

United States Department of Agriculture Natural Resources Conservation Service

Ecological Site Description

Site Type: Rangeland

Site Name: Very Shallow

Site ID: R060AY016SD

Major Land Resource Area (MLRA): 60A – Pierre Shale Plains

Physiographic Features

This site typically occurs on gently to steeply sloping uplands.

Landform: terrace, knoll, ridge

Aspect: N/A

	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	2,500	4,300
Slope (percent):	6	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:	Low	Medium



Climatic Features

The climate in this MLRA is typical of the drier portions of the Northern Great Plains where sagebrush steppes to the west yield to grassland steppes to the east. Annual precipitation ranges from 13 to 18 inches per year, with most occurring during the growing season. Temperatures show a wide range between summer and winter and between daily maximums and minimums, due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Cold air masses from Canada in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Chinook winds may occur in winter and bring rapid rises in temperature. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring. The normal average annual temperature is about 46°F. January is the coldest month with average temperatures ranging from about 19°F (Moorcroft CAA, Wyoming (WY)), to about 22°F (Belle Fourche, South Dakota (SD)). July is the warmest month with temperatures averaging from about 70°F (Moorcroft CAA, WY), to about 72°F (Belle Fourche, SD). The range of normal average monthly temperatures between the coldest and warmest months is about 51°F. Hourly winds are estimated to average about 11 miles per hour (mph) annually, ranging from about 13 mph during the spring to about 10 mph 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 mph.

Growth of cool-season plants begins in early to mid-March, slowing or ceasing in late June. Warm-season plants begin growth about mid-May and can continue to early or mid-September. Greenup of cool-season plants may occur in September and October when adequate soil moisture is present.

	<u>Minimum</u>	<u>Maximum</u>
Frost-free period (days):	122	129
Freeze-free period (days):	145	152
Mean Annual Precipitation (inches):	13	18

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

	Precip. Min.	Precip. Max	Temp. Min.	Temp. Max.
January	0.32	0.43	7.1	34.1
February	0.44	0.57	12.6	40.1
March	0.65	0.94	19.7	46.5
April	1.43	1.72	29.4	60.2
May	2.45	3.19	39.7	70.6
June	2.34	3.38	48.5	80.1
July	1.60	2.78	54.8	88.0
August	1.24	1.76	53.1	87.7
September	1.01	1.50	42.3	77.0
October	0.90	1.11	31.4	64.9
November	0.40	0.61	19.8	47.5
December	0.40	0.48	10.2	38.0

Climate Stations		Period	
Station ID	Location or Name	From	To
SD0236	Ardmore 2 N	1948	1999
SD0559	Belle Fourche	1948	1999
SD1124	Buffalo Gap	1951	1999
WY6395	Moorcroft CAA	1948	1998
WY9207	Upton 13 SW	1949	1998

For other 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 soils in this site are well-drained and formed in soft siltstone, sandstone, porcelanite, or alluvium. The loam surface layer is three to six inches thick. The soils have a moderate 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. Subsurface soil layers are restrictive to water movement and root penetration.

These soils are mainly susceptible to water erosion. The hazard of water erosion increases on slopes greater than about 15 percent. Low available water capacity caused by the shallow rooting depth strongly influences the soil-water-plant relationship.

More information can be found in the various soil survey reports. Contact the local USDA Service Center for soil survey reports that include more detail specific to your location.

Parent Material Kind: alluvium, outwash
Parent Material Origin: sedimentary, unspecified
Surface Texture: loam
Surface Texture Modifier: gravelly, very gravelly
Subsurface Texture Group: loamy
Surface Fragments ≤3” (% Cover): 0-25
Surface Fragments >3” (%Cover): 0-10
Subsurface Fragments ≤3” (% Volume): 20-70
Subsurface Fragments >3” (% Volume): 6-65

