

United States Department of Agriculture Natural Resources Conservation Service

Ecological Site Description

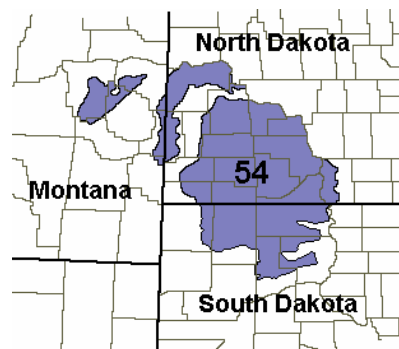
Site Name: Shallow Clayey

Site Type: Rangeland

Site ID: R054XY028ND

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_1rr/



Physiographic Features

This site occurs on gently sloping to very steep sedimentary uplands.

Landform: hill, knoll and ridge

Aspect: NA

	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	1600	3600
Slope (percent):	2	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:	High	Very 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.

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

Average Monthly Precipitation (inches) and Temperature (°F):

	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 silty clay to clay-textured substratum and slopes of 2 to 35 percent. The soils in this site are well drained and formed in shale. The surface layer is 1 to 6 inches thick. The soils have a slow to very slow infiltration rate. This site should show slight to no evidence of rills, wind scoured areas or pedestalled plants. Water flow paths are broken, irregular in appearance or discontinuous with numerous debris dams or vegetative barriers. The soil surface is stable and intact.

These soils are mainly susceptible to water erosion. The hazard of water erosion increases on slopes greater than about 5 percent. Low available water capacity and very slow permeability strongly influences the soil-water-plant relationship. 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: shale
Parent Material Origin: shale, unspecified
Surface Texture: silty clay loam, silty clay, clay
Surface Texture Modifier: none
Subsurface Texture Group: clayey
Surface Fragments ≤ 3" (% Cover): 0
Surface Fragments > 3" (%Cover): 0
Subsurface Fragments ≤ 3" (% Volume): 0-10
Subsurface Fragments > 3" (% Volume): 0-5

	<u>Minimum</u>	<u>Maximum</u>
Drainage Class:	well	well
Permeability Class:	very slow	moderately slow
Depth to first restrictive layer (inches):	10	20
Electrical Conductivity (mmhos/cm)*:	0	8
Sodium Absorption Ratio*:	0	4
Soil Reaction (1:1 Water)*:	6.1	9.0
Soil Reaction (0.1M CaCl₂)*:	NA	NA
Available Water Capacity (inches)*:	1	3
Calcium Carbonate Equivalent (percent)*:	0	25

* - 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).

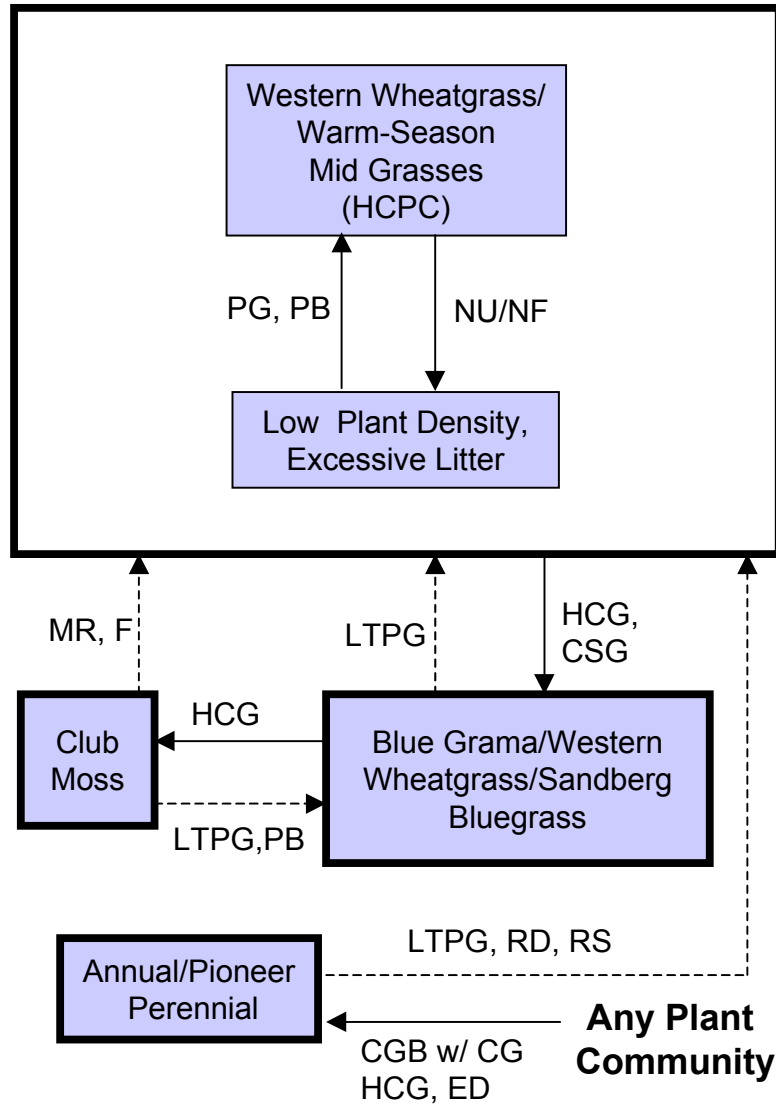
The plant community upon which interpretations are primarily based is the HCPC. The HCPC has been determined by study of rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily grazed to lightly grazed areas, seasonal use pastures, and historical accounts also have been considered. Subclimax plant communities, states, transitional pathways, and thresholds have been determined through similar studies and experience.

