United States Department of Agriculture
Natural Resources Conservation Service

Ecological Site Description

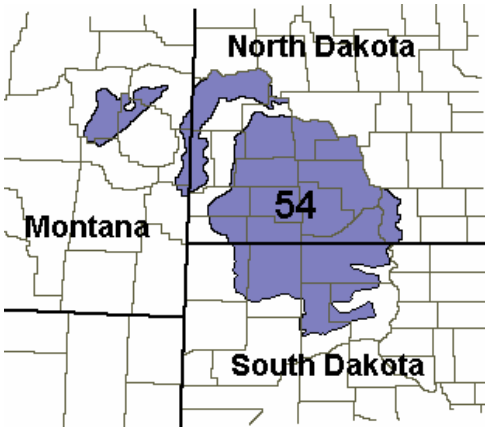
Site Name: Shallow Sandy

Site Type: Rangeland

Site ID: R054XY043ND

Major Land Resource Area (MLRA): 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 occurs on gently sloping to moderately steep sedimentary uplands.

Landform: hill, outwash plain, ridge **Aspect:** NA

	Minimum	Maximum
Elevation (feet):	1600	3600
Slope (percent):	3	50
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:	Negligible	Medium

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, North Dakota (ND),) to about 16°F (Bison, South Dakota (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 loamy fine sand, fine sandy loam subsoils or loam subsoils (with sand and gravels at 14 inches) and slopes of 3 to 50 percent. The soils in this site are somewhat excessive to excessively drained and formed in residuum and alluvium. The loamy fine sand, fine sandy loam, or loam surface layer is three to six inches thick. The soils have a moderate to rapid infiltration rate. This site typically should show slight to no evidence of rills, wind scoured areas or pedestalled plants. Water flow paths are broken, irregular in appearance, or discontinuous with numerous debris dams or vegetative barriers. The soil surface is stable and intact. Subsurface soil layers are restrictive to water movement and root penetration. The low available water capacity has a strong effect on the soil-water-plant relationship.

These soils are 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:

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 or alluvium
Parent Material Origin: sedimentary, unspecified
Surface Texture: loamy fine sand, fine sandy loam, loam
Surface Texture Modifier: gravelly
Subsurface Texture Group: sandy
Surface Fragments ≤ 3" (% Cover): 0-10
Surface Fragments > 3" (%Cover): 0-5
Subsurface Fragments ≤ 3" (% Volume): 0-10
Subsurface Fragments > 3" (% Volume): 0-5

	Minimum	Maximum
Drainage Class:	somewhat excessively	excessively
Permeability Class:	moderate	rapid
Depth to first restrictive layer (inches):	10	20
Electrical Conductivity (mmhos/cm)*:	0	2
Sodium Absorption Ratio*:	0	2
Soil Reaction (1:1 Water)*:	6.1	8.4
Soil Reaction (0.1M CaCl2)*:	NA	NA
Available Water Capacity (inches)*:	1	3
Calcium Carbonate Equivalent (percent)*:	5	15

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

Plant Communities

Ecological Dynamics of the Site:
This site developed under Northern Great Plains climatic conditions and included natural influence of large herbivores and occasional fire. Changes will occur in the plant communities due to climatic conditions and/or management actions. Due to the nature of the soils, the site is considered 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.

Heavy continuous grazing or continuous seasonal (spring) grazing without adequate recovery opportunities following each grazing event during the growing season will cause threadleaf sedge to

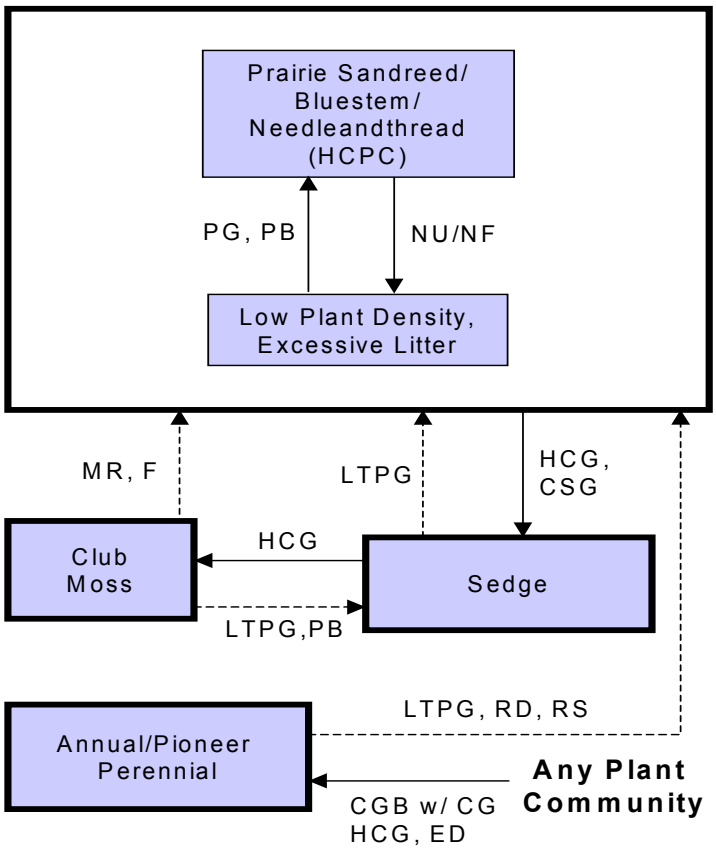
increase. Species such as prairie sandreed, sand bluestem, and little bluestem will decrease in frequency and production.