	<u>Minimum</u>	<u>Maximum</u>
Drainage Class:	well	excessively
Permeability Class:	moderately rapid	rapid
Depth (inches):	0	10
Electrical Conductivity (mmhos/cm)*:	0	4
Sodium Absorption Ratio*:	0	0
Soil Reaction (1:1 Water)*:	6.1	8.4
Soil Reaction (0.1M CaCl₂)*:	NA	NA
Available Water Capacity (inches)*:	1	3
Calcium Carbonate Equivalent (percent)*:	0	10

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

Plant Communities

Ecological Dynamics of the Site:

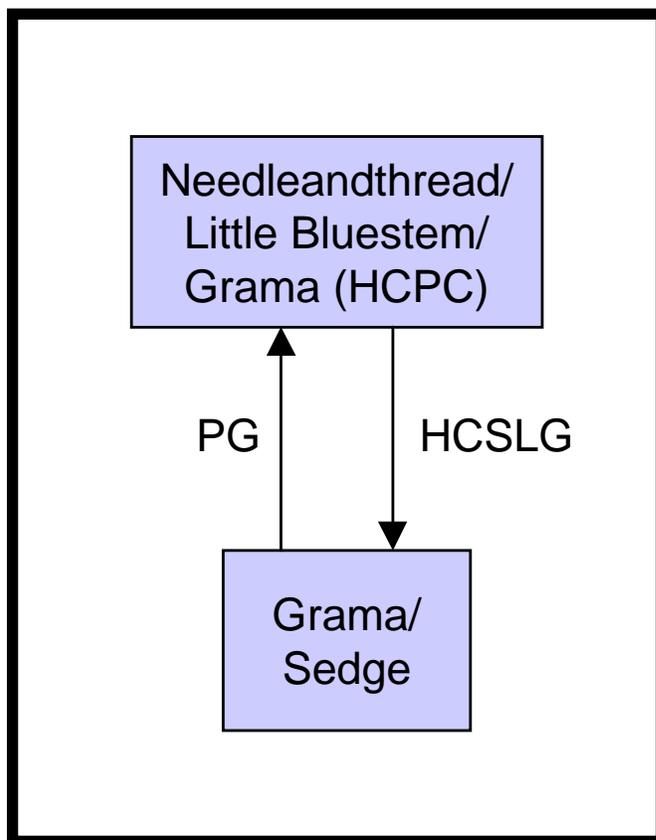
This site developed under Northern Great Plains climatic conditions, natural influences of large herbivores, occasional fire, and other biotic and abiotic factors that typically influence soil/site development. Changes will occur in the plant communities due to short-term weather variations, impacts of native and/or exotic plant and animal species, and management actions. While the following plant community descriptions describe more typical transitions between communities that will occur, severe disturbances, such as, periods of well below average precipitation, can cause significant shifts in plant communities and/or species composition.

Continuous grazing without adequate recovery periods following each grazing occurrence over several years causes this site to depart from the Historic Climax Plant Community (HCPC). Species such as threadleaf sedge and blue grama will initially increase. Plains muhly, western wheatgrass, bluebunch wheatgrass, little bluestem, and sideoats grama will decrease in frequency and production and later disappear. Heavy continuous grazing causes blue grama and/or threadleaf sedge to dominate.

The plant community upon which interpretations are primarily based is the HCPC. The HCPC has been determined by studying 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 used. Plant communities, states, transitional pathways, and thresholds have been determined through similar studies and experience.

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 are discussed in more detail in the plant community descriptions following the diagram.

Plant Communities and Transitional Pathways



HCPC - Historic Climax Plant Community;
HCSLG - Heavy, continuous season-long grazing;
PG - Prescribed grazing.

Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SCIENTIFIC NAME	SYMBOL	Needleandthread/Little Bluestem/Grama (HCPC)		
			Group	lbs./acre	% Comp
GRASSES & GRASS-LIKES				600 - 720	75 - 90
needleandthread	Hesperostipa comata ssp. comata	HECOC8	1	80 - 160	10 - 20
MID WARM SEASON GRASSES				80 - 160	10 - 20
little bluestem	Schizachyrium scoparium	SCSC	2	80 - 120	10 - 15
plains muhly	Muhlenbergia cuspidata	MUCU3	2	16 - 40	2 - 5
GRAMA				160 - 320	20 - 40
sideoats grama	Bouteloua curtipendula	BOCU	3	80 - 200	10 - 25
blue grama	Bouteloua gracilis	BOGR2	3	40 - 160	5 - 20
hairy grama	Bouteloua hirsuta	BOHI2	3	40 - 80	5 - 10
WHEATGRASS				40 - 80	5 - 10
western wheatgrass	Pascopyrum smithii	PASM	4	40 - 80	5 - 10
thickspike wheatgrass	Elymus lanceolatus ssp. lanceolatus	ELLAL	4	0 - 40	0 - 5
OTHER NATIVE GRASSES				8 - 40	1 - 5
sand dropseed	Sporobolus cryptandrus	SPCR	5	0 - 16	0 - 2
prairie junegrass	Koeleria macrantha	KOMA	5	8 - 40	1 - 5
Sandberg bluegrass	Poa secunda	POSE	5	8 - 16	1 - 2
bluebunch wheatgrass	Pseudoroegneria spicata	PSSP6	5	0 - 40	0 - 5
threeawn	Aristida spp.	ARIST	5	0 - 8	0 - 1
prairie sandreed	Calamovilfa longifolia	CALO	5	0 - 40	0 - 5
other perennial grasses		2GP	5	0 - 40	0 - 5
GRASS-LIKES				40 - 120	5 - 15
threadleaf sedge	Carex filifolia	CAFI	6	40 - 120	5 - 15
sedge	Carex spp.	CAREX	6	0 - 16	0 - 2
FORBS				40 - 120	5 - 15
American pasqueflower	Pulsatilla patens	PUPA5	8	0 - 16	0 - 2
cudweed sagewort	Artemisia ludoviciana	ARLU	8	8 - 24	1 - 3
cutleaf ironplant	Machaeranthera pinnatifida	MAPI	8	0 - 16	0 - 2
dotted gayfeather	Liatris punctata	LIPU	8	8 - 40	1 - 5
erigonum	Eriogonum spp.	ERIOG	8	0 - 8	0 - 1
green sagewort	Artemisia dracuncululus	ARDR4	8	0 - 16	0 - 2
hairy goldaster	Heterotheca villosa	HEVI4	8	8 - 32	1 - 4
heath aster	Symphyotrichum ericoides	SYER	8	8 - 24	1 - 3
Hood's phlox	Phlox hoodii	PHHO	8	8 - 16	1 - 2
Indian breadroot	Pediomelum esculentum	PEES	8	0 - 16	0 - 2
milkvetch	Astragalus spp.	ASTRA	8	0 - 8	0 - 1
prairie coneflower	Ratibida columnifera	RACO3	8	8 - 24	1 - 3
purple coneflower	Echinacea angustifolia	ECAN2	8	8 - 24	1 - 3
purple prairie clover	Dalea purpurea	DAPU5	8	8 - 24	1 - 3
pussytoes	Antennaria spp.	ANTEN	8	8 - 16	1 - 2
rush skeletonweed	Lygodesmia juncea	LYJU	8	0 - 16	0 - 2
scarlet gaura	Gaura coccinea	GACO5	8	0 - 16	0 - 2
scarlet globemallow	Sphaeralcea coccinea	SPCO	8	0 - 16	0 - 2
stemless hymenoxys	Tetranneuris acaulis	TEAC	8	0 - 16	0 - 2
white prairie clover	Dalea candida	DACA7	8	8 - 24	1 - 3
wild onion	Allium spp.	ALLIU	8	0 - 8	0 - 1
other perennial forbs		2FP	8	0 - 24	0 - 3
SHRUBS				40 - 80	5 - 10
broom snakeweed	Gutierrezia sarothrae	GUSA2	9	0 - 8	0 - 1
cactus	Opuntia spp.	OPUNT	9	0 - 16	0 - 2
fringed sagewort	Artemisia frigida	ARFR4	9	8 - 24	1 - 3
rose	Rosa spp.	ROSA5	9	8 - 24	1 - 3
skunkbush sumac	Rhus trilobata	RHTR	9	0 - 24	0 - 3
yucca	Yucca glauca	YUGL	9	0 - 24	0 - 3
other shrubs		2SHRUB	9	0 - 24	0 - 3

