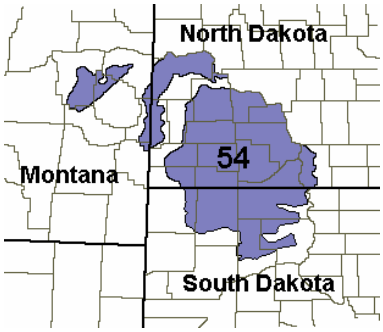
United States Department of Agriculture
Natural Resources Conservation Service

Ecological Site Description

Site Name: Thin Loamy



Site Type: Rangeland

Site ID: R054XY038ND

Major Land Resource Area: 54 – Rolling Soft Shale Plain

For more information on MLRA's refer to the following web site:
http://www.essc.psu.edu/soil_info/soil_lrr/

Physiographic Features

This site typically occurs on moderately steep to steep sedimentary uplands.

Landform: hill, knoll, ridge and butte

Aspect: NA

	Minimum	Maximum
Elevation (feet):	1600	3600
Slope (percent):	6	35
Water Table Depth (inches):	None	None
Flooding:		
Frequency:	None	None
Duration:	None	None
Ponding:		
Depth (inches):	None	None
Frequency:	None	None
Duration:	None	None
Runoff Class:	Medium	High

Climatic Features

MLRA 54 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 14 to 18 inches per year. The normal average annual temperature is about 42° F. January is the coldest month with average temperatures ranging from about 13° F (Beach, ND) to about 16° F (Bison, SD). July is the warmest month with temperatures averaging from about 69° F (Beach, ND) to about 72° F (Timber Lake, SD). The range of normal average monthly temperatures between the coldest and warmest months is about 57° F. This large annual range attests to the continental nature of this MLRA's climate. Hourly winds are estimated to 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.

	Minimum	Maximum
Frost-free period (days):	119	136
Freeze-free period (days):	139	157
Mean Annual Precipitation (inches):	14	18

Average Monthly Precipitation (inches) and Temperature (ºF):

	Precip. Min.	Precip. Max	Temp. Min.	Temp. Max.
January	0.41	0.54	2.2	23.8
February	0.37	0.61	8.7	30.4
March	0.51	1.07	17.1	40.0
April	1.13	1.88	28.9	56.8
May	1.98	2.83	40.5	69.3
June	2.83	3.29	49.8	78.3
July	2.05	2.25	54.6	85.2
August	1.49	2.07	53.0	84.3
September	1.29	1.45	42.0	73.4
October	0.89	1.35	31.6	60.4
November	0.48	0.61	19.0	41.5
December	0.42	0.55	8.1	29.0

Climate Stations		Period	
Station ID	**Location or Name**	**From**	**To**
ND0590	Beach	1949	1999
MT7560	Sidney	1949	1999
SD8307	Timber Lake	1948	1999
ND2183	Dickinson FAA AP	1948	1999

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

The common features of soils in this site are the calcareous silt loam to calcareous fine sandy loam textured subsoils and slopes of typically greater than 6 to 35 percent. The soils in this site are well drained and formed in soft siltstone, loess deposits or glacial till deposits. The loam to silt loam surface layer is 4 to 7 inches thick. The soils have a moderate to moderately slow infiltration rate. 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. The soil surface is unstable and slumping, erosion and deposition is common to the site. 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 Field Office Technical Guide or the following web sites:

North Dakota http://www.nd.nrcs.usda.gov/
South Dakota http://www.sd.nrcs.usda.gov/
Montana http://www.mt.nrcs.usda.gov/

Parent Material Kind: residuum and alluvium
Parent Material Origin: siltstone, calcareous
Surface Texture: loam, silt loam
Surface Texture Modifier: none
Subsurface Texture Group: loamy
Surface Fragments ≤ 3" (% Cover): 0
Surface Fragments > 3" (%Cover): 0
Subsurface Fragments ≤ 3" (% Volume): 0-20
Subsurface Fragments > 3" (% Volume): 0-10

	Minimum	Maximum
Drainage Class:	well	well
Permeability Class:	moderately slow	moderate
Depth to first restrictive layer (inches):	20	72
Electrical Conductivity (mmhos/cm)*:	0	8
Sodium Absorption Ratio*:	0	4
Soil Reaction (1:1 Water)*:	6.6	8.4
Soil Reaction (0.1M CaCl2)*:	NA	NA
Available Water Capacity (inches)*:	5	6
Calcium Carbonate Equivalent (percent)*:	10	30

* - 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 management actions and/or climatic conditions. 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).