Continuous grazing without adequate recovery periods following each grazing occurrence over several years causes this site to depart from the HCPC. Species such as western wheatgrass and blue grama will initially increase. Little bluestem, green needlegrass, plains muhly and sideoats grama will decrease in frequency and production. Heavy continuous grazing causes blue grama to increase and eventually dominates 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 no fire will result in a plant community having high litter levels, which favors an increase in Sandberg bluegrass and the invasion of Kentucky bluegrass and/or smooth brome grass. In time, shrubs such as silver sagebrush and rubber rabbitbrush 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; **F** - fertilization followed by prescribed grazing; **HCPC** - Historical Climax Plant Community; **HCG** - heavy continuous grazing; **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

		Western Wheatgrass/Warm-Season Mid Grasses (HCPC)		
COMMON/GROUP NAME	SYMBOL	Group	lbs./acre	% Comp
GRASSES & GRASS-LIKES			960 - 1080	80 - 90
COOL-SEASON MID GRASSES		1	420 - 540	35 - 45
western wheatgrass	PASM	1	380 - 480	30 - 40
thickspike wheatgrass	ELLAL	1	0 - 120	0 - 10
green needlegrass	NAV14	1	80 - 120	5 - 10
WARM-SEASON MID GRASSES		2	120 - 180	10 - 15
plains muhly	MUCU3	2	60 - 120	5 - 10
little bluestem	SCSC	2	60 - 120	5 - 10
sideoats grama	BOCU	2	60 - 120	5 - 10
OTHER WARM-SEASON GRASSES		3	60 - 120	5 - 10
blue grama	BOGR2	3	36 - 96	3 - 8
buffalograss	BUDA	3	0 - 24	0 - 2
inland saltgrass	DISP	3	24 - 36	2 - 3
dropseed	SPORO	3	0 - 12	0 - 1
OTHER NATIVE GRASSES		4	60 - 96	5 - 8
needleandthread	HECOC8	4	24 - 36	2 - 3
plains reedgrass	CAMO	4	24 - 36	2 - 3
prairie junegrass	KOMA	4	24 - 36	2 - 3
Sandberg bluegrass	POSE	4	36 - 60	3 - 5
other perennial grasses	2GP	4	12 - 24	1 - 2
other annual grasses	2GA	4	0 - 12	0 - 1
GRASS-LIKES		5	12 - 12	1 - 1
needleleaf sedge	CADU6	5	12 - 12	1 - 1
other grass-like	2GL	5	0 - 12	0 - 1
FORBS		6	60 - 120	5 - 10
blanketflower	GAAR	6	12 - 12	1 - 1
cudweed sagewort	ARLU	6	0 - 12	0 - 1
erigonum	ERIOG	6	12 - 12	1 - 1
gayfeather	LIATR	6	12 - 24	1 - 2
goldenpea	THRH	6	0 - 12	0 - 1
heath aster	SYER	6	12 - 12	1 - 1
Lambert crazyweed	OXLA3	6	12 - 12	1 - 1
Missouri goldenrod	SOM12	6	12 - 24	1 - 2
Nuttall's violet	VINU2	6	12 - 12	1 - 1
povertyweed	IVAX	6	0 - 12	0 - 1
prairie coneflower	RACO3	6	12 - 24	1 - 2
prairie smoke	GETR	6	12 - 12	1 - 1
purple coneflower	ECAN2	6	12 - 12	1 - 1
rose pussytoes	ANRO2	6	0 - 12	0 - 1
rush skeletonweed	LYJU	6	12 - 12	1 - 1
scarlet globemallow	SPCO	6	12 - 12	1 - 1
silverleaf scurfpea	PEAR6	6	12 - 24	1 - 2
sticky cinquefoil	POGL9	6	12 - 12	1 - 1
wavyleaf thistle	CIUN	6	0 - 12	0 - 1
western yarrow	ACM12	6	12 - 24	1 - 2
wild onion	ALLIU	6	12 - 12	1 - 1
wild parsley	MUDI	6	12 - 12	1 - 1
woolly Indianwheat	PLPA2	6	0 - 12	0 - 1
native forbs	2FORB	6	0 - 24	0 - 2
SHRUBS		7	60 - 120	5 - 10
big sagebrush	ARTR2	7	0 - 24	0 - 2
broom snakeweed	GUSA2	7	12 - 12	1 - 1
fringed sagewort	ARFR4	7	12 - 24	1 - 2
Nuttall's saltbush	ATNU2	7	0 - 12	0 - 1
plains pricklypear	OPPO	7	0 - 12	0 - 1
purple pincushion	ESVIV	7	0 - 12	0 - 1
rubber rabbitbrush	ERNA10	7	12 - 24	1 - 2
silver sagebrush	ARCA13	7	12 - 24	1 - 2
winterfat	KRLA2	7	24 - 36	2 - 3
other shrubs	2SHRUB	7	0 - 24	0 - 2
CRYPTOGAMS		8	0 - 12	0 - 1
clubmoss	SEDE2	8	0 - 12	0 - 1

Annual Production lbs./acre	LOW	RV	HIGH
GRASSES & GRASS-LIKES	490 -	1014	- 1135
FORBS	55 -	90	- 125
SHRUBS	55 -	90	- 125
CRYPTOGAMS	0 -	6	- 15
TOTAL	600 -	1200	- 1400