In time, heavy continuous grazing will likely cause upland sedges and blue grama to dominate and pioneer perennials, annuals, and club moss (in its range) 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 minimal.

Extended periods of non-use and/or lack of fire will result in a plant community having high litter levels causing decadence, mortality and an increase of cool season grasses such as Kentucky bluegrass and/or smooth bromegrass.

The following diagram illustrates the common plant communities and vegetation states commonly occurring on the site and the transition pathways between communities and states. The ecological processes will be discussed in more detail in the plant community descriptions following the diagram.

Plant Communities and Transitional Pathways



CGB w/ CG - cropped go-back with continuous grazing; **CSG** - continuous seasonal grazing; **ED** - excessive defoliation; **F** - fertilization followed with prescribed grazing; **HCG** - heavy continuous grazing; **HCPC** - Historical Climax Plant Community; **LTPG** - long-term prescribed grazing; **MR** - mechanical renovation with prescribed grazing; **NU/NF** - extended period of non-use & no fire; **PB** - prescribed burning; **PG** - prescribed grazing; **RD** - removal of disturbance; **RS** - range seeding followed by prescribed grazing.

Plant Community Composition and Group Annual Production

		Prairie Sandreed/Bluestem/ Needleandthread (HCPC)		
COMMON/GROUP NAME	**SYMBOL**	**Group**	**lbs./acre**	**% Comp**
GRASSES & GRASS-LIKES			*1120 - 1260*	*80 - 90*
		1	**280 - 420**	**20 - 30**
prairie sandreed	CALO	1	210 - 350	15 - 25
plains muhly	MUCU3	1	56 - 112	4 - 8
little bluestem	SCSC	1	70 - 210	5 - 15
BLUESTEM		**2**	**70 - 140**	**5 - 10**
sand bluestem	ANHA	2	70 - 140	5 - 10
NEEDLEGRASS		**3**	**112 - 154**	**8 - 11**
needleandthread	HECOC8	3	70 - 154	5 - 11
green needlegrass	NAVI4	3	28 - 56	2 - 4
GRAMA		**4**	**56 - 112**	**4 - 8**
blue grama	BOGR2	4	42 - 98	3 - 7
hairy grama	BOHI2	4	14 - 70	1 - 5
OTHER NATIVE GRASSES		**5**	**70 - 140**	**5 - 10**
bluebunch wheatgrass	PSSP6	5	0 - 28	0 - 2
plains reedgrass	CAMO	5	0 - 14	0 - 1
prairie junegrass	KOMA	5	14 - 28	1 - 2
red threeawn	ARPUL	5	14 - 28	1 - 2
sand dropseed	SPCR	5	14 - 28	1 - 2
Scribner panicum	DIOLS	5	14 - 14	1 - 1
sideoats grama	BOCU	5	28 - 56	2 - 4
thickspike wheatgrass	ELLAL	5	0 - 42	0 - 3
western wheatgrass	PASM	5	28 - 56	2 - 4
other perennial grasses	2GP	5	14 - 28	1 - 2
GRASS-LIKES		**6**	**70 - 210**	**5 - 15**
threadleaf sedge	CAFI	6	42 - 140	3 - 10
sun sedge	CAINH2	6	28 - 70	2 - 5
Penn sedge	CAPE6	6	14 - 14	1 - 1
other grass-likes	2GL	6	0 - 42	0 - 3
FORBS		*7*	*70 - 140*	*5 - 10*
American pasqueflower	PUPA5	7	0 - 14	0 - 1
American vetch	VIAM	7	14 - 14	1 - 1
blanketflower	GAAR	7	14 - 14	1 - 1
cinquefoil	POTEN	7	14 - 14	1 - 1
cudweed sagewort	ARLU	7	14 - 14	1 - 1
cutleaf ironplant	MAPI	7	0 - 14	0 - 1
gayfeather	LIATR	7	14 - 28	1 - 2
goldenrod	SOLID	7	14 - 28	1 - 2
green sagewort	ARDR4	7	14 - 28	1 - 2
groundplum milkvetch	ASCR2	7	14 - 14	1 - 1
hairy goldaster	HEVI4	7	14 - 14	1 - 1
Hood's phlox	PHHO	7	14 - 14	1 - 1
Lambert crazyweed	OXLA3	7	14 - 28	1 - 2
penstemon	PENST	7	14 - 14	1 - 1
plains milkvetch	ASGI5	7	0 - 14	0 - 1
prairie clover	DALEA	7	28 - 42	2 - 3
prairie coneflower	RACO3	7	14 - 14	1 - 1
purple coneflower	ECAN2	7	14 - 28	1 - 2
pussytoes	ANTEN	7	14 - 14	1 - 1
rush skeletonweed	LYJU	7	14 - 14	1 - 1
scarlet globemallow	SPCO	7	14 - 14	1 - 1
scurfpea	PSORA2	7	14 - 14	1 - 1
spiderwort	TRADE	7	14 - 14	1 - 1
stiff sunflower	HEPA19	7	14 - 28	1 - 2
wavyleaf thistle	CIUN	7	0 - 14	0 - 1
western wallflower	ERCAC	7	0 - 14	0 - 1
western yarrow	ACMI2	7	14 - 14	1 - 1
wild onion	ALLIU	7	14 - 14	1 - 1
other perennial forbs	2FP	7	0 - 14	0 - 1
SHRUBS		*8*	*28 - 70*	*2 - 5*
broom snakeweed	GUSA2	8	14 - 14	1 - 1
cactus	OPUNT	8	14 - 14	1 - 1
creeping juniper	JUHO2	8	14 - 14	1 - 1
fringed sagewort	ARFR4	8	14 - 14	1 - 1
kinnikinnick	ARUV	8	0 - 14	0 - 1
rose	ROSA5	8	14 - 28	1 - 2
skunkbush sumac	RHTR	8	0 - 14	0 - 1
winterfat	KRLA2	8	28 - 42	2 - 3
yucca	YUGL	8	0 - 14	0 - 1
other shrubs	2SHRUB	8	0 - 14	0 - 1
CRYPTOGAMS		*9*	*0 - 14*	*0 - 1*
clubmoss	SEDE2	9	0 - 14	0 - 1