Annual Production lbs./acre	LOW	RV	HIGH
GRASSES & GRASS-LIKES	380	660	890
FORBS	35	80	125
SHRUBS	35	60	85
TOTAL	450	800	1100

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	Needleandthread/Little Bluestem/Grama (HCPC)			Grama/Sedge		
		Group	lbs./acre	% Comp	Group	lbs./acre	% Comp
GRASSES & GRASS-LIKES			600 - 720	75 - 90		260 - 340	65 - 85
needleandthread	HECOC8	1	80 - 160	10 - 20	1	4 - 20	1 - 5
MID WARM-SEASON GRASSES		2	80 - 160	10 - 20	2	8 - 20	2 - 5
little bluestem	SCSC	2	80 - 120	10 - 15	2	4 - 20	1 - 5
plains muhly	MUCU3	2	16 - 40	2 - 5	2	4 - 20	1 - 5
GRAMA		3	160 - 320	20 - 40	3	120 - 180	30 - 45
sideoats grama	BOCU	3	80 - 200	10 - 25	3	0 - 20	0 - 5
blue grama	BOGR2	3	40 - 160	5 - 20	3	80 - 140	20 - 35
hairy grama	BOHI2	3	40 - 80	5 - 10	3	40 - 80	10 - 20
WHEATGRASS		4	40 - 80	5 - 10	4	4 - 20	1 - 5
western wheatgrass	PASM	4	40 - 80	5 - 10	4	4 - 20	1 - 5
thickspike wheatgrass	ELLAL	4	0 - 40	0 - 5	4	0 - 4	0 - 1
OTHER NATIVE GRASSES		5	8 - 40	1 - 5	5	4 - 20	1 - 5
sand dropseed	SPCR	5	0 - 16	0 - 2	5	0 - 8	0 - 2
prairie junegrass	KOMA	5	8 - 40	1 - 5	5	4 - 20	1 - 5
Sandberg bluegrass	POSE	5	8 - 16	1 - 2	5	4 - 12	1 - 3
bluebunch wheatgrass	PSSP6	5	0 - 40	0 - 5			
threeawn	ARIST	5	0 - 8	0 - 1	5	4 - 20	1 - 5
prairie sandreed	CALO	5	0 - 40	0 - 5	5	0 - 8	0 - 2
other perennial grasses	2GP	5	0 - 40	0 - 5	5	0 - 12	0 - 3
GRASS-LIKES		6	40 - 120	5 - 15	6	80 - 140	20 - 35
threadleaf sedge	CAFI	6	40 - 120	5 - 15	6	80 - 140	20 - 35
sedge	CAREX	6	0 - 16	0 - 2	6	4 - 20	1 - 5
NON-NATIVE GRASSES		7			7	4 - 8	1 - 2
cheatgrass	BRTE				7	4 - 8	1 - 2
FORBS		8	40 - 120	5 - 15	8	40 - 80	10 - 20
American pasqueflower	PUPA5	8	0 - 16	0 - 2	8	0 - 4	0 - 1
cudweed sagewort	ARLU	8	8 - 24	1 - 3	8	4 - 12	1 - 3
curlycup gumweed	GRSQ				8	0 - 12	0 - 3
cutleaf ironplant	MAPI	8	0 - 16	0 - 2	8	4 - 12	1 - 3
dotted gayfeather	LIPU	8	8 - 40	1 - 5	8	4 - 20	1 - 5
eriogonum	ERIOG	8	0 - 8	0 - 1	8	0 - 12	0 - 3
green sagewort	ARDR4	8	0 - 16	0 - 2	8	4 - 12	1 - 3
hairy goldaster	HEVI4	8	8 - 32	1 - 4	8	4 - 20	1 - 5
heath aster	SYER	8	8 - 24	1 - 3	8	4 - 20	1 - 5
Hood's phlox	PHHO	8	8 - 16	1 - 2	8	8 - 20	2 - 5
Indian breadroot	PEES	8	0 - 16	0 - 2	8	0 - 8	0 - 2
milkvetch	ASTRA	8	0 - 8	0 - 1	8	4 - 12	1 - 3
prairie coneflower	RACO3	8	8 - 24	1 - 3	8	4 - 20	1 - 5
purple coneflower	ECAN2	8	8 - 24	1 - 3	8	4 - 12	1 - 3
purple prairie clover	DAPU5	8	8 - 24	1 - 3	8	0 - 8	0 - 2
pussytoes	ANTEN	8	8 - 16	1 - 2	8	4 - 20	1 - 5
rush skeletonweed	LYJU	8	0 - 16	0 - 2	8	0 - 16	0 - 4
scarlet gaura	GACO5	8	0 - 16	0 - 2	8	0 - 8	0 - 2
scarlet globemallow	SPCO	8	0 - 16	0 - 2	8	0 - 8	0 - 2
stemless hymenoxys	TEAC	8	0 - 16	0 - 2	8	0 - 8	0 - 2
white prairie clover	DACA7	8	8 - 24	1 - 3	8	0 - 8	0 - 2
wild onion	ALLIU	8	0 - 8	0 - 1	8	0 - 12	0 - 3
other perennial forbs	2FP	8	0 - 24	0 - 3	8	4 - 20	1 - 5
SHRUBS		9	40 - 80	5 - 10	9	20 - 60	5 - 15
broom snakeweed	GUSA2	9	0 - 8	0 - 1	9	4 - 20	1 - 5
cactus	OPUNT	9	0 - 16	0 - 2	9	0 - 20	0 - 5
fringed sagewort	ARFR4	9	8 - 24	1 - 3	9	8 - 24	2 - 6
rose	ROSA5	9	8 - 24	1 - 3	9	4 - 12	1 - 3
skunkbush sumac	RHTR	9	0 - 24	0 - 3	9	0 - 12	0 - 3
yucca	YUGL	9	0 - 24	0 - 3	9	0 - 20	0 - 5
other shrubs	2SHRUB	9	0 - 24	0 - 3	9	0 - 12	0 - 3

