 10	9	0 - 45	0 - 5	9	0 - 110	0 - 10
wayleaf thistle	CIUN	9	0 - 19	0 - 1	9	0 - 15	0 - 1	9	0 - 9	0 - 1	9	0 - 11	0 - 1
western salsify	TRDU				9	0 - 45	0 - 3	9	0 - 18	0 - 2	9	0 - 55	0 - 5
western yarrow	ACMIO	9	19 - 38	1 - 2	9	15 - 30	1 - 2	9	9 - 18	1 - 2	9	11 - 22	1 - 2
wild onion	ALLIU	9	0 - 19	0 - 1	9	0 - 15	0 - 1				9	0 - 11	0 - 1
other perennial forbs	2FP	9	0 - 57	0 - 3	9	15 - 75	1 - 5	9	9 - 45	1 - 5	9	11 - 55	1 - 5
other annual forbs	2FA	9	0 - 38	0 - 2	9	15 - 75	1 - 5	9	9 - 45	1 - 5	9	11 - 55	1 - 5
SHRUBS													
cactus	OPUNT	10	0 - 19	0 - 1	10	0 - 15	0 - 1	10	9 - 27	1 - 3	10	0 - 11	0 - 1
dwarf false indigo	AMNA	10	0 - 19	0 - 1									
fringed sagewort	ARFR4	10	19 - 38	1 - 2	10	15 - 75	1 - 5	10	18 - 72	2 - 8	10	11 - 55	1 - 5
juneberry	AMAL2	10	0 - 19	0 - 1									
leadplant	AMCA6	10	19 - 57	1 - 3	10	0 - 15	0 - 1						
rose	ROSA5	10	19 - 38	1 - 2	10	15 - 75	1 - 5	10	9 - 36	1 - 4	10	11 - 55	1 - 5
silverberry	ELCO	10	0 - 38	0 - 2	10	0 - 30	0 - 2				10	0 - 11	0 - 1
western snowberry	SYOC	10	0 - 38	0 - 2	10	0 - 75	0 - 5	10	0 - 36	0 - 4	10	0 - 55	0 - 5
other shrubs	2SHRUB	10	0 - 57	0 - 3	10	0 - 45	0 - 3	10	0 - 27	0 - 3	10	0 - 33	0 - 3
Annual Production lbs./acre													
		LOW	RV	HIGH	LOW	RV	HIGH	LOW	RV	HIGH	LOW	RV	HIGH
GRASSES & GRASS-LIKES		1275	1691	2105	860	1238	1615	420	743	1165	445	853	1360
FORBS		90	143	195	70	150	230	40	68	95	105	165	225
SHRUBS		35	67	100	70	113	155	40	90	140	50	83	115
TOTAL		1400	1900	2400	1000	1500	2000	500	900	1400	600	1100	1700

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.

Bluestem/Needlegrass/Sideoats Grama Plant Community

This is the interpretive plant community for this site 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. The site is dominated by a mixture of cool- and warm-season grasses. The major grasses include the needlegrasses, little bluestem, plains muhly, and sideoats grama. Other grasses occurring on the site include western wheatgrass, blue grama, and big bluestem.

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. Runoff from adjacent sites and moderate or high available water capacity provides a favorable soil-water-plant relationship.

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 *Needlegrass/Western Wheatgrass/Kentucky Bluegrass Plant Community*.
- Heavy, continuous grazing or continuous seasonal grazing (annual, early spring) will convert the plant community to the *Grama/Sedge Plant Community*.
- Go-back land with continuous grazing will convert this plant community to the *Annual/Pioneer Perennial Plant Community*.

Grama/Sedge Plant Community

This plant community evolves from heavy grazing over several years of time. Diversity is lost as the short grasses become dominant in the plant community. Big bluestem, little bluestem, western wheatgrass, and the needlegrasses are replaced by the grazing tolerant blue grama, and sedges. Sideoats grama remains in the plant community, but is less productive because of the mid-summer grazing pressure. Because they are less palatable, cudweed sagewort and green sagewort become more prevalent in the plant community. This plant community is resistant to change. The herbaceous species present are not suitable to grazing.

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 *Bluestem/Needlegrass/Sideoats Grama Plant Community (HCPC)*.
- Heavy, continuous grazing may shift this plant community to the *Annual/Pioneer Perennial Plant Community*.
- Go-back land with continuous grazing will convert this plant community to the *Annual/Pioneer Perennial Plant Community*.