Annual Production lbs./acre	LOW RV HIGH
GRASSES & GRASS-LIKES	810 - 1239 - 1665
FORBS	65 - 105 - 145
SHRUBS	25 - 49 - 75
CRYPTOGAMS	0 - 7 - 15
TOTAL	900 - 1400 - 1900

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

		Prairie Sandreed/Bluestem/ Needleandthread (HCPC)			Sedge			Low Plant Density, Excessive Litter			Club Moss		
COMMON/GROUP NAME	SYMBOL	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp
GRASSES & GRASS-LIKES			*1120 - 1260*	*80 - 90*		*375 - 425*	*75 - 85*		*960 - 1080*	*80 - 90*		*280 - 340*	*70 - 85*
		1	**280 - 420**	**20 - 30**	**1**	**5 - 10**	**1 - 2**	**1**	**60 - 132**	**5 - 11**	**1**		
prairie sandreed	CALO	1	210 - 350	15 - 25	1	5 - 10	1 - 2	1	60 - 96	5 - 8			
plains muhly	MUCU3	1	56 - 112	4 - 8	1	0 - 5	0 - 1	1	24 - 36	2 - 3			
little bluestem	SCSC	1	70 - 210	5 - 15	1	5 - 10	1 - 2	1	60 - 96	5 - 8			
BLUESTEM		**2**	**70 - 140**	**5 - 10**	**2**			**2**	**36 - 72**	**3 - 6**	**2**		
sand bluestem	ANHA	2	70 - 140	5 - 10				2	36 - 72	3 - 6			
NEEDLEGRASSES		**3**	**70 - 154**	**5 - 11**	**3**	**5 - 50**	**1 - 10**	**3**	**120 - 240**	**10 - 20**	**3**	**4 - 40**	**1 - 10**
needleandthread	HECOC8	3	70 - 154	5 - 11	3	5 - 50	1 - 10	3	120 - 240	10 - 20	3	4 - 40	1 - 10
green needlegrass	NAVI4	3	28 - 56	2 - 4				3	36 - 60	3 - 5			
GRAMA		**4**	**56 - 112**	**4 - 8**	**4**	**25 - 75**	**5 - 15**	**4**	**12 - 24**	**1 - 2**	**4**	**20 - 40**	**5 - 10**
blue grama	BOGR2	4	42 - 98	3 - 7	4	25 - 75	5 - 15	4	12 - 24	1 - 2	4	20 - 40	5 - 10
hairy grama	BOHI2	4	14 - 70	1 - 5	4	5 - 25	1 - 5	4	12 - 24	1 - 2	4	4 - 20	1 - 5
OTHER NATIVE GRASSES		**5**	**70 - 140**	**5 - 10**	**5**	**15 - 35**	**3 - 7**	**5**	**60 - 120**	**5 - 10**	**5**	**12 - 40**	**3 - 10**
bluebunch wheatgrass	PSSP6	5	0 - 28	0 - 2				5	0 - 12	0 - 1			
plains reedgrass	CAMO	5	0 - 14	0 - 1				5	0 - 12	0 - 1			
prairie junegrass	KOMA	5	14 - 28	1 - 2	5	0 - 5	0 - 1	5	12 - 24	1 - 2	5	4 - 8	1 - 2
red threeawn	ARPUL	5	14 - 28	1 - 2	5	5 - 25	1 - 5	5	24 - 36	2 - 3	5	8 - 28	2 - 7
sand dropseed	SPCR	5	14 - 28	1 - 2	5	10 - 35	2 - 7	5	12 - 24	1 - 2	5	8 - 28	2 - 7
Scribner panicum	DIOLS	5	14 - 14	1 - 1	5	0 - 5	0 - 1	5	12 - 24	1 - 2	5	0 - 4	0 - 1
sideoats grama	BOCU	5	28 - 56	2 - 4				5	12 - 24	1 - 2			
thickspike wheatgrass	ELLAL	5	0 - 42	0 - 3	5	0 - 5	0 - 1	5	0 - 48	0 - 4	5	0 - 4	0 - 1
western wheatgrass	PASM	5	28 - 56	2 - 4	5	0 - 5	0 - 1	5	36 - 60	3 - 5	5	0 - 4	0 - 1