Annual Production lbs./acre	LOW	RV	HIGH	LOW	RV	HIGH
GRASSES & GRASS-LIKES	380	660	-890	150	300	-450
FORBS	35	80	-125	35	60	-85
SHRUBS	35	60	-85	15	40	-65
TOTAL	450	800	-1100	200	400	-600

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 information is collected, some of these plant community descriptions may be revised or removed, and new ones added. None of these plant communities should necessarily be thought of as “Desired Plant Communities” (DPCs). According to the USDA Natural Resources Conservation Service (NRCS) National Range and Pasture Handbook, DPCs 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.

Needleandthread/Little Bluestem/Grama Plant Community

The plant community upon which interpretations are primarily based is the Needleandthread/Little Bluestem/Grama Plant Community. This is also considered to be the HCPC. This plant community 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 75-90 percent grasses or grass-like plants, 5-15 percent forbs, and 5-10 percent shrubs. An even mix of both warm- and cool-season grasses or grass-likes dominates this plant community. The major grasses or grass-likes include needleandthread, western wheatgrass, threadleaf sedge, little bluestem, and both sideoats and blue grama. Other grasses occurring on the site include thickspike wheatgrass, bluebunch wheatgrass, plains muhly, and prairie Junegrass. The significant forbs include gayfeather, purple coneflower, prairie clover, and cutleaf ironplant. Significant shrubs are fringed sagewort, rose, skunkbush sumac, and yucca.

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 at the sites potential. Plant litter is properly distributed with some movement offsite and natural plant mortality is low. The diversity in plant species allows for high drought tolerance.

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: SD6003

Growth curve name: Pierre Shale Plains, cool-season/warm-season codominant.

Growth curve description: Cool-season, warm-season codominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	10	20	28	21	10	5	3	0	0

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

- Heavy, continuous season long grazing will convert the plant community to the *Grama/Sedge Plant Community*.