Needlegrass/Western Wheatgrass/Kentucky Bluegrass Plant Community

This plant community develops after an extended period 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 accumulates as this community develops. Litter buildup reduces plant vigor and density, and seedling recruitment declines. Eventually, litter levels become abundant enough to crowd out living plants and reduce plant density. Due to a lack of tiller stimulation and sunlight, native bunchgrasses typically develop dead centers and native rhizomatous grasses are limited to small colonies. Heavy litter covers shorter understory species (i.e., shortgrasses and sedges) restricting their ability to capture adequate sunlight for photosynthesis. Vigor and diversity of native plants are reduced.

The dominant grasses are the needlegrasses and western wheatgrass. Non-native grasses, such as Kentucky bluegrass and smooth brome grass tend to invade. Other grasses present include little bluestem, plains muhly, sideoats grama, and blue grama. The common forbs include sweet clover, green sagewort, cudweed sagewort, and American vetch. Western snowberry is the principal shrub and tends to increase in density and cover.

This plant community is resistant to change without prescribed grazing and/or fire. The combination of both grazing and fire is most effective in moving this plant community towards the HCPC. Soil erosion is low. Compared to the HCPC, infiltration is reduced to the lower root zone. Runoff is similar

to the HCPC. This plant community tends to be moisture loving and usually tends to utilize the spring moisture quickly causing forage base to become dry and not very palatable early in the summer.

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 *Bluestem/Needlegrass/Sideoats Grama Plant Community (HCPC)*.
- Heavy continuous grazing will shift this plant community to *Kentucky Bluegrass Plant Community*.
- Non-use and no fire will move this plant community toward the *Kentucky Bluegrass Plant Community*.
- 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 develops after an extended period of 10 or more years of non-use by herbivores and exclusion of fire or by heavy continuous grazing. The main difference is in the amount of litter present on the site. 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. With non-use and no fire, plant litter accumulates in large amounts as this community develops. Litter buildup reduces plant vigor and density, and seedling recruitment declines. Eventually, litter levels become abundant enough to crowd out living plants and reduce plant density. Annual and/or biennial forbs, annual grasses, and cryptogams commonly fill these interspaces. Due to a lack of tiller stimulation and sunlight, native bunchgrasses typically develop dead centers and native rhizomatous grasses are limited to small colonies. Heavy litter covers shorter understory species (i.e., shortgrasses and sedges) restricting their ability to capture adequate sunlight for photosynthesis. Vigor and diversity of native plants are reduced.

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 include western wheatgrass, porcupine grass, green needlegrass, and bearded wheatgrass. The common forbs include sweet clover, green sagewort, cudweed sagewort, and American vetch. Western snowberry is the principal shrub and tends to increase in density and cover.

This plant community is resistant to change without prescribed grazing and/or fire. The combination of both grazing and fire is most effective in moving this plant community towards the HCPC. Soil erosion is low. Compared to the HCPC, infiltration is reduced to the lower root zone. Runoff is similar to the HCPC. This plant community tends to be moisture loving and usually tends to utilize the spring moisture quickly causing forage base to become dry and not very palatable early in the summer.

Once this plant community is reached, time and external resources will be needed to see any immediate recovery in the diversity of the site.

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

Growth curve number: ND5301

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

Growth curve description: Cool-season dominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	8	24	45	10	3	5	2	0	0

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

- Long-term prescribed grazing or prescribed burning followed by prescribed grazing may move this plant community toward the *Needlegrass/Western Wheatgrass/Kentucky Bluegrass Plant Community*. This would require long-term management with prescribed grazing and/or prescribed burning under controlled conditions.
- Heavy continuous grazing or cropped go-back land with continuous grazing will likely shift this plant community to *Annual/Pioneer Perennial Plant Community*.

Annual/Pioneer Perennial Plant Community

This plant community develops under severe disturbance. This can result from heavy livestock or wildlife concentration, and cropping abandonment (go-back land). The dominant vegetation includes pioneer annual grasses, forbs, invaders, and early successional biennial and perennial species. Grasses may include red threeawn, sixweeks fescue, smooth brome, crested wheatgrass, annual brome, needleandthread, prairie Junegrass, western wheatgrass, and little bluestem. The dominant forbs include curlycup gumweed, salsify, cudweed sagewort, kochia, thistles, pussytoes, and other early successional species. Shrubs that may be present include prairie rose, fringed sagewort, and broom snakeweed. The community is susceptible to invasion of other nonnative species due to severe soil disturbances and relatively high percent of bare ground. Compared to the *Bluestem/Needlegrass/Sideoats Grama Plant Community*, western wheatgrass, green needlegrass, porcupine grass, big bluestem, sideoats grama, little bluestem, and blue grama have decreased.