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

Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SYMBOL	Western Wheatgrass/Warm-Season Mid Grasses (HCPC)			Blue Grama/Western Wheatgrass/Sandberg Bluegrass			Low Plant Density, Excessive Litter			Clubmoss		
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp
GRASSES & GRASS-LIKES													
COOL-SEASON MID GRASSES													
western wheatgrass	PASM	1	360 - 480	30 - 40	1	28 - 40	7 - 10	1	180 - 270	20 - 30	1	15 - 24	5 - 8
thickspike wheatgrass	ELLAL	1	0 - 120	0 - 10	1	0 - 8	0 - 2	1	0 - 45	0 - 5	1	0 - 3	0 - 1
green needlegrass	NAVIA	2	60 - 120	5 - 10									
WARM-SEASON MID GRASSES													
plains muhly	MUCU3	2	60 - 120	5 - 10	2	4 - 8	1 - 2	2	9 - 45	1 - 5	2	0 - 3	0 - 1
little bluestem	SCSC	2	60 - 120	5 - 10	2	8 - 20	2 - 5		9 - 45	1 - 5	2	0 - 3	0 - 1
sideoats grama	BOCU	2	60 - 120	5 - 10				2	9 - 9	1 - 1			
OTHER WARM-SEASON GRASSES													
blue grama	BOGR2	3	36 - 96	3 - 8	3	80 - 120	20 - 30	3	18 - 45	2 - 5	3	90 - 105	30 - 35
buffalograss	BUDA	3	0 - 24	0 - 2	3	4 - 8	1 - 2	3	9 - 9	1 - 1	3	9 - 15	3 - 5
dropseed	SPORO	3	0 - 12	0 - 1	3	4 - 12	1 - 3	3	0 - 9	0 - 1	3	6 - 15	2 - 5
inland saltgrass	DISP	3	24 - 36	2 - 3	3	8 - 16	2 - 4	3	0 - 9	0 - 1	3	12 - 30	4 - 10
tumblegrass	SCPA				3	4 - 8	1 - 2	3	0 - 9	0 - 1			
OTHER NATIVE GRASSES													
needleandthread	HECOC8	4	24 - 36	2 - 3	4	20 - 40	5 - 10	4	18 - 36	2 - 4	4	12 - 24	4 - 8
plains reedgrass	CAMO	4	24 - 36	2 - 3	4	4 - 8	1 - 2				4	0 - 3	0 - 1
prairie junegrass	KOMA	4	24 - 36	2 - 3	4	8 - 12	2 - 3	4	9 - 18	1 - 2	4	9 - 15	3 - 5
red threeawn	ARPUL				4	20 - 40	5 - 10	4	36 - 45	4 - 5	4	12 - 24	4 - 8
Sandberg bluegrass	POSE	4	36 - 60	3 - 5	4	40 - 60	10 - 15	4	90 - 135	10 - 15	4	15 - 30	5 - 10
other perennial grasses	2GP	4	12 - 24	1 - 2	4	4 - 8	1 - 2	4	0 - 9	0 - 1	4	3 - 6	1 - 2
other annual grasses	2GA	4	0 - 12	0 - 1	4	4 - 8	1 - 2	4	0 - 9	0 - 1	4	3 - 6	1 - 2
GRASS-LIKES													