Grama/Sedge Plant Community

This plant community can develop from the adverse effects of heavy, continuous season-long grazing. Short grasses and forbs increase to dominate the site and annual production decreases dramatically. Lack of litter and short plant heights result in higher soil temperatures, poor water infiltration rates, and higher evaporation, which gives blue grama and sedges a competitive advantage over cool- and

warm-season midgrasses. Blue grama and threadleaf sedge are the dominant grass/grass-like species. Other grasses may include western wheatgrass, needleandthread, little bluestem, prairie Junegrass, and threeawn. Significant forbs include green sagewort, cutleaf ironplant, rush skeletonweed, hairy goldaster, pussytoes, Hood’s phlox, and scarlet globemallow. The significant shrubs include broom snakeweed, cactus, and fringed sagewort.

This plant community is relatively stable. The competitive advantage of blue grama and threadleaf sedge prevents other species from establishing. This plant community is less productive than the HCPC. Runoff has increases and infiltration has decreased. Soil erosion does not increase appreciably.

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: SD6003

Growth curve name: Pierre Shale Plains, cool-season/warm-season codominant.

Growth curve description: Cool-season, warm-season codominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	10	20	28	21	10	5	3	0	0

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

- Prescribed grazing will shift this plant community back to the *Needleandthread/Little Bluestem/Grama Plant Community*.

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

The MLRA 60A lies within the drier portion of the northern mixed-grass prairie ecosystem where sagebrush steppes to the west yield to grassland steppes to the east. Prior to European settlement, this area consisted of diverse grass/shrub land habitats interspersed with varying densities of depressional, in-stream wetlands, and woody riparian corridors. These habitats provided critical life cycle components for many of its users. Many species of grassland birds, small mammals, reptiles, amphibians, and herds of roaming bison, elk, and pronghorn were among the inhabitants adapted to this semi-arid region. Roaming herbivores, as well as, several small mammal and insect species, were the primary consumers linking the grassland resources to predators such as the wolf, mountain lion, and grizzly bear, as well as, smaller carnivores such as the coyote, bobcat, fox, and raptors. The prairie dog was once abundant; however, the species remains a keystone species within its range. The black-footed ferret, burrowing owl, ferruginous hawk, mountain plover, and swift fox were associated with prairie dog complexes.

Historically, the northern mixed-grass prairie was a disturbance-driven ecosystem with fire, herbivory, and climate functioning as the primary disturbance factors either singly or in combination. Following European settlement, livestock grazing, cropland conversion, elimination of fire, energy development, and other anthropogenic factors influenced species composition and abundance. Introduced and invasive species further impacted plant and animal communities. Bison was a historical keystone species but have been extirpated as a free-ranging herbivore. The loss of the bison and prairie dog, and fire as ecological drivers greatly influenced the character of the remaining native plant communities and altered wildlife habitats. Human development has reduced habitat quality for area-sensitive species.

Within MLRA 60A the Thin Claypan Ecological Site provides upland grassland cover with an associated forb and shrub component. It was typically part of an expansive grassland landscape that included combinations of Shallow Loamy, Shallow Clayey, Thin Loamy, Claypan, Sandy, Sandy Claypan, Loamy, and Clayey Ecological Sites. This site provided habitat for species requiring unfragmented grassland. Important habitat features and components found commonly or exclusively on this site may include greater sage-grouse and sharp-tailed grouse leks; upland nesting habitat for grassland birds, forbs and insects for brood habitat; and a forage source for small and large herbivores. Many grassland and shrub steppe nesting bird populations are declining. Extirpated species include free-ranging American bison, grizzly bear, gray wolf, black-footed ferret, mountain plover, Rocky Mountain locust, and swift fox.

The majority of the Thin Claypan Ecological Site remains intact and provides increasingly important habitat for grassland and shrub steppe nesting birds, small rodents, coyotes, and a variety of reptiles, amphibians, and insects. Invasive species such as annual brome grasses and crested wheatgrass have impacted the biological integrity of the site for some grassland birds such as greater sage-grouse. Changes in historic fire regime and domestic grazing have impacted the forb/shrub/grass percentages. Greater sage-grouse and Brewer's sparrow benefit when big sagebrush increases.