other perennial grasses	2GP	5	14 - 28	1 - 2	5	0 - 5	0 - 1	5	12 - 24	1 - 2	5	0 - 4	0 - 1
GRASS-LIKES		**6**	**70 - 210**	**5 - 15**	**6**	**150 - 200**	**30 - 40**	**6**	**120 - 180**	**10 - 15**	**6**	**120 - 160**	**30 - 40**
threadleaf sedge	CAFI	6	42 - 140	3 - 10	6	150 - 200	30 - 40	6	60 - 120	5 - 10	6	120 - 160	30 - 40
sun sedge	CAINH2	6	28 - 70	2 - 5	6	0 - 25	0 - 5	6	36 - 48	3 - 4	6	0 - 20	0 - 5
Penn sedge	CAPE6	6	14 - 14	1 - 1				6	12 - 24	1 - 2			
other grass-likes	2GL	6	0 - 42	0 - 3	6	0 - 20	0 - 4	6	0 - 12	0 - 1	6	0 - 16	0 - 4
NON-NATIVE GRASSES		**7**			**7**	**0 - 10**	**0 - 2**	**7**	**96 - 180**	**8 - 15**	**7**		
cheatgrass	BRTE				7	0 - 10	0 - 2	7	0 - 60	0 - 5			
crested wheatgrass	AGCR				7	0 - 10	0 - 2	7	0 - 60	0 - 5			
smooth bromegrass	BRIN2							7	0 - 120	0 - 10			
bluegrass	POA							7	24 - 60	2 - 5			
FORBS		*8*	*70 - 140*	*5 - 10*	*8*	*50 - 75*	*10 - 15*	*8*	*60 - 120*	*5 - 10*	*8*	*20 - 40*	*5 - 10*
American pasqueflower	PUPA5	8	0 - 14	0 - 1	8	10 - 15	2 - 3	8	0 - 12	0 - 1	8	8 - 12	2 - 3
American vetch	VIAM	8	14 - 14	1 - 1	8	0 - 5	0 - 1	8	12 - 12	1 - 1			
blanketflower	GAAR	8	14 - 14	1 - 1				8	0 - 12	0 - 1			
cinquefoil	POTEN	8	14 - 14	1 - 1	8	0 - 5	0 - 1	8	12 - 12	1 - 1	8	0 - 4	0 - 1
common dandelion	TAOF				8	5 - 10	1 - 2	8	12 - 24	1 - 2	8	4 - 8	1 - 2
cudweed sagewort	ARLU	8	14 - 14	1 - 1	8	0 - 5	0 - 1	8	12 - 24	1 - 2	8	0 - 4	0 - 1
curlycup gumweed	GRSQ				8	0 - 15	0 - 3	8	12 - 36	1 - 3	8	0 - 12	0 - 3
cutleaf ironplant	MAPI	8	0 - 14	0 - 1	8	15 - 20	3 - 4	8	0 - 24	0 - 2	8	12 - 16	3 - 4
gayfeather	LIATR	8	14 - 28	1 - 2	8	0 - 5	0 - 1	8	12 - 24	1 - 2	8	0 - 4	0 - 1
goldenrod	SOLID	8	14 - 28	1 - 2	8	10 - 15	2 - 3	8	12 - 24	1 - 2	8	0 - 4	0 - 1
green sagewort	ARDR4	8	14 - 28	1 - 2	8	15 - 20	3 - 4	8	24 - 36	2 - 3	8	12 - 16	3 - 4
groundplum milkvetch	ASCR2	8	14 - 14	1 - 1				8	12 - 12	1 - 1			
hairy goldaster	HEVI4	8	14 - 14	1 - 1	8	10 - 15	2 - 3	8	12 - 24	1 - 2	8	8 - 12	2 - 3
Hood's phlox	PHHO	8	14 - 14	1 - 1	8	5 - 10	1 - 2	8	12 - 12	1 - 1	8	4 - 8	1 - 2
Lambert crazyweed	OXLA3	8	14 - 28	1 - 2	8	10 - 15	2 - 3	8	12 - 12	1 - 1	8	8 - 12	2 - 3
marestail	COCA5				8	0 - 10	0 - 2	8	0 - 12	0 - 1			
penstemon	PENST	8	14 - 14	1 - 1				8	12 - 12	1 - 1			
plains milkvetch	ASGI5	8	0 - 14	0 - 1	8	0 - 5	0 - 1	8	0 - 12	0 - 1			
prairie clover	DALEA	8	28 - 42	2 - 3				8	12 - 12	1 - 1			