needleleaf sedge	CADU6	5	12 - 12	1 - 1	5	4 - 8	1 - 2	5	18 - 27	2 - 3	5	0 - 3	0 - 1
other grass-likes	2GL	5	0 - 12	0 - 1	5	0 - 4	0 - 1	5	0 - 9	0 - 1			
NON-NATIVE GRASSES													
bluegrass	POA							6	81 - 135	9 - 15			
smooth bromegrass	BRIN2							6	0 - 45	0 - 5			
cheatgrass	BRTE				6	0 - 8	0 - 2	6	0 - 18	0 - 2	6	0 - 6	0 - 2
crested wheatgrass	AGCR							6	0 - 45	0 - 5			
FORBS													
blanketflower	GAAR	7	12 - 12	1 - 1	7	0 - 4	0 - 1	7	0 - 9	0 - 1			
cudweed sagewort	ARLU	7	0 - 12	0 - 1	7	8 - 12	2 - 3	7	27 - 45	3 - 5	7	12 - 15	4 - 5
cutleaf ironplant	MAPI				7	4 - 8	1 - 2				7	9 - 12	3 - 4
erigonum	ERIOG	7	12 - 12	1 - 1	7	4 - 4	1 - 1	7	9 - 9	1 - 1	7	0 - 3	0 - 1
gayfeather	LIATR	7	12 - 24	1 - 2	7	4 - 4	1 - 1	7	9 - 9	1 - 1	7	0 - 3	0 - 1
goldenpea	THRH	7	0 - 12	0 - 1	7	4 - 8	1 - 2	7	9 - 9	1 - 1	7	3 - 6	1 - 2
health aster	SYER	7	12 - 12	1 - 1	7	8 - 12	2 - 3	7	18 - 27	2 - 3	7	9 - 12	3 - 4
Lambert's crazyweed	#NIA	7	12 - 12	1 - 1	7	8 - 12	2 - 3	7	9 - 9	1 - 1	7	9 - 12	3 - 4
Missouri goldenrod	SOMI2	7	12 - 24	1 - 2	7	0 - 4	0 - 1	7	0 - 9	0 - 1			
Nuttall's violet	VINU2	7	12 - 12	1 - 1	7	0 - 4	0 - 1	7	0 - 9	0 - 1			
povertyweed	IVAX	7	0 - 12	0 - 1	7	4 - 8	1 - 2	7	9 - 18	1 - 2	7	6 - 9	2 - 3
prairie coneflower	RACO3	7	12 - 24	1 - 2	7	8 - 12	2 - 3	7	18 - 27	2 - 3	7	9 - 12	3 - 4
prairie smoke	GETR	7	12 - 12	1 - 1	7	0 - 4	0 - 1	7	9 - 9	1 - 1			
purple coneflower	ECAN2	7	12 - 12	1 - 1	7	0 - 4	0 - 1	7	9 - 9	1 - 1			
rose pussytoes	ANRO2	7	0 - 12	0 - 1	7	4 - 8	1 - 2	7	9 - 9	1 - 1	7	6 - 9	2 - 3
rush skeletonweed	LYJU	7	12 - 12	1 - 1	7	4 - 8	1 - 2	7	9 - 9	1 - 1	7	6 - 9	2 - 3
scarlet globemallow	SPCO	7	12 - 12	1 - 1	7	4 - 8	1 - 2	7	9 - 9	1 - 1	7	6 - 9	2 - 3
silverleaf scurfpea	PEAR6	7	12 - 24	1 - 2	7	8 - 12	2 - 3	7	18 - 27	2 - 3	7	9 - 12	3 - 4
sticky cinquefoil	POGL9	7	12 - 12	1 - 1	7	4 - 4	1 - 1	7	9 - 9	1 - 1	7	3 - 6	1 - 2
sweetclover	MELIL				7	0 - 8	0 - 2	7	0 - 90	0 - 10	7	0 - 12	0 - 4
