

## United States Department of Agriculture Natural Resources Conservation Service

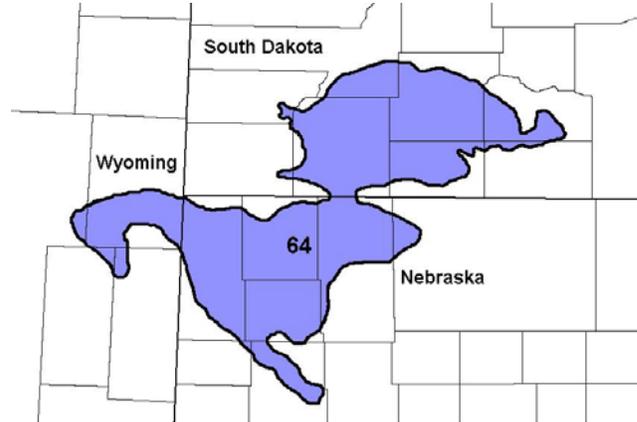
### Ecological Site Description

**Site Type:** Rangeland

**Site Name:** Sands

**Site ID:** R064XY012NE

**Major Land Resource Area (MLRA):**  
64 – Mixed Sandy and Silty Tableland



### Physiographic Features

This site typically occurs on gently to more steeply sloping to rolling dunes.

**Landform:** dune, hill

**Aspect:** N/A

	<u>Minimum</u>	<u>Maximum</u>
<b>Elevation (feet):</b>	2,900	4,000
<b>Slope (percent):</b>	3	30
<b>Water Table Depth (inches):</b>	None	None
<b>Flooding:</b>		
<b>Frequency:</b>	None	None
<b>Duration:</b>	None	None
<b>Ponding:</b>		
<b>Depth (inches):</b>	None	None
<b>Frequency:</b>	None	None
<b>Duration:</b>	None	None
<b>Runoff Class:</b>	Negligible	Low

### Climatic Features

MLRA 64 is considered to have a continental climate – cold winters and hot summers, low humidity, light rainfall, and much sunshine. Extremes in temperature may also abound. The climate is the result of this MLRA's location near the geographic center of North America. There are few natural barriers on the Northern Great Plains and air masses move freely across the plains and account for rapid changes in temperature.

Annual precipitation ranges from 14 to 20 inches per year. The normal average annual temperature is about 47°F. January is the coldest month with average temperatures ranging from about 21°F (Wood, South Dakota (SD)), to about 25°F (Hemingford, Nebraska (NE)). July is the warmest month with temperatures averaging from about 70°F (Keeline 3 W, Wyoming (WY)), to about 76°F (Wood, SD). The range of normal average monthly temperatures between the coldest and warmest months is about 55°F. This large annual range attests to the continental nature of this area's climate. Hourly winds 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 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>
<b>Frost-free period (days):</b>	138	143
<b>Freeze-free period (days):</b>	161	163
<b>Mean Annual Precipitation (inches):</b>	14	20

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

	Precip. Min.	Precip. Max	Temp. Min.	Temp. Max.
January	0.42	0.52	9.0	35.8
February	0.48	0.61	14.6	40.7
March	0.90	1.22	21.0	47.5
April	1.83	2.15	28.9	61.3
May	2.22	3.38	38.3	72.2
June	2.05	3.27	47.3	82.1
July	1.63	2.73	53.9	90.1
August	1.09	1.96	52.3	89.3
September	1.09	1.58	42.4	79.5
October	0.80	1.38	32.6	66.6
November	0.56	0.65	20.4	49.0
December	0.42	0.50	13.4	38.4

Climate Stations		Period	
Station ID	Location or Name	From	To
NE3755	Hemingford, NE	1964	1999
WY5085	Keeline 3 W, WY	1953	1986
SD9442	Wood, SD	1948	1999

For local climate stations that may be more representative, refer to <http://www.wcc.nrcs.usda.gov>.

**Riparian and Wetland Features**

No riparian areas or wetland features are directly associated with this site.

**Representative Soil Features**

The features common to soils in this site are the loamy fine sand to sand textured surface layers and slopes of 3 to 30 percent. The soils in this site are somewhat excessively to excessively drained and formed in eolian sand or sandy alluvium. The surface layer is 3 to 18 inches thick. The texture of the subsurface layers ranges from loamy fine sand to sand. 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 vegetative barriers. The soil surface is stable and intact.