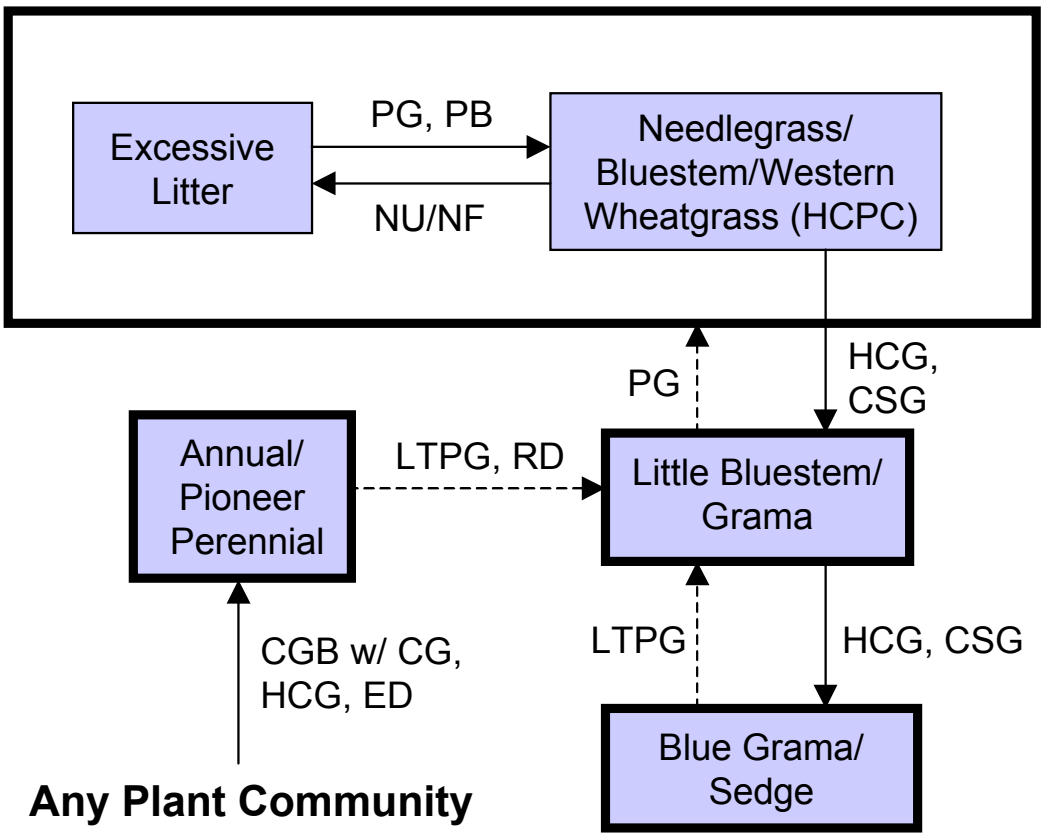
The plant community upon which interpretations are primarily based is the Historic Climax Plant Community. The HCPC has been determined by study of rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics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

This plant community is relatively stable and the competitive advantage prevents other species from establishing. This plant community is less productive than the HCPC. Runoff increases and infiltration will decrease. Soil erosion will be critical. Extended periods of non-use and/or lack of fire will result in excessive litter, which favors an increase in Kentucky bluegrass and/or smooth bromegrass and/or Crested Wheatgrass. In many areas shrubs such as western snowberry and fringed sagewort will also increase. In other areas, silver sagebrush will be the dominant shrub that will increase.

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

Plant Communities and Transitional Pathways



CGB w/ CG - cropped go-back with continuous grazing; **CSG** - continuous seasonal grazing; **ED** - excessive defoliation; **HCPC** - Historical Climax Plant Community; **HCG** - heavy continuous grazing; **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