This plant community is resistant to change, as long as soil disturbance or vegetation defoliation persists, thus holding back secondary plant succession. Soil erosion is potentially high in this plant community. Reduced surface cover, low plant density, low plant vigor, loss of root biomass, and soil compaction, all contribute to decreased water infiltration, increased runoff, and accelerated erosion.

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 400 to 1,200 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 and/or removal of disturbance, including adequate rest periods, this plant community will move through the successional stages, and may eventually lead to a plant community resembling the *Bluestem/Needlegrass/Sideoats Grama Plant Community (HCPC)*. Depending on the slope, aspect, and size, and if adequate perennial plants exist, this change can occur more rapidly. This process will likely take a long period of time (50+ years).

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

-- Under Development --

Bluestem/Needlegrass/Sideoats Grama Plant Community:

Gramma/Sedge Plant Community:

Needlegrass/Western Wheatgrass/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							
bearded 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
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
Canadian 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
green needlegrass	U P U D	N P N P	U P U D	N P N P	N P N P	U P U D	U P U D
little bluestem	U D D U	N D N N	U D D U	N D N N	N D N N	U D D U	U D D U
needleandthread	U D U D	N D N U	U D U D	N D N U	N D N U	U D U D	U D U D
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
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
red threeawn	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
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
spikeoat	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
sun sedge	U D U D	U P N D	U D U D	U D U D	U D U D	U D U D	U D U D
threadleaf sedge	U D U D	U P N D	U D U D	U D U D	U D U D	U D U D	U D U D
western wheatgrass	U P D U	N D N N	U P D U	N D N N	N D N N	U P D U	U P D U
Forbs							
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
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
heath aster	U U D U	U U P U	U U D U	U U P U	U U P U	U U D U	U U P U
Hood's phlox	U D U U	U P P U	U D U U	U P P U	U P P U	U D U U	U P P U
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
Lewis' flax	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
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
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 globemallow	U U D U	U D D U	U U D U	U D D U	U D D U	U U D U	U D D U
scurfpea	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
stiff sunflower	U D P U	U D P U	U D P U	U D P U	U D P U	U D P U	U D P U
wavyleaf thistle	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N
western 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
Shrubs							
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
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
juneberry	N D P U	N D P U	N D P U	N D P U	N D P U	N D P U	N D P U
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
silverberry	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
western snowberry	U U U U	U U U U	U U U U	D U D D	U U U U	U U U U	D U U U

N = not used; U = undesirable; D = desirable; P = preferred; T = toxic

[†] Quarters: 1 – Jan., Feb., Mar.; 2 – Apr., May, Jun.; 3 – Jul., Aug., Sep.; 4 – Oct., Nov., Dec.

Animal Community – Grazing Interpretations

Hydrology Functions

Water is the principal factor limiting herbage production on this site. The site is dominated by soils in hydrologic group B, with localized area in hydrologic group C. Infiltration varies from moderately slow to moderate and runoff potential for this site varies from low to high 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

None noted.

Supporting Information

Associated Sites

(053BY011ND) – Loamy

(053BY010ND) – Shallow to Gravel

(053BY009ND) – Shallow Loamy

(053BY007ND) – Sands

(053BY001ND) – Clayey

(053BY008ND) – Sandy

Similar Sites

(053BY011ND) – Loamy (Lo)

Found on dry uplands, upslope from Loamy Overflow site, down slope from Thin Loamy or Shallow Loamy sites; similar landscape position as Sandy, Sands, Clayey sites. Will ribbon greater than one inch and up to two inches. Indicator species are western wheatgrass, green needlegrass, and blue grama, with fringed sagewort and western snowberry being the dominant shrubs. Higher production, different landscape position, less little bluestem, plains muhly, and sideoats grama, more western wheatgrass, and green needlegrass.]

(053BY009ND) – Shallow Loamy (SwL)

[Somewhat excessively drained soils more than 10 less than 20 inches to bedrock that restricts root penetration. Surface layer will ribbon less than two inches and greater than one inch. Upslope from Loamy sites and sometimes down slope from Very Shallow site. Indicator species: needlegrasses, plains muhly, sideoats grama, and little bluestem, with dotted gayfeather, pasqueflower and purple coneflower, and shrubs like broom snakeweed. This

site has similar species but more plains muhly and western wheatgrass, less little bluestem, a restrictive layer above twenty inches, and 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	13	1968 – 1986	ND, SD	Burke, Edmunds, Emmons, McPherson, Walworth, Ward

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>)

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

Thin Loamy
R053BY015ND

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