wayleaf thistle	CIUN	7	0 - 12	0 - 1	7	4 - 8	1 - 2	7	9 - 27	1 - 3	7	6 - 9	2 - 3
western salsify	TRDU				7	0 - 4	0 - 1	7	9 - 18	1 - 2	7	3 - 6	1 - 2
western yarrow	ACMI2	7	12 - 24	1 - 2	7	8 - 12	2 - 3	7	9 - 18	1 - 2	7	6 - 9	2 - 3
wild onion	ALLIU	7	12 - 12	1 - 1	7	4 - 8	1 - 2	7	0 - 9	0 - 1	7	0 - 3	0 - 1
wild parsley	MUDI	7	12 - 12	1 - 1	7	0 - 4	0 - 1	7	9 - 18	1 - 2			
woolly Indianwheat	PLPA2	7	0 - 12	0 - 1	7	4 - 8	1 - 2	7	9 - 9	1 - 1	7	6 - 9	2 - 3
native forbs	2FORB	7	0 - 24	0 - 2	7	0 - 4	0 - 1	7	9 - 18	1 - 2	7	0 - 3	0 - 1
non-native forbs	2FORB				7	0 - 4	0 - 1	7	9 - 18	1 - 2	7	0 - 3	0 - 1
SHRUBS													
big sagebrush	ARTR2	8	0 - 24	0 - 2	8	0 - 12	0 - 3	8	0 - 27	0 - 3	8	0 - 18	0 - 6
broom snakeweed	GUSA2	8	12 - 12	1 - 1	8	8 - 12	2 - 3	8	9 - 18	1 - 2	8	12 - 18	4 - 6
creeping juniper	JUHO2				8	4 - 8	1 - 2	8	9 - 18	1 - 2	8	6 - 9	2 - 3
fringed sagewort	ARFR4	8	12 - 24	1 - 2	8	20 - 40	5 - 10	8	27 - 45	3 - 5	8	15 - 30	5 - 10
Nuttall's saltbush	ATNU2	8	0 - 12	0 - 1	8	0 - 8	0 - 2	8	18 - 27	2 - 3			
plains pricklypear	OPPO	8	0 - 12	0 - 1	8	4 - 8	1 - 2	8	36 - 45	4 - 5	8	9 - 12	3 - 4
purple pincushion	ESVIV	8	0 - 12	0 - 1	8	0 - 4	0 - 1	8	9 - 18	1 - 2	8	0 - 3	0 - 1
rubber rabbitbrush	ERNA10	8	12 - 24	1 - 2	8	12 - 16	3 - 4	8	36 - 45	4 - 5	8	12 - 15	4 - 5
silver sagebrush	ARCA13	8	12 - 24	1 - 2	8	8 - 12	2 - 3	8	27 - 36	3 - 4	8	9 - 12	3 - 4
winterfat	KRLA2	8	24 - 36	2 - 3	8	0 - 4	0 - 1	8	18 - 27	2 - 3			
other shrubs	2SHRUB	8	0 - 24	0 - 2	8	0 - 4	0 - 1	8	18 - 27	2 - 3	8	0 - 3	0 - 1
CRYPTOGAMS													
clubmoss	SEDE2	9	0 - 12	0 - 1	9	8 - 12	2 - 3	9	0 - 9	0 - 1	9	15 - 24	5 - 8
Annual Production lbs./acre													
		LOW	RV	HIGH	LOW	RV	HIGH	LOW	RV	HIGH	LOW	RV	HIGH
GRASSES		490	1014	-1135	225	294	-465	475	716	-1055	140	206	-275
FORBS		55	90	-125	35	50	-65	85	113	-140	25	38	-50
SHRUBS		55	90	-125	35	48	-55	40	68	-95	25	38	-50
CRYPTOGAMS		0	6	-15	5	10	-15	0	5	-10	10	20	-25
TOTAL		600	1200	-1400	300	400	-600	600	900	-1300	200	300	-400