		Needlegrass/Bluestem/Western Wheatgrass (HCPC)		
COMMON/GROUP NAME	SYMBOL	Group	lbs./acre	% Comp
GRASSES & GRASS-LIKES			*1445 - 1530*	*85 - 90*
western wheatgrass	PASM	1	170 - 255	10 - 15
little bluestem	SCSC	2	85 - 170	5 - 10
plains muhly	MUCU3	3	85 - 170	5 - 10
NEEDLEGRASS		**4**	**170 - 340**	**10 - 20**
porcupine grass	HESP11	4	85 - 170	5 - 10
green needlegrass	NAVI4	4	85 - 170	5 - 10
needleandthread	HECOC8	4	85 - 170	5 - 10
GRAMA		**5**	**170 - 255**	**10 - 15**
sideoats grama	BOCU	5	85 - 255	5 - 15
blue grama	BOGR2	5	34 - 85	2 - 5
OTHER NATIVE GRASSES		**6**	**85 - 170**	**5 - 10**
prairie junegrass	KOMA	6	17 - 34	1 - 2
red threeawn	ARPUL	6	17 - 34	1 - 2
prairie sandreed	CALO	6	0 - 17	0 - 1
prairie dropseed	SPHE	6	0 - 17	0 - 1
thickspike wheatgrass	ELLAL	6	0 - 17	0 - 1
inland saltgrass	DISP	6	0 - 17	0 - 1
Sandberg bluegrass	POSE	6	17 - 34	1 - 2
plains reedgrass	CAMO	6	0 - 17	0 - 1
big bluestem	ANGE	6	0 - 85	0 - 5
other perennial grasses	2GP	6	0 - 34	0 - 2
GRASS-LIKES		**7**	**51 - 85**	**3 - 5**
threadleaf sedge	CAFI	7	51 - 85	3 - 5
other grass-likes	2GL	7	17 - 34	1 - 2
FORBS		*8*	*85 - 170*	*5 - 10*
American pasqueflower	PUPA5	8	17 - 34	1 - 2
American vetch	VIAM	8	17 - 17	1 - 1
cudweed sagewort	ARLU	8	17 - 17	1 - 1
cutleaf ironplant	MAPI	8	17 - 17	1 - 1
eriogonum	ERIOG	8	17 - 17	1 - 1
gayfeather	LIATR	8	17 - 34	1 - 2
goldenrod	SOLID	8	17 - 34	1 - 2
green sagewort	ARDR4	8	0 - 17	0 - 1
groundplum milkvetch	ASCR2	8	17 - 17	1 - 1
heath aster	SYER	8	17 - 17	1 - 1
Hood's phlox	PHHO	8	0 - 17	0 - 1
Indian breadroot	PEES	8	0 - 17	0 - 1
prairie clover	DALEA	8	17 - 17	1 - 1
prairie coneflower	RACO3	8	17 - 17	1 - 1
prairie smoke	GETR	8	0 - 17	0 - 1
purple coneflower	ECAN2	8	17 - 17	1 - 1
pussytoes	ANTEN	8	0 - 17	0 - 1
rush skeletonweed	LYJU	8	0 - 17	0 - 1
scarlet globemallow	SPCO	8	17 - 17	1 - 1
scurfpea	PSORA2	8	17 - 17	1 - 1
stiff sunflower	HEPA19	8	17 - 17	1 - 1
wavyleaf thistle	CIUN	8	0 - 17	0 - 1
western yarrow	ACMI2	8	17 - 17	1 - 1
wild onion	ALLIU	8	0 - 17	0 - 1
other perennial forbs	2FP	8	0 - 17	0 - 1
other annual forbs	2FA	8	0 - 17	0 - 1
SHRUBS		*9*	*34 - 85*	*2 - 5*
broom snakeweed	GUSA2	9	17 - 17	1 - 1
cactus	OPUNT	9	0 - 17	0 - 1
creeping juniper	JUHO2	9	0 - 17	0 - 1
dwarf false indigo	AMNA	9	17 - 17	1 - 1
fringed sagewort	ARFR4	9	17 - 17	1 - 1
poison ivy	TORY	9	0 - 17	0 - 1
rose	ROSA5	9	17 - 34	1 - 2
rubber rabbitbrush	ERNA10	9	0 - 17	0 - 1
silver buffaloberry	SHAR	9	0 - 17	0 - 1
silver sagebrush	ARCA13	9	0 - 34	0 - 2
silverberry	ELCO	9	0 - 34	0 - 2
skunkbush sumac	RHTR	9	0 - 17	0 - 1
western snowberry	SYOC	9	0 - 34	0 - 2
winterfat	KRLA2	9	17 - 34	1 - 2
other shrubs	2SHRUB	9	0 - 17	0 - 1

Annual Production lbs./acre	LOW	RV	HIGH
GRASSES & GRASS-LIKES	890 -	1513	- 2135
FORBS	80 -	128	- 175
SHRUBS	30 -	60	- 90
TOTAL	1000 -	1700	- 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