prairie coneflower	RACO3	8	14 - 14	1 - 1	8	10 - 15	2 - 3	8	24 - 36	2 - 3	8	4 - 8	1 - 2
purple coneflower	ECAN2	8	14 - 28	1 - 2	8	5 - 5	1 - 1	8	12 - 24	1 - 2	8	4 - 4	1 - 1
pussytoes	ANTEN	8	14 - 14	1 - 1	8	5 - 10	1 - 2	8	12 - 12	1 - 1	8	8 - 12	2 - 3
rush skeletonweed	LYJU	8	14 - 14	1 - 1	8	5 - 10	1 - 2	8	12 - 12	1 - 1	8	4 - 8	1 - 2
scarlet globemallow	SPCO	8	14 - 14	1 - 1	8	10 - 15	2 - 3	8	12 - 24	1 - 2	8	4 - 8	1 - 2
scurfpea	PSORA2	8	14 - 14	1 - 1	8	10 - 15	2 - 3	8	12 - 24	1 - 2	8	4 - 8	1 - 2
spiderwort	TRADE	8	14 - 14	1 - 1				8	0 - 12	0 - 1			
stiff sunflower	HEPA19	8	14 - 28	1 - 2				8	12 - 24	1 - 2			
sweetclover	MELIL				8	0 - 25	0 - 5	8	0 - 120	0 - 10			
wavyleaf thistle	CIUN	8	0 - 14	0 - 1	8	5 - 15	1 - 3	8	12 - 24	1 - 2	8	0 - 4	0 - 1
western ragweed	AMPS				8	5 - 15	1 - 3	8	12 - 24	1 - 2	8	8 - 16	2 - 4
western salsify	TRDU				8	5 - 10	1 - 2	8	12 - 24	1 - 2			
western wallflower	ERCAC	8	0 - 14	0 - 1				8	0 - 12	0 - 1			
western yarrow	ACMI2	8	14 - 14	1 - 1	8	5 - 10	1 - 2	8	24 - 36	2 - 3	8	4 - 4	1 - 1
wild onion	ALLIU	8	14 - 14	1 - 1	8	5 - 5	1 - 1	8	12 - 12	1 - 1	8	4 - 4	1 - 1
woolly Indianwheat	PLPA2				8	5 - 5	1 - 1	8	12 - 12	1 - 1	8	4 - 4	1 - 1
other perennial forbs	2FP	8	0 - 14	0 - 1	8	5 - 5	1 - 1	8	12 - 12	1 - 1	8	4 - 4	1 - 1
other annual forbs	2FA				8	5 - 5	1 - 1	8	12 - 24	1 - 2	8	4 - 4	1 - 1
SHRUBS		*9*	*28 - 70*	*2 - 5*	*9*	*25 - 35*	*5 - 7*	*9*	*60 - 120*	*5 - 10*	*9*	*20 - 40*	*5 - 10*
broom snakeweed	GUSA2	9	14 - 14	1 - 1	9	10 - 15	2 - 3	9	12 - 12	1 - 1	9	12 - 16	3 - 4
cactus	OPUNT	9	14 - 14	1 - 1	9	5 - 10	1 - 2	9	24 - 36	2 - 3	9	12 - 16	3 - 4
creeping juniper	JUHO2	9	14 - 14	1 - 1	9	5 - 10	1 - 2	9	0 - 24	0 - 2	9	12 - 16	3 - 4
fringed sagewort	ARFR4	9	14 - 14	1 - 1	9	10 - 15	2 - 3	9	36 - 60	3 - 5	9	4 - 12	1 - 3
kinnikinnick	ARUV	9	0 - 14	0 - 1				9	0 - 24	0 - 2			
rose	ROSA5	9	14 - 28	1 - 2	9	5 - 10	1 - 2	9	24 - 48	2 - 4	9	4 - 8	1 - 2
skunkbush sumac	RHTR	9	0 - 14	0 - 1	9	0 - 5	0 - 1	9	0 - 24	0 - 2	9	0 - 4	0 - 1
winterfat	KRLA2	9	0 - 14	0 - 1				9	24 - 36	2 - 3			
yucca	YUGL	9	0 - 14	0 - 1	9	0 - 15	0 - 3	9	0 - 24	0 - 2	9	0 - 4	0 - 1
other shrubs	2SHRUB	9	0 - 14	0 - 1	9	0 - 5	0 - 1	9	0 - 12	0 - 1	9	0 - 4	0 - 1
CRYPTOGAMS		*10*	*0 - 14*	*0 - 1*	*10*	*5 - 10*	*1 - 2*	*10*	*0 - 12*	*0 - 1*	*10*	*20 - 40*	*5 - 10*
clubmoss	SEDE2	10	0 - 14	0 - 1	10	5 - 10	1 - 2	10	0 - 12	0 - 1	10	20 - 40	5 - 10