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 and 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.

Western Wheatgrass/Warm-Season Mid Grasses Plant Community

This is the interpretive plant community 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 79% grasses or grass-like plants, 10% forbs, 10% shrubs and 1% cryptogams. The plant community is dominated by both cool season and mid warm-season grasses. The co-dominant grasses include western wheatgrass, green needlegrass, plains muhly, little bluestem and sideoats grama. Other grasses and grass-like plants present include needleandthread, thickspike wheatgrass, blue grama, buffalograss, inland salt, Sandberg bluegrass, prairie junegrass, plains reedgrass, and sedges. Significant forbs include prairie coneflower, dotted gayfeather, Missouri goldenrod, silverleaf scurfpea, eriogonum, wild parsley and cudweed sagewort, silverleaf scurfpea and Missouri goldenrod. Rubber rabbitbrush, Gardner’s saltbush, winterfat and silver sagebrush are the principal shrub and occur randomly throughout the site. Other shrubs include plains pricklypear, purple pincushion, broom snakeweed and fringed sagewort.

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 the annual growth of the dormant species expected during the 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 will convert the plant community to the *Blue Grama/Western Wheatgrass/Sandberg Bluegrass 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* or the *Club Moss Plant Community*.

Blue Grama/Western Wheatgrass/Sandberg Bluegrass Plant Community

This plant community can quickly result from heavy, continuous grazing and/or annual, early spring seasonal grazing. Annual, grazing too early in the spring depletes stored carbohydrates, resulting in weakening and eventual death of the cool season mid-grasses. Short grasses, low vigor western wheatgrass and unpalatable forbs increase to dominate the site, and annual production decreases dramatically. Lack of litter and reduced plant vigor result in higher soil temperatures, poor water infiltration rates, and high evapotranspiration, which gives blue grama and early cool season species like Sandberg bluegrass a competitive advantage over both the cool and warm season mid-grasses. This plant community can occur throughout the pasture, on spot grazed areas, and around water sources where season-long grazing patterns occur.

Blue grama, western wheatgrass and Sandberg bluegrass are the dominant species with the balance being a few species of cool-season grasses and warm-season grasses including inland saltgrass, little bluestem, plains muhly, buffalograss, prairie junegrass, plains reedgrass, needleandthread, and annual grasses. Forbs such as hairy golden aster, heath aster, Lambert’s crazyweed, prairie coneflower, scarlet globemallow, scurfpea, curlycup gumweed, goldenpea and western yarrow will also be present. There is usually less than 15% bare ground.

This plant community is relatively stable. The thick sod and 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 due to the sod forming habit of blue grama.