		Needlegrass/Bluestem/ Western Wheatgrass (HCPC)			Little Bluestem/Grama			Blue Grama/Sedge			Excessive Litter		
COMMON/GROUP NAME	SYMBOL	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp
GRASSES & GRASS-LIKES			*1445 - 1530*	*85 - 90*		*750 - 850*	*75 - 85*		*560 - 630*	*80 - 90*		*1050 - 1275*	*70 - 85*
western wheatgrass	PASM	1	170 - 255	10 - 15	1	30 - 60	3 - 6	1	14 - 28	2 - 4	1	45 - 75	3 - 5
little bluestem	SCSC	2	85 - 170	5 - 10	2	150 - 200	15 - 20	2	0 - 35	0 - 5	2	30 - 75	2 - 5
plains muhly	MUCU3	3	85 - 170	5 - 10	3	0 - 30	0 - 3	3	0 - 7	0 - 1	3	0 - 15	0 - 1
NEEDLEGRASS		**4**	**170 - 340**	**10 - 20**	**4**	**100 - 150**	**10 - 15**	**4**	**21 - 35**	**3 - 5**	**4**	**30 - 60**	**2 - 4**
porcupine grass	HESP11	4	85 - 170	5 - 10									
green needlegrass	NAVI4	4	85 - 170	5 - 10	4	0 - 10	0 - 1						
needleandthread	HECOC8	4	85 - 170	5 - 10	4	100 - 150	10 - 15	4	21 - 35	3 - 5	4	30 - 60	2 - 4
GRAMA		**5**	**170 - 255**	**10 - 15**	**5**	**100 - 140**	**10 - 14**	**5**	**175 - 210**	**25 - 30**	**5**		
sideoats grama	BOCU	5	85 - 255	5 - 15	5	0 - 20	0 - 2						
blue grama	BOGR2	5	34 - 85	2 - 5	5	100 - 140	10 - 14	5	175 - 210	25 - 30			
OTHER NATIVE GRASSES		**6**	**85 - 170**	**5 - 10**	**6**	**50 - 70**	**5 - 7**	**6**	**56 - 105**	**8 - 15**	**6**	**75 - 150**	**5 - 10**
prairie junegrass	KOMA	6	17 - 34	1 - 2	6	20 - 60	2 - 6	6	7 - 21	1 - 3	6	15 - 30	1 - 2
red threeawn	ARPUL	6	17 - 34	1 - 2	6	40 - 70	4 - 7	6	21 - 70	3 - 10	6	15 - 45	1 - 3
prairie sandreed	CALO	6	0 - 17	0 - 1									
prairie dropseed	SPHE	6	0 - 17	0 - 1									
thickspike wheatgrass	ELLAL	6	0 - 17	0 - 1	6	0 - 20	0 - 2						
inland saltgrass	DISP	6	0 - 17	0 - 1	6	0 - 20	0 - 2	6	0 - 7	0 - 1	6	0 - 15	0 - 1
Sandberg bluegrass	POSE	6	17 - 34	1 - 2	6	10 - 30	1 - 3	6	7 - 28	1 - 4	6	45 - 75	3 - 5
plains reedgrass	CAMO	6	0 - 17	0 - 1									
big bluestem	ANGE	6	0 - 85	0 - 5									
other perennial grasses	2GP	6	0 - 34	0 - 2	6	10 - 20	1 - 2	6	0 - 7	0 - 1	6	0 - 15	0 - 1
GRASS-LIKES		**7**	**51 - 85**	**3 - 5**	**7**	**50 - 100**	**5 - 10**	**7**	**105 - 140**	**15 - 20**	**7**	**30 - 60**	**2 - 4**
threadleaf sedge	CAFI	7	51 - 85	3 - 5	7	50 - 100	5 - 10	7	98 - 140	14 - 20	7	30 - 60	2 - 4
other grass-likes	2GL	7	17 - 34	1 - 2	7	10 - 20	1 - 2	7	7 - 35	1 - 5	7	0 - 15	0 - 1
NON-NATIVE GRASSES		**8**									**8**	**450 - 615**	**30 - 41**
bluegrass	POA										8	300 - 615	20 - 41
smooth bromegrass	BRIN2										8	0 - 450	0 - 30
cheatgrass	BRTE										8	0 - 150	0 - 10
FORBS		*9*	*85 - 170*	*5 - 10*	*9*	*50 - 150*	*5 - 15*	*9*	*21 - 35*	*3 - 5*	*9*	*150 - 300*	*10 - 20*
American pasqueflower	PUPA5	9	17 - 34	1 - 2	9	30 - 60	3 - 6	9	14 - 21	2 - 3	9	15 - 30	1 - 2
American vetch	VIAM	9	17 - 17	1 - 1	9	0 - 10	0 - 1				9	0 - 15	0 - 1
cudweed sagewort	ARLU	9	17 - 17	1 - 1	9	20 - 40	2 - 4	9	0 - 7	0 - 1	9	15 - 30	1 - 2
cutleaf ironplant	MAPI	9	17 - 17	1 - 1	9	20 - 30	2 - 3	9	14 - 21	2 - 3	9	0 - 15	0 - 1
eriogonum	ERIOG	9	17 - 17	1 - 1	9	0 - 10	0 - 1						
gayfeather	LIATR	9	17 - 34	1 - 2	9	0 - 10	0 - 1				9	0 - 15	0 - 1
goldenrod	SOLID	9	17 - 34	1 - 2	9	0 - 10	0 - 1				9	0 - 15	0 - 1
green sagewort	ARDR4	9	0 - 17	0 - 1	9	20 - 30	2 - 3	9	21 - 28	3 - 4	9	15 - 45	1 - 3
groundplum milkvetch	ASCR2	9	17 - 17	1 - 1	9	0 - 10	0 - 1						
heath aster	SYER	9	17 - 17	1 - 1	9	20 - 30	2 - 3	9	7 - 14	1 - 2	9	15 - 30	1 - 2
Hood's phlox	PHHO	9	0 - 17	0 - 1	9	10 - 10	1 - 1	9	7 - 7	1 - 1	9	0 - 15	0 - 1
Indian breadroot	PEES	9	0 - 17	0 - 1	9	0 - 10	0 - 1						
prairie clover	DALEA	9	17 - 17	1 - 1									
prairie coneflower	RACO3	9	17 - 17	1 - 1	9	20 - 30	2 - 3	9	7 - 21	1 - 3	9	15 - 30	1 - 2
prairie smoke	GETR	9	0 - 17	0 - 1	9	10 - 10	1 - 1						
purple coneflower	ECAN2	9	17 - 17	1 - 1	9	0 - 10	0 - 1	9	7 - 7	1 - 1	9	15 - 15	1 - 1
pussytoes	ANTEN	9	0 - 17	0 - 1	9	10 - 20	1 - 2	9	14 - 21	2 - 3	9	15 - 15	1 - 1
rush skeletonweed	LYJU	9	0 - 17	0 - 1	9	10 - 10	1 - 1	9	7 - 7	1 - 1	9	15 - 15	1 - 1
scarlet globemallow	SPCO	9	17 - 17	1 - 1	9	10 - 20	1 - 2	9	7 - 7	1 - 1	9	0 - 15	0 - 1
scurfpea	PSORA2	9	17 - 17	1 - 1	9	20 - 30	2 - 3	9	7 - 14	1 - 2	9	15 - 30	1 - 2
stiff sunflower	HEPA19	9	17 - 17	1 - 1							9	0 - 15	0 - 1
sweetclover	MELIL				9	0 - 20	0 - 2	9	7 - 28	1 - 4	9	30 - 105	2 - 7
wavyleaf thistle	CIUN	9	0 - 17	0 - 1	9	10 - 20	1 - 2	9	7 - 14	1 - 2	9	15 - 30	1 - 2
western salsify	TRDU				9	0 - 10	0 - 1	9	7 - 7	1 - 1	9	15 - 15	1 - 1
western yarrow	ACMI2	9	17 - 17	1 - 1	9	20 - 30	2 - 3	9	7 - 14	1 - 2	9	15 - 30	1 - 2
wild onion	ALLIU	9	0 - 17	0 - 1	9	10 - 20	1 - 2	9	7 - 7	1 - 1	9	0 - 15	0 - 1
other perennial forbs	2FP	9	0 - 17	0 - 1	9	0 - 10	0 - 1	9	0 - 7	0 - 1	9	0 - 15	0 - 1
other annual forbs	2FA	9	0 - 17	0 - 1	9	0 - 10	0 - 1	9	0 - 7	0 - 1	9	0 - 15	0 - 1
SHRUBS		*10*	*34 - 85*	*2 - 5*	*10*	*50 - 100*	*5 - 10*	*10*	*70 - 105*	*10 - 15*	*10*	*75 - 150*	*5 - 10*
broom snakeweed	GUSA2	10	17 - 17	1 - 1	10	20 - 30	2 - 3	10	7 - 28	1 - 4	10	15 - 15	1 - 1
cactus	OPUNT	10	0 - 17	0 - 1	10	10 - 20	1 - 2	10	7 - 21	1 - 3	10	0 - 15	0 - 1
creeping juniper	JUHO2	10	0 - 17	0 - 1	10	10 - 20	1 - 2	10	7 - 21	1 - 3	10	0 - 15	0 - 1
dwarf false indigo	AMNA	10	17 - 17	1 - 1									
fringed sagewort	ARFR4	10	17 - 17	1 - 1	10	50 - 80	5 - 8	10	49 - 84	7 - 12	10	30 - 45	2 - 3
poison ivy	TORY	10	0 - 17	0 - 1									
rose	ROSA5	10	17 - 34	1 - 2	10	10 - 10	1 - 1	10	0 - 7	0 - 1	10	0 - 15	0 - 1
silver buffaloberry	SHAR	10	0 - 17	0 - 1	10	0 - 10	0 - 1	10	0 - 7	0 - 1	10	0 - 45	0 - 3
silver sagebrush	ARCA13	10	0 - 34	0 - 2	10	0 - 30	0 - 3	10	0 - 14	0 - 2	10	30 - 60	2 - 4
skunkbush sumac	RHTR	10	0 - 17	0 - 1	10	0 - 10	0 - 1				10	0 - 30	0 - 2
western snowberry	SYOC	10	0 - 34	0 - 2	10	0 - 10	0 - 1				10	0 - 60	0 - 4
winterfat	KRLA2	10	17 - 34	1 - 2	10	0 - 10	0 - 1				10	0 - 15	0 - 1
other shrubs	2SHRUB	10	0 - 17	0 - 1	10	0 - 10	0 - 1				10	0 - 15	0 - 1