Annual Production lbs./acre	LOW	RV	HIGH	LOW	RV	HIGH	LOW	RV	HIGH	LOW	RV	HIGH
GRASSES & GRASS-LIKES	810	1239	1665	235	400	465	690	1014	1335	155	310	365
FORBS	65	105	145	45	63	80	55	90	125	15	30	45
SHRUBS	25	49	75	20	30	40	55	90	125	15	30	45
CRYPTOGAMS	0	7	15	0	8	15	0	6	15	15	30	45
TOTAL	900	1400	1900	300	500	600	800	1200	1600	200	400	500

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" (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/Needleandthread 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 fires. This plant community can be found on areas that are properly managed with grazing and/or prescribed burning, and sometimes on areas receiving occasional short periods of rest.

The potential vegetation is about 80 percent grasses or grass-like plants, 10 percent forbs, 7 percent shrubs, and 1 percent cryptogams. The major grasses include prairie sandreed, sand bluestem, needleandthread, and little bluestem. Other grasses include sideoats grama, blue grama, and plains muhly. Significant forbs include gayfeather, purple coneflower, prairie clover, and stiff sunflower. Significant shrubs are fringed sagewort, broom snakeweed, creeping juniper, and rose.

This plant community is well adapted to the Northern Great Plains climatic conditions. Individual species can vary greatly in production depending on growing conditions (timing and amount of precipitation and temperature). Community dynamics, nutrient cycle, water cycle, and energy flow are functioning properly. Plant litter is properly distributed with very little movement offsite and natural plant mortality is very low. The diversity in plant species allows for high drought tolerance. Low available water capacity provides an unfavorable 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 *Low Plant Density, Excessive Litter Plant Community*.
- Heavy, continuous grazing or continuous seasonal grazing (spring) will convert the plant community to the *Sedge Plant Community*.
- Excessive defoliation (i.e., areas of heavy animal concentration) and heavy continuous grazing will convert the plant community to the *Annual/Pioneer Perennial Plant Community*.
- Cropped go-back land with continuous grazing will convert this plant community to the *Annual/Pioneer Perennial Plant Community*.

Sedge Plant Community

This plant community is the result of long-term, heavy, continuous grazing and/or continuous seasonal grazing (annual, early spring seasonal grazing). Threadleaf sedge dominates the community. Other grasses that have increased are blue grama, red threeawn, and sand dropseed. Prairie sandreed and little bluestem have been significantly reduced. Sand bluestem and sideoats grama are mostly absent. Significant forbs include American pasqueflower, cutleaf ironplant, groundplum milkvetch, goldenrod, prairie coneflower, and scarlet globemallow. There is usually less than 10 percent bare ground. The significant shrubs include broom snakeweed, cactus, and fringed sagewort. This plant community can occur throughout the pasture, on spot grazed areas, and around water sources where season-long grazing patterns occur.

Species diversity has shifted from a predominantly tall warm-season grass community to a shortgrass/grass-like plant community. Production has been significantly decreased. 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 is an estimate of the monthly percentages of total annual growth of the dominant species expected during a normal year:
Growth curve number: ND5408
Growth curve name: Missouri Slope, Sedge Dominant.
Growth curve description: Cool-season, short grasses and grass-likes.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	10	30	25	20	5	5	2	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 adequate recovery periods will slowly lead this back to the *Prairie Sandreed/Bluestem/Needleandthread Plant Community (HCPC),* assuming an adequate seed/vegetative source exists.

- Heavy, continuous grazing will cause further deterioration resulting in a shift to the *Club Moss Plant Community*.

- Excessive defoliation (i.e., areas of heavy animal concentration) will convert the plant community to the *Annual/Pioneer Perennial Plant Community*.

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

Low Plant Density, Excessive Litter Plant Community

This plant community develops after an extended period of 15 or more years of non-use by herbivores and exclusion of fire. This plant community is dispersed throughout the pasture, encircling spot grazed areas, and areas distant from water sources. This is a typical pattern found in properly stocked pastures grazed season-long. Plant litter may accumulate as this plant community first develops. Due to a lack of tiller stimulation and sunlight, native bunchgrasses typically develop dead centers and native rhizomatous grasses are limited to colonies.

Standing decadent plants and moderate litter covers shorter understory species (i.e., short grasses and sedges), restricting their ability to capture adequate sunlight for photosynthesis. Vigor and diversity of native plants are reduced. Annual and/or biennial forbs, annual grasses, and cryptogams commonly fill interspaces once occupied by desirable species.

Kentucky bluegrass, crested wheatgrass, smooth bromegrass, cheatgrass, and sweetclover tend to invade and may dominate this plant community. Other grasses present include western wheatgrass, needleandthread, and red threeawn. The common forbs include green sagewort, prairie coneflower, and hairy goldaster. Fringed sagewort, rose, cactus, and yucca are principal shrubs and tend to increase in density and cover.