Western Wheatgrass/Blue Grama (HCPC): The predominance of grasses plus high diversity of forbs and shrubs in this community favors grazers and mixed-feeders, such as deer and pronghorn. Insects, such as pollinators, play a large role in maintaining the forb community and provide a forage base for grassland birds and other species. The complex plant structural diversity provides habitat for a wide array of migratory and resident birds. Brewer's and grasshopper sparrow, lark bunting, western meadowlark, greater sage-grouse, and sharp-tailed grouse are common and benefit from the structure and composition this plant community provides. This site provides important breeding habitat for the loggerhead shrike. This site provides excellent nesting and brood rearing habitat for greater sage-grouse and sharp-tailed grouse. Diverse prey populations are available for grassland raptors such as northern harrier, ferruginous hawk, Swainson's hawk, golden eagle, and prairie falcon.

The diversity of grasses, forbs, and shrubs provide high nutrition levels for small and large herbivores including voles, mice, thirteen-lined ground squirrels, white-tailed jackrabbit, and deer. This ecological site provides excellent wintering habitat for pronghorn. The moderate stature of this plant community provides suitable thermal, protective, and escape cover for small herbivores and grassland birds. Predators utilizing this plant community including coyote, American badger, red fox, and long-tailed weasel. This plant community provides habitat for spade foot toad, Great Plains toad, bull snake, and western rattlesnake.

Blue Grama/Cactus: Resulting from heavy continuous grazing and/or annual, spring seasonal grazing, blue grama, and cactus will dominate. Forb diversity decreases and abundance has remained relatively unchanged. Shrub abundance significantly increases, especially cacti and to a lesser extent big sagebrush.

A shift to shorter plant structure will favor prairie dog expansion and associate species such as ferruginous hawk, burrowing owl, and swift fox. Species such as horned lark, long-billed curlew, upland sandpiper, and white-tailed jackrabbit may be present, while species such as Brewer's sparrow, greater sage-grouse, as well as, desert cottontail will increase. This plant community may provide areas suitable for lek site development.

The short stature of this plant community limits suitable thermal, protective, and escape cover. Predators utilizing this plant community include the coyote, American badger, red fox, and long-tailed

weasel. This plant community provides habitat for spade foot toad, Great Plains toad, bull snake, and western rattlesnake.

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

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
Grasses & Grass-like							
blue grama	U D P D	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
hairy grama	U D P D	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	U U D U	U D D U	N D N N	N D N N	U D D U	U D D U
needleandthread	U D U D	N D N U	U D U D	N D N U	N D N U	U D U D	U D U D
plains muhly	U U D U	U U D U	U U D U	N N N N	N N N N	U U D U	U U D U
prairie junegrass	U D U D	N D N U	U D U D	N D N U	N D N U	U D U D	U D U D
prairie sandreed	U D D U	U D U U	U D D U	U U D U	U U D U	U D D U	U D D U
sand 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
Sandberg bluegrass	U U U U	U D U U	N U N N	N D N N	N D N N	N U N N	N U N N
sedge	U P U D	U P U D	U D U D	U D U D	U D U D	U D U D	U D U D
sideoats grama	U D P D	U P D D	U D P U	U P D U	U P D U	U D P U	U D P U
thickspike wheatgrass	U D D U	U D U U	U D D U	N D N N	N D N N	U D D U	U D D U
threadleaf sedge	U P U D	U P U D	U D U D	U D U D	U D U D	U D U D	U D U D
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
western wheatgrass	U P D D	U D U U	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
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
dotted 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
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
green sagewort	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U
hairy goldaster	U U D U	N N N N	U U D U	N N N N	N N N N	U U D U	N N N N
heath aster	U U D U	U U P U	U U D U	U U P U	U U P U	U U D U	U U P U
Hood's phlox	U D U U	U D D U	U D U U	U D D U	U D D U	U D U U	U D D U
Indian breadroot	U U U U	U D U U	U U U U	U D U U	U D U U	U U U U	U D U U
milkvetch	U U U U	U D U U	U U U U	U D U U	U D U U	U U U U	U D U U
prairie 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
purple 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
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 gaura	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
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
stemless hymenoxys	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
white 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
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
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
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 D D D	D U U D	D U U D	D U U D	D U U D	D U U D
yucca	D N N D	D U U D	D N N D	D U U D	D U U D	D N N D	D U U D