Annual Production lbs./acre	LOW RV HIGH	LOW RV HIGH	LOW RV HIGH	LOW RV HIGH
GRASSES & GRASS-LIKES	890 - 1513 - 2135	610 - 825 - 1140	315 - 585 - 850	685 - 1163 - 1620
FORBS	80 - 128 - 175	45 - 100 - 155	20 - 28 - 40	145 - 225 - 325
SHRUBS	30 - 60 - 90	45 - 75 - 105	65 - 88 - 110	70 - 113 - 155
TOTAL	1000 - 1700 - 2400	700 - 1000 - 1400	400 - 700 - 1000	900 - 1500 - 2100

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 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". According to the USDA NRCS National Range and Pasture Handbook, Desired Plant Communities (DPC's) will be determined by the decision-makers and will meet minimum quality criteria established by the NRCS. The main purpose for including any description of a plant community here is to capture the current knowledge and experience at the time of this revision.

Needlegrass/Bluestem/Western Wheatgrass Plant Community

This is the interpretive plant community for this site and is considered to be the Historic Climax Plant Community (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% grasses or grass-like plants, 10% forbs, and 5% shrubs. The site is dominated by a mixture of cool and warm-season grasses. The major grasses include the needlegrasses, western wheatgrass, little bluestem, and sideoats grama. Other grasses occurring on the site include blue grama, plains muhly, and red threeawn.

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 off-site and natural plant mortality is very low. The diversity in plant species allows for high drought tolerance. Run-off 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: ND5402
Growth curve name: Missouri Slope, Native Grasslands, Cool/Warm-season Mix.
Growth curve description: Cool-season/tall warm-season 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 *Excessive Litter Plant Community*.
- Heavy, continuous grazing will convert the plant community to the *Little Bluestem/Grama Plant Community*. Annual, early spring seasonal grazing will convert the plant community to the *Little Bluestem/Grama Plant Community*.
- Excessive defoliation (i.e., areas of heavy animal concentration) will convert the 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*.