This plant community is resistant to change without prescribed grazing or fire. Grazing 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.

The following growth curve represents monthly percentages of total annual growth of the dominant species 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 *Prairie Sandreed/Bluestem/Needleandthread Plant Community (HCPC)*. This would require long-term management with prescribed grazing and/or prescribed burning under controlled conditions.

Club Moss Plant Community

This plant community typically occurs in the western portion of MLRA 54. A dense sod of club moss dominates this plant community. Club moss occupies bare soil areas within deteriorated or disturbed higher successional plant communities due to long-term repeated disturbances. Club moss cover is often 25 percent or greater. Club moss creates a more arid microclimate, resulting in extreme competition for available moisture. Vigor and production of other species is reduced dramatically.

Grasses and grass-like plants include western wheatgrass, needleandthread, blue grama, red threeawn, and threadleaf sedge. Forbs commonly found in this plant community include American pasqueflower, green sagewort, cutleaf ironplant, prairie coneflower, scarlet globemallow, and pussytoes. Significant shrubs include broom snakeweed, cactus, and creeping juniper.

This plant community is relatively resistant to change. The thick “sod-like” competitive advantage of the club moss and threadleaf sedge can prevent other species from expanding and establishing. This plant community is far less productive than the HCPC. Initial runoff rates are low but then increase as clubmoss becomes saturated. Once clubmoss has been saturated then runoff increases and infiltration decreases as compared HCPC. Soil erosion will be minimal.

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

- Fertilization followed by prescribed grazing will move this community through the successional stages, eventually leading toward the *Prairie Sandreed/Bluestem/Needleandthread Plant Community*.

- Mechanical renovation followed by prescribed grazing will reduce club moss, increase western wheatgrass, and eventually shift this plant community back toward the *Prairie Sandreed/Bluestem/Needleandthread Plant Community*.

- Long-term prescribed grazing, including changing season of use and adequate recovery periods, will move this plant community to either the *Sedge Plant Community* or the *Prairie Sandreed/Bluestem/Needleandthread Plant Community (HCPC),* assuming an adequate seed/vegetative source exists. This transition may take greater than 25 years to accomplish.

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

- Excessive defoliation (i.e., areas of heavy animal concentration,) will convert the plant community to the *Annual/Pioneer Perennial Plant Community*.

Annual/Pioneer Perennial Plant Community

This plant community develops under severe disturbance and/or excessive defoliation. This can result from heavy livestock or wildlife concentration, and cropping abandonment (go-back land). The dominant vegetation includes pioneer annual grasses, forbs, invaders, and early successional biennial, and perennial species. Grasses may include red threeawn, smooth bromegrass, crested wheatgrass, annual brome, needleandthread, sand dropseed, sandbur, Scribner's Panicum, and little bluestem. The dominant forbs include curlycup gumweed, marestail, salsify, kochia, field bindweed, thistles, western ragweed, pussytoes, prostrate verbena, and other early successional species. Shrubs that may be present include prairie rose, fringed sagewort and broom snakeweed. Plant species from adjacent ecological sites may become minor components of this plant community. The community also is susceptible to invasion of nonnative species due to severe soil disturbances and relatively high percent of bare ground. Many annual and perennial forbs, including nonnative species, have invaded the site.

This plant community is resistant to change, as long as disturbance persists, thus holding back secondary plant succession. Soil erosion is potentially high. Significant economic inputs, management, and time would be required to move this community toward a higher successional stage and a more productive plant community. Secondary succession is highly variable, depending upon availability and diversity of a viable seed bank of higher successional species within the existing plant community and neighboring plant communities. This plant community can be renovated to improve the production capability, but management changes would be needed to maintain the new plant community.

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

- Removal of disturbance and long-term prescribed grazing, including changing season of use and adequate recovery periods, will move this community through the successional stages, and may eventually lead to a plant community resembling the *Prairie Sandreed/Bluestem/ Needleandthread 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/Needleandthread Plant Community (HCPC):

Low Plant Density, Excessive Litter Plant Community:

Sedge Plant Community:

Club Moss Plant Community:

Annual/Pioneer Perennial Plant Community:

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

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
Grasses & Grass-likes							
blue grama	U D P U	D P P D	U D P U	D P P D	D P P D	U D P U	U D P U
bluebunch wheatgrass	U P D D	P P P P	U P D D	D D D D	D D D D	U P D D	U P D D
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
crested wheatgrass	U P U D	U P N N	U P U D	U P N N	U P N N	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
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
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
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
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
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
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
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
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
blanketflower	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
cinquefoil	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
cudweed sagewort	U U U U	U U D U	U U U U	U U D U	U U D U	U U U U	U U D U
cutleaf ironplant	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
gayfeather	U U D U	U P P U	U U D U	U P P U	U P P U	U U D U	U P P U
goldenrod	U U D U	N U U N	U U D U	N U U N	N U U N	U U D U	N U U N
green sagewort	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U
groundplum milkvetch	U D U U	U D D U	U D U U	U D D U	U D D U	U D U U	U D D U
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
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
Lambert crazyweed	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T
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
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
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
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 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
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							
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
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
kinnikinnick	N N N N	D U D P	N N N N	D U D P	D U U D	N N N N	D U D P
rose	U D D U	U D D U	U D D U	U D D U	U D D U	U D D U	U D D U
skunkbush sumac	D U U D	D U U D	D U U D	D U U D	D U U D	D U U D	D U U D
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
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
Cryptogams							
clubmoss	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