These soils are susceptible to wind and water erosion. The hazard of water erosion increases on slopes greater than about 15 percent. Loss of 50 percent or more of the surface layer of the soils on this site can result in a shift in species composition and/or production.

More information can be found in the various soil survey reports. Contact the local United States Department of Agricultural (USDA) Service Center for soil survey reports that include more detail specific to your location.

Parent Material Kind: eolian deposits, alluvium  
Parent Material Origin: mixed  
Surface Texture: loamy fine sand, fine sand, sand  
Surface Texture Modifier: none  
Subsurface Texture Group: sandy  
Surface Fragments ≤3” (% Cover): 0  
Surface Fragments >3” (%Cover): 0  
Subsurface Fragments ≤3” (% Volume): 0  
Subsurface Fragments >3” (% Volume): 0

	<u>Minimum</u>	<u>Maximum</u>
Drainage Class:	somewhat excessively	excessively
Permeability Class:	rapid	very rapid
Depth (inches):	80	80
Electrical Conductivity (mmhos/cm)*:	0	2
Sodium Absorption Ratio*:	0	0
Soil Reaction (1:1 Water)*:	5.6	8.4
Soil Reaction (0.1M CaCl <sub>2</sub> )*:	NA	NA
Available Water Capacity (inches)*:	3	4
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

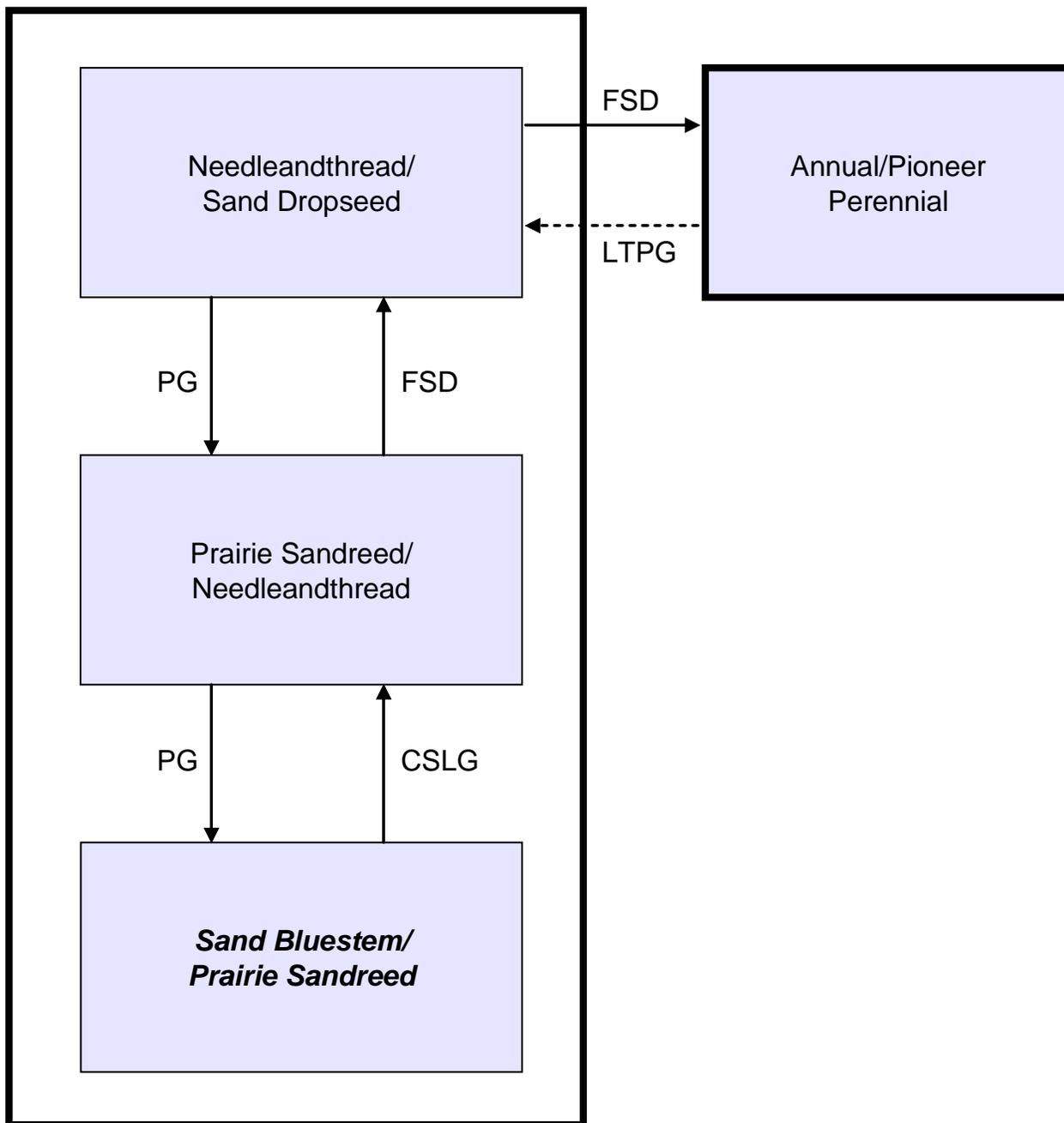
This site developed under Northern Great Plains climatic conditions, light to severe grazing by bison and other large herbivores, sporadic natural or man-caused wildfire (often of light intensities), and other biotic and abiotic factors that typically influence soil/site development. Changes will occur 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 season-long grazing (during the typical growing season of May through October) and/or repeated seasonal grazing (e.g., every spring, every summer) without adequate recovery periods following each grazing occurrence causes this site to depart from the Sand Bluestem/Prairie Sandreed Plant Community. Species such as sand dropseed and blue grama will increase, while sand bluestem and little bluestem will decrease. Sand sagebrush occurs primarily in the western portion of this MLRA.