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:

- Heavy, continuous grazing may cause further deterioration resulting in a shift to the *Club Moss Plant Community*.
- Heavy, continuous grazing and/or excessive defoliation may shift this plant community to the *Annual/Pioneer Perennial Plant Community*.
- Long-term prescribed grazing that includes changing season of use and allowing adequate recovery periods to enhance the mid grasses may eventually moves this plant community through the successional stages leading toward the *Western Wheatgrass/Warm-Season Mid Grasses 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, green needlegrass, prairie junegrass, Sandberg bluegrass and sedges with lesser amounts of plains muhly, little bluestem, blue grama, sideoats grama, and inland saltgrass. The common forbs include dotted gayfeather, Missouri goldenrod, prairie coneflower, silverleaf scurfpea, western yarrow and heath aster. Fringed sagewort, silver sagebrush, rubber rabbitbrush, Gardner's saltbush, broom snakeweed and winterfat are the principal shrubs.

This plant community is resistant to change without prescribed grazing or fire. The combination of both grazing and fire is most effective in moving this plant community towards the HCPC. Soil erosion is low. Compared to the HCPC, infiltration is reduced to the lower root zone. Runoff is similar to the HCPC. This plant community tends to favor early cool season plant species which are moisture loving and usually tends to utilize the spring moisture quickly causing the forage base to become dry and not very palatable early in the summer. Once this plant community is reached, any of the preferred treatments can readily return the diversity and production 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 *Western Wheatgrass/Warm-Season Mid Grasses Plant Community*. 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% 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.

Blue grama, western wheatgrass and Sandberg bluegrass are the dominant grass species with the balance being a few species of cool-season grasses and warm-season grasses including, inland saltgrass, buffalograss, prairie junegrass and annual grasses. Sedges are typically not found. Forbs such as hairy goldaster, heath aster, Lambert’s crazyweed, scarlet globemallow, scurfpea, curlycup gumweed, goldenpea and western yarrow will also be present. There is usually less than 10% bare ground.

This plant community is very resistant to change. The thick sod and competitive advantage of both the clubmoss and the blue grama prevents 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 & 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 combined with prescribed grazing will move this plant community subsequently through the successional stages leading toward the *Western Wheatgrass/Warm-Season Mid Grasses Plant Community*.
- Mechanical renovation followed by prescribed grazing will reduce club moss, increase western wheatgrass, and eventually shift this plant community back toward the *Western Wheatgrass/Warm-Season Mid Grasses Plant Community*.
- Prescribed burning followed by prescribed grazing may eventually convert this plant community back to the *Blue Grama/Western Wheatgrass/Sandberg Bluegrass Plant Community*.
- Long-term prescribed grazing may eventually move this plant community through the successional stages leading toward the *Blue Grama/Western Wheatgrass/Sandberg Bluegrass Plant Community*.
- Heavy, continuous grazing and/or excessive defoliation may shift this plant community to the *Annual/Pioneer Perennial Plant Community*.

Annual/Pioneer Perennial Plant Community

This plant community develops under severe disturbance and/or excessive defoliation. This can result from heavy livestock or wildlife concentration, and cropping abandonment (go-back land). The dominant vegetation includes pioneer annual grasses, forbs, invaders, and early successional biennial and perennial species. Grasses may include red threeawn, sixweeks fescue, smooth brome, crested wheatgrass, annual brome, needleandthread, prairie junegrass, western wheatgrass and little bluestem.. The dominant forbs include curlycup gumweed, marestalk, 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 other non-native species due to severe soil disturbances and relatively high percent of bare ground.

Compared to the HCPC western wheatgrass and blue grama have decreased drastically or even disappeared while green needlegrass, plains muhly, sideoats grama, little bluestem have completely disappeared. 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 persist, 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 300 to 1100 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) *Western Wheatgrass/ Warm-Season Mid 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).
- Range seeding with deferment and prescribed grazing can convert this to a plant community resembling the *Western Wheatgrass/Warm-Season Mid Grasses Plant Community*.