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)
Prairie Sandreed/Bluestem/Needleandthread	1400	0.44 [2]
Low Plant Density, Excessive Litter	1200	0.38 [2]
Sedge	500	0.16
Club Moss	400	0.13
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 onsite.

Hydrology Functions

Water is the principal factor limiting herbage production on this site. The site is dominated by soils in hydrologic groups D and B. Infiltration varies from moderate to rapid and runoff potential varies from low to medium depending on soil hydrologic group and ground cover. In many cases, areas with greater than 75 percent ground cover have the greatest potential for high infiltration and lower runoff. An exception would be where short grasses form a dense sod and dominate. 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

(054XY025ND) – Sands
(054XY026ND) – Sandy
(054XY034ND) – Thin Sands
(054XY045ND) – Limy Sands
(054XY035ND) – Very Shallow

Similar Sites

(054XY025ND) – Sands (Sa)

[Does not receive additional moisture. Found on dry uplands, upslope from sandy terraces or loamy overflow sites, down slope from limy sands or shallow sandy 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, less little bluestem, blue grama, and sedges, more prairie sandreed and sand bluestem, no restrictive layer within twenty inches, usually different landscape positions.]

(054XY026ND) – Sandy (Sy)

[Does not receive additional moisture. Found on dry uplands upslope from sandy terraces or loamy overflow sites, down slope from limy sands or shallow sandy 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, no limiting layer above 20 inches, less little bluestem, plains muhly, sideoats grama, more prairie sandreed, usually different landscape positions.]

(054XY027ND) – Sandy Claypan (SyCp)

[Well drained soils on uplands and terraces that don't receive extra moisture with a dense sodic subsoil below 6 inches with salts below 16 inches. Subsoil will ribbon up to one inch. Indicator species are western wheatgrass intermixed with areas of prairie sandreed both dominating with an understory of needleandthread and blue grama, heath aster, cudweed sagewort, and western yarrow along with fringed sagewort. This site has more production, a limiting layer above 20 inches but with a dense sodic subsoil below 6 inches with salts below 16 inches, less little bluestem, plains muhly, sideoats grama, more western wheatgrass, usually different landscape positions.]

(054XY038ND) – Thin Loamy (TLy)

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

(054XY034ND) – Thin Sands (TSa)

[Deep entisol found on knobs and ridges of level to choppy sand blown plains; will not ribbon, found upslope from sands and sandy terrace sites; won't ribbon. Indicator species: Sand bluestem, prairie sandreed and needleandthread, evenly mixed, some Canada wildrye, penstemon, lemon scurfpea western ragweed, yucca, silky prairie clover, and leadplant. This site has similar production, more little bluestem, sand bluestem, and sedges, less needleandthread, no restrictive layer within 20 inches.]

(054XY045ND) – Limy Sands (LSa)

[Moderately deep entisol, usually calcareous within four 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 more production, more little bluestem, porcupinegrass, big bluestem, or sand bluestem, and less blue grama, less plains muhly, sedges, and needleandthread, no restrictive layer within 20 inches.]

(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 two inches and greater than one 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, purple coneflower, and purple prairie clover, and shrubs like broom snakeweed. This site has similar species but less little bluestem, sand bluestem, prairie sandreed, and sedges, more plains muhly, green needlegrass, western wheatgrass, restrictive layer above 20 inches is not sandstone or gravels, slightly less production.]

(054XY035ND) – Very Shallow (VS)
[Excessively well drained soils less than 10 inches to scoria or gravels bedrock that restricts root penetration, upslope of shallow clayey, shallow loamy, or shallow sandy ecological sites. Indicator species are little bluestem, sideoats grama, blue grama, purple coneflower, pasqueflower, and creeping juniper. This site has similar species but more needleandthread, blue grama, and little bluestem, less prairie sandreed, sand bluestem, restrictive layer above10 inches bedrock or gravels, less production.]

Inventory Data References

Information presented here has been derived from NRCS clipping and other inventory data. Also, field knowledge of range-trained personnel was used. All descriptions were peer reviewed and/or field tested by various private, state, and federal agency specialists.

Those involved in developing this site description include: 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; Dean Chamrad, NRCS State 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	10	1968 – 1986	ND	Adams, Grant, Slope
Ocular estimate	5	2000 – 2001	ND	Bowman, Dunn,

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://www.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

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State Range Management Specialist Date

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State Range Management Specialist Date

_____ _____
State Range Management Specialist Date