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

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

Animal Community – Grazing Interpretations

The following table lists annual, suggested initial stocking rates with average growing conditions. These are conservative estimates that should be used only as guidelines in the initial stages of conservation planning. Often, the current plant composition does not entirely match any particular plant community (as described in this Ecological Site Description). Because of this, a resource inventory is necessary to document plant composition and production. More accurate carrying capacity estimates should eventually be calculated using the following stocking rate information along with animal preference data and actual stocking records, 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	Average Annual Production (lbs./acre, air-dry)	Stocking Rate* (AUM/acre)
Needleandthread/Little Bluestem/Grama	800	0.25
Grama/Sedge	400	0.13

*Based on 790 lbs./acre (air-dry weight) per Animal Unit Month (AUM), and on 25 percent harvest efficiency (refer to USDA NRCS, National Range and Pasture Handbook).

Grazing by domestic livestock is one of the major income-producing industries in the area. Rangeland in this area may provide yearlong forage. During the dormant period, the forage for livestock will likely be lacking protein to meet livestock requirements, and added protein will allow ruminants to better utilize the energy stored in grazed plant materials. A forage quality test (either directly or through fecal sampling) should be used to determine the level of supplementation needed.

Hydrology Functions

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

Other Products

Selected seed harvest of certain unique native plant species can provide additional income.

Supporting Information

Associated Sites

- (060AY009SD) – Sandy
- (060AY024SD) – Shallow Loamy
- (060AY044SD) – Shallow Sandy
- (060AY017SD) – Shallow Clayey

Similar Sites

- (060AY024SD) – Shallow Loamy
[less needleandthread, porcupine grass, western wheatgrass, and sideoats grama; higher production]
- (060AY044SD) – Shallow Sandy
[more sandreed/bluestem; less plains muhly/sideoats grama; higher production]

Inventory Data References

Information presented here has been derived from NRCS clipping data and other inventory data. Field observations from range trained personnel were also used. Those involved in developing this site description include: Stan Boltz, Range Management Specialist (RMS), NRCS; Darrel DuVall, RMS, NRCS; Jill Epley, RMS, NRCS; Cheryl Nielsen, RMS, NRCS; Rick Peterson, RMS, NRCS; and Mike Stirling, RMS, NRCS.

<u>Data Source</u>	<u>Number of Records</u>	<u>Sample Period</u>	<u>State</u>	<u>County</u>
SCS-RANGE-417				

State Correlation

This site has been correlated between Montana (MT), Nebraska (NE), SD, and WY in MLRA 60A.

Field Offices

Belle Fourche, SD	Custer, SD	Hot Springs, SD	Pine Ridge, SD	Sundance, WY
Broadus, MT	Ekalaka, MT	Lusk, WY	Rapid City, SD	Wall, SD
Buffalo, SD	Faith, SD	Martin, SD	Rushville, NE	
Chadron, NE	Gillette, WY	Newcastle, WY	Sturgis, SD	

Relationship to Other Established Classifications

Level IV Ecoregions of the Conterminous United States: 43e – Sagebrush Steppe, 43g – Semi-arid Pierre Shale Plains, and 43k – Dense Clay Prairie.

Other References

High Plains Regional Climate Center, University of Nebraska, 830728 Chase Hall, Lincoln, NE 68583-0728. (<http://www.hprcc.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://soils.usda.gov/technical/nasis>)

USDA, NRCS, 2002. National Soil Survey Handbook, Title 430-VI.
(<http://soils.usda.gov/technical/handbook/>)

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

MT, State Range Management Specialist Date

NE, State Range Management Specialist Date

SD, State Range Management Specialist Date

WY, State Range Management Specialist Date