Little Bluestem/Grama Plant Community

Historically, this plant community evolved under heavy grazing and a low fire frequency. Little bluestem, blue grama and needleandthread are the significant species in this plant community. Warm-season grass such as blue grama make up the majority of the understory with the balance made up of the sedges. Forbs and shrubs commonly found in this plant community include cudweed sagewort and fringed sagewort. Shrub canopy ranges from 2% to 4%.

When compared to the HCPC, little bluestem, blue grama and needleandthread have increased. The green needlegrass and/or porcupine grass have decreased.

This plant community is moderately resistant to change. The herbaceous species present are well adapted to grazing; however, species composition can be altered through long-term overgrazing. If the herbaceous component is intact, it tends to be resilient if the disturbance is not long-term.

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: ND5404
Growth curve name: Missouri Slope, Warm-season Dominant, Cool-season Subdominant.
Growth curve description: Short warm-season dominant, mid cool-season subdominant & club moss.

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:

- 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 *Needle Grass/Bluestem/Western Wheatgrass Plant Community*.
- Heavy, continuous grazing may cause further deterioration resulting in a shift to the *Blue Grama/Sedge Plant Community*.
- Heavy, continuous grazing and/or excessive defoliation may shift this plant community to the *Annual/Pioneer Perennial Plant Community*.

Blue 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: ND5405
Growth curve name: Missouri Slope, Warm-season Short Grass.
Growth curve description: Warm season, short grass dominant, and some sedge.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	1	7	18	33	26	10	4	1	0	0

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

- Long-term prescribed grazing that includes changing season of use and allowing adequate recovery periods to enhance cool season grasses will slowly lead this plant community back to the *Little Bluestem/Grama Plant Community*.
- Heavy, continuous grazing and/or excessive defoliation may shift this plant community to the *Annual/Pioneer Perennial Plant Community*.

Excessive Litter Plant Community

This plant community develops after an extended period of 10 or more years of non-use by herbivores and exclusion of fire. This plant community is dispersed throughout the pasture, encircling spot grazed areas, and areas distant from water sources. This is a typical pattern found in properly stocked pastures grazed season-long. Plant litter 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 cryptograms 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 bromegrass 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 sweetclover, 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: ND5406
Growth curve name: Missouri Slope, Introduced Cool-season Grasses.
Growth curve description: Introduced cool-season grasses.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	10	35	35	5	2	8	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 *Needle Grass/Bluestem/Western Wheatgrass Plant Community*. This would require long-term management with prescribed grazing and/or prescribed burning under controlled conditions.

Annual/Pioneer Perennial Plant Community

This plant community develops under severe disturbance and/or excessive defoliation. This can result from heavy livestock or wildlife concentration, and cropping abandonment (go-back land). The dominant vegetation includes pioneer annual grasses, forbs, invaders, and early successional biennial and perennial species. Grasses may include red threeawn, sixweeks fescue, smooth bromegrass, 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. Plant species from adjacent ecological sites may become minor components of this plant community. The community also is susceptible to invasion of other non-native species due to severe soil disturbances and relatively high percent of bare ground. Compared to the *Needle Grass/Bluestem/Western Wheatgrass Plant Community*, western wheatgrass, green needlegrass, porcupine grass, big bluestem, sideoats grama and blue grama have decreased. Many annual and perennial forbs, including non-native species, have invaded the site.

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

Significant economic inputs, management and time would be required to move this plant community toward a higher successional stage and a more productive plant community. Secondary succession is highly variable, depending upon availability and diversity of a viable seed bank of higher successional species within the existing plant community and neighboring plant communities. This plant community can be renovated to improve the production capability, but management changes would be needed to maintain the new plant community. The total annual production ranges from 400 to 1200 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 (HCPC) *Needle Grass/Bluestem/Western Wheatgrass Plant Community*. Depending on the slope, aspect, and size, and if adequate perennial plants exist, this change can occur more rapidly. This process will likely take a long period of time (50+ years).

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

-- Under Development --

Needle Grass/Bluestem/Western Wheatgrass Plant Community:

Little Bluestem/Grama Plant Community:

Blue Grama/Sedge Plant Community:

Excessive Litter Plant Community:

Annual/Pioneer Perennial Plant Community:

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

Common Name	Cattle				Sheep				Horses				Deer				Antelope				Bison				Elk			
rasses & Grass-likes																												
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
bluegrass	U	D	U	U	D	P	U	D	U	D	U	U	U	P	N	D	U	P	N	D	U	D	U	U	U	D	U	U
cheatgrass	U	D	U	U	N	P	U	N	U	D	U	U	N	P	U	N	N	P	U	N	U	D	U	U	U	D	U	U
green needlegrass	U	P	U	D	N	P	N	P	U	P	U	D	N	P	N	P	N	P	N	P	U	P	U	D	U	P	U	D
inland saltgrass	N	U	U	N	N	N	N	N	N	U	U	N	N	N	N	N	N	N	N	N	N	U	U	N	N	U	U	N
little bluestem	U	D	D	U	N	D	N	N	U	D	D	U	N	D	N	N	N	D	N	N	U	D	D	U	U	D	D	U
needleandthread	U	D	U	D	N	D	N	U	U	D	U	D	N	D	N	U	N	D	N	U	U	D	U	D	U	D	U	D
plains muhly	U	U	D	U	U	U	D	U	U	U	D	U	N	N	N	N	N	N	N	N	U	U	D	U	U	U	D	U
plains reedgrass	U	D	U	U	N	D	N	N	U	D	U	U	N	D	N	N	N	D	N	N	U	D	U	U	U	D	U	U
porcupine grass	U	P	U	D	N	D	N	U	U	P	U	D	N	D	N	U	N	D	N	U	U	P	U	D	U	P	U	D
prairie dropseed	N	U	P	U	N	U	D	U	N	U	P	U	N	U	D	U	N	U	D	U	N	U	P	U	N	U	P	U
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
Sandberg bluegrass	N	U	N	N	N	D	N	N	N	U	N	N	N	D	N	N	N	D	N	N	N	U	N	N	N	U	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
smooth bromegrass	U	P	U	U	U	P	U	U	U	P	U	U	U	P	U	U	U	P	U	U	U	P	U	U	U	P	U	U
thickspike wheatgrass	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
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
rbs																												
American pasqueflower	N	N	N	N	N	U	N	N	N	N	N	N	N	U	N	N	N	U	N	N	N	N	N	N	N	N	N	N
American vetch	U	D	P	U	U	P	P	U	U	D	P	U	U	P	P	U	U	P	P	U	U	D	P	U	U	P	P	U
cudweed sagewort	U	U	U	U	U	U	D	U	U	U	U	U	U	U	D	U	U	U	D	U	U	U	U	U	U	U	D	U
cutleaf ironplant	U	U	U	U	N	U	U	N	U	U	U	U	N	U	U	N	N	U	U	N	U	U	U	U	N	U	U	N
eriogonum	U	U	D	U	U	U	U	U	U	U	D	U	U	U	U	U	U	U	U	U	U	U	D	U	U	U	U	U
gayfeather	U	U	D	U	U	P	P	U	U	U	D	U	U	P	P	U	U	P	P	U	U	U	D	U	U	P	P	U
goldenrod	U	U	D	U	N	U	U	N	U	U	D	U	N	U	U	N	N	U	U	N	U	U	D	U	N	U	U	N
green sagewort	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
groundplum milkvetch	U	D	U	U	U	D	D	U	U	D	U	U	U	D	D	U	U	D	D	U	U	D	U	U	U	D	D	U
heath aster	U	U	D	U	U	U	P	U	U	U	D	U	U	U	P	U	U	U	P	U	U	U	D	U	U	U	P	U
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
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
prairie smoke	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
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
hrubs																												
broom snakeweed	N	N	N	N	U	U	U	U	N	N	N	N	U	U	U	U	U	U	U	U	N	N	N	N	U	U	U	U
cactus	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
creeping juniper	U	N	N	U	U	N	N	U	U	N	N	U	U	N	N	U	U	N	N	U	U	N	N	U	U	N	N	U
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
poison ivy	N	N	N	N	U	U	U	U	N	N	N	N	U	U	U	U	U	U	U	U	N	N	N	N	U	U	U	U
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
rubber rabbitbrush	N	N	N	N	D	U	U	D	N	N	N	N	D	U	U	D	U	D	D	U	N	N	N	N	D	U	U	U
silver buffaloberry	D	U	U	U	D	U	U	U	D	U	U	U	P	U	D	P	U	U	U	U	D	U	U	U	D	U	U	U
silver sagebrush	D	U	U	D	D	U	U	D	D	U	U	D	P	D	D	P	P	P	P	P	D	U	U	D	D	U	U	D
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
skunkbush sumac	D	U	U	D	D	U	U	D	D	U	U	D	D	U	U	D	D	U	U	D	D	U	U	D	D	U	U	D
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
winterfat	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

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

The following table lists suggested initial stocking rates for cattle under continuous grazing (year long grazing or growing season long grazing) under normal growing conditions; however, *continuous grazing is not recommended.* These are conservative estimates that should be used only as guidelines in the initial stages of the conservation planning process and may need to be adjusted due to diet preferences of other types or kinds of livestock and/or other factors. Often, the current plant composition does not entirely match any particular plant community (as described in this ecological site description). Because of this, a field visit is recommended, in all cases, to document plant composition and production. More precise carrying capacity estimates should eventually be calculated using the following stocking rate information along with animal preference data, particularly when grazers other than cattle are involved. With consultation of the land manager, more intensive grazing management may result in improved harvest efficiencies and increased carrying capacity.

Plant Community	Production (lbs./acre)	Carrying Capacity [1] (AUM/acre)
Needle Grass/Bluestem/Western Wheatgrass	1700	0.54 [2]
Little Bluestem/Grama	1000	0.32 [2]
Blue Grama/Sedge	700	0.22
Excessive Litter	1500	0.47 [2]
Annual/Pioneer Perennial	-- [3]	-- [3]

[1] Continuous season-long grazing by cattle under average growing conditions.
[2] Stocking rates may need to be adjusted due to palatability and/or availability of forage.
[3] Highly variable; stocking rate needs to be determined on site.