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

-- Under Development --

Western Wheatgrass/Warm-Season Mid Grasses Plant Community:

Blue Grama/Western Wheatgrass/Sandberg Bluegrass Plant Community:

Club Moss Plant Community:

Low Plant Density, 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
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
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
buffalograss	U U D U	N U D U	U U D U	N U D U	N U D U	U U D U	U U D 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
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
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
needleleaf 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
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
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
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							
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
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
erigonum	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
goldenpea	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
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
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
Missouri 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
Nuttall's violet	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
povertyweed	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
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
rose 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
silverleaf 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
sticky cinquefoil	N N N N	N U D N	N N N N	N U D N	N U D N	N N N N	N U D N
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
wild parsley	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
woolly Indianwheat	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
Shrubs							
big sagebrush	U N U U	D U U D	U N U U	P U D P	P P P P	U N U U	D U U U
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
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
Nuttall's saltbush	P D D P	P D D P	P D D P	P D D P	P D D P	P D D P	P D D P
plains pricklypear	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
purple pincushion	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
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 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
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
Mosses							
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)
Western Wheatgrass/Warm-Season Mid Grasses	1200	0.38
Blue Grama/Western Wheatgrass/Sandberg Bluegrass	400	0.13
Club Moss	300	0.10
Low Plant Density, Excessive Litter	900	0.28 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 groups D. Infiltration is low and runoff potential for this site varies from moderate 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

Seed harvest of native plant species can provide additional income on this site.

Supporting Information

Associated Sites

(054XY020ND) – Clayey

(054XY035ND) – Very Shallow

Similar Sites

(054XY020ND) – Clayey (Cy)

[Does not receive additional moisture. Found on dry uplands, upslope from loamy or clayey terraces or loamy overflow sites, down slope from thin loamy, shallow loamy or shallow clayey sites. Similar landscape position as sandy, sands, and loamy sites. Will ribbon greater than 2 inches. Indicator species: dominated by of western wheatgrass and green needlegrass. This site has more production, different landscape position, no restrictive shales above twenty inches, no little bluestem, plains muhly, and sideoats grama, more western wheatgrass and green needlegrass.]

(054XY021ND) – Claypan (Cp)

[Well drained soils on uplands or terraces that don't receive extra moisture with a dense sodic subsoil below 6 inches with salts below 16 inches. Indicator species are western wheatgrass with an understory of blue grama, heath aster, and western yarrow along with a few shrubs of fringed sagewort and Nuttall's Saltbush. This site has no little bluestem, plains muhly, sideoats grama, less green needlegrass, more blue grama and needleandthread, similar production, different restrictive layer.]

(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, purple coneflower and purple prairie clover, and shrubs like broom snakeweed. This site has similar species but more little bluestem, and sideoats, less plains muhly, green needlegrass, western wheatgrass, restrictive layer above twenty inches is sedimentary bedrock, slightly more production.]

(054XY043ND) – Shallow Sandy (SwSy)

[Some what excessively drained soils more than 10 less than 20 inches to sedimentary sandstone bedrock and/or gravels that restricts root penetration. Surface layer will ribbon less than 1 inch unless above gravels than more than 1 but less than 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 needle grasses, with dotted gayfeather, pasqueflower, purple coneflower and purple prairie clover, 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, western wheatgrass, restrictive layer above twenty inches is sandstone or gravels, slightly more production.]

(054XY033ND) – Thin Claypan (TCp)

[Well drained soils on uplands or terraces that don't receive extra moisture with a dense sodic subsoil above 6 inches and with salts above 16 inches that restricts root penetration. Usually found in micro relief within Claypan sites, indicator species are western wheatgrass, Sandberg's bluegrass with an understory of blue grama and buffalograss, heath aster, cudweed sagewort and western yarrow along with a few shrubs of fringed sagewort, cactus and Nuttall's Saltbush. This site has no little bluestem, plains muhly, sideoats grama, less green needlegrass, more blue grama and needleandthread, less production, different restrictive layer at less than 6 inches and salts above 16 inches.]

(054XY035ND) – Very Shallow (VS)

[Excessively well drained soils less than 10 inches to scoria or gravel 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 plains muhly, green needlegrass, western wheatgrass, restrictive layer above 10 inches is scoria 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 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; David Dewald, NRCS State Biologist; and Brad Podoll, NRCS Biologist.

<u>Data Source</u>	<u>Number of Records</u>	<u>Sample Period</u>	<u>State</u>	<u>County</u>
SCS-RANGE-417	5	1984 – 1989	ND, SD	Bowman, Dewey
Ocular Estimates	2	1998	ND	Bowman

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