Hydrology Functions

Water is the principal factor limiting herbage production on this site. The site is dominated by soils in hydrologic group B. Infiltration varies from moderately slow to moderate and runoff potential for this site varies from medium to high depending on soil hydrologic group and ground cover. In many cases, areas with greater than 75% 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% 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 variety 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

(054XY031ND) – Loamy
(054XY030ND) – Shallow Loamy
(054XY035ND) – Very Shallow

Similar Sites

(054XY031ND) – Loamy (Ly)
Found on dry uplands, upslope from loamy terraces or loamy overflow sites, down slope from thin loamy or shallow loam sites; similar landscape position as sandy, sands, clayey sites. Will ribbon greater than 1 inch and up to 2 inches. Indicator species are western wheatgrass some green needlegrass and blue grama, with fringed sagewort and western snowberry being the dominant shrubs. This site has more production, different landscape position, no restrictive layers above twenty inches, no little bluestem, plains muhly, and sideoats grama, more western wheatgrass and green needlegrass.]

(054XY028ND) – Shallow Clayey (SwCy)
[Well drained soils more than 10 less than 20 inches to unweathered shales that restricts root penetration. Upslope of clayey site, surface layer will ribbon greater than 2 inches, upslope of clayey ecological site. Indicator species: western wheatgrass dominates with little bluestem, plains muhly and sideoats grama, gayfeather. This site has similar species but no porcupinegrass, similar little bluestem, less sideoats, more western wheatgrass, plains muhly, green needlegrass, restrictive layer above twenty inches is shale, less production.]

(054XY043ND) – Shallow Sandy (SwSy)
[Somewhat excessively drained soils > 10 and $\leq$ 20 inches to sedimentary sandstone bedrock or gravel restricting root penetration. Surface layer ribbons < 1 inch unless above gravel, than > 1 but < 2 inches. Upslope from thin loamy, limy sands, sands or sandy sites and some times down slope form very shallow ecological sites. Indicator species: little bluestem, prairie sandreed, sand bluestem, and needlegrasses, with dotted gayfeather, pasqueflower and purple coneflower, and shrubs like prairie rose and yucca. This site has similar species but more little bluestem, sand bluestem, prairie sandreed and sedges, less plains muhly, green needlegrass, porcupinegrass, western wheatgrass, restrictive layer above twenty inches is sandstone or gravels, less production.]

(054XY030ND) – Shallow Loamy (SwLy)
[Well drained soils more than 10 less than 20 inches to sedimentary bedrock that restricts root penetration. Surface layer will ribbon less than 2 inches and greater than 1 inch. Upslope from thin loamy or loamy sites and some times down slope form very shallow ecological sites. Indicator species: little bluestem, plains muhly, needle grasses and sideoats grama, with dotted gayfeather, pasqueflower and purple coneflower, and shrubs like broom snakeweed. This site has similar species but more little bluestem and plains muhly, less sideoats grama, green needlegrass, western wheatgrass, has a restrictive layer above twenty inches is sedimentary bedrock, less production.]

(054XY045ND) – Limy Sands (LSa)
[Moderately deep entisol, usually calcareous within 4 inches to the surface, found on knobs and/or sideslopes of hills and buttes; will not form a ribbon; up slope of sands or sandy and down slope from shallow sandy ecological sites. Indicator species: Little bluestem, sand bluestem, and prairie sandreed, along with penstemon, silverleaf scurfpea, purple coneflower, yucca, creeping juniper, and leadplant. This site has less western wheatgrass, plains muhly, green needlegrass and sideoats grama, more little bluestem, sedges, prairie sandreed and sand bluestem, similar production, soil depths.]

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 specialist.

Those involved in developing this site description include: Dennis Froemke, NRCS Range Management Specialist; Jeff Printz, NRCS State Range Management Specialist; Stan Boltz, NRCS Range Management Specialist; Darrell Vanderbusch, NRCS Resource Soil Scientist; L. Michael Stirling, NRCS Range Management Specialist; Josh Saunders, NRCS Range Management Specialist; David Dewald, NRCS State Biologist; and Brad Podoll, NRCS Biologist.

Data Source	Number of Records	Sample Period	State	County
SCS-RANGE-417	5	1971 – 1997	ND, SD	Billings, Dunn, Hettinger, Perkins
Ocular estimates	4	1997 – 2001	ND, SD	Dunn, Corson, Morton, Stark

State Correlation

This site has been correlated with Montana and South Dakota in MLRA 54.

Field Offices

Baker, MT	Buffalo, SD	Faith, SD	Mott, ND
Beach, ND	Carson, ND	Hettinger, ND	Selfridge, ND
Beulah, ND	Culbertson, MT	Killdeer, ND	Sidney, MT
Bison, SD	Dickinson, ND	Mandan, ND	Watford City, ND
Bowman, ND	Dupree, SD	McIntosh, SD	Wibaux, MT

Relationship to Other Established Classifications

Level IV Ecoregions of the Conterminous United States: 43a – Missouri Plateau.

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

State Range Management Specialist	Date	State Range Management Specialist	Date
State Range Management Specialist	Date		