Interpretations are primarily based on the Sand Bluestem/Prairie Sandreed Plant Community. It 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 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 will be discussed in more detail in the plant community descriptions following the diagram.

## Plant Communities and Transitional Pathways



**CSLG** - Continuous season-long grazing (grazing a unit for an entire growing season); **FSD** - Frequent and severe defoliation; **LTPG** - Long-term prescribed grazing; **PG** - Prescribed grazing (planned, controlled harvest of vegetation with grazing or browsing animals – see FOTG, Section IV, 528).

Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SYMBOL	Sand Bluestem/Prairie Sandreed			Prairie Sandreed/Needleandthread			Needleandthread/Sand Dropseed			Annual/Pioneer Perennial			
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	
<b>GRASSES &amp; GRASS-LIKES</b>														
sand bluestem	ANHA	1	285 - 475	15 - 25	1	14 - 140	1 - 10	1			1			
prairie sandreed	CALO	2	285 - 760	15 - 40	2	210 - 420	15 - 30	2	0 - 90	0 - 10	2	0 - 50	0 - 10	
little bluestem	SCSC	3	0 - 285	0 - 15	3	0 - 70	0 - 5	3			3			
needleandthread	HECOC8	4	95 - 190	5 - 10	4	70 - 210	5 - 15	4	90 - 180	10 - 20	4	50 - 100	10 - 20	
<b>SHORT WARM-SEASON</b>		<b>5</b>	<b>38 - 190</b>	<b>2 - 10</b>	<b>5</b>	<b>70 - 210</b>	<b>5 - 15</b>	<b>5</b>	<b>90 - 270</b>	<b>10 - 30</b>	<b>5</b>	<b>50 - 150</b>	<b>10 - 30</b>	
blue grama	BOGR2	5	19 - 190	1 - 10	5	14 - 210	1 - 15	5	90 - 270	10 - 30	5	50 - 150	10 - 30	
hairy grama	BOHI2	5	19 - 95	1 - 5	5	14 - 70	1 - 5	5	0 - 45	0 - 5	5	0 - 25	0 - 5	
<b>OTHER NATIVE</b>		<b>6</b>	<b>95 - 285</b>	<b>5 - 15</b>	<b>6</b>	<b>70 - 210</b>	<b>5 - 15</b>	<b>6</b>	<b>45 - 180</b>	<b>5 - 20</b>	<b>6</b>	<b>25 - 100</b>	<b>5 - 20</b>	
switchgrass	PAVI2	6	0 - 95	0 - 5	6	0 - 28	0 - 2							
sand dropseed	SPCR	6	0 - 190	0 - 10	6	14 - 140	1 - 10	6	9 - 135	1 - 15	6	5 - 75	1 - 15	
Indian ricegrass	ACHY	6	0 - 38	0 - 2	6	0 - 14	0 - 1							
threeawn	ARIST	6	0 - 95	0 - 5	6	0 - 70	0 - 5	6	0 - 45	0 - 5	6	0 - 25	0 - 5	
sand lovegrass	ERTR3	6	0 - 38	0 - 2	6	0 - 14	0 - 1							
sand paspalum	PASE5	6	0 - 19	0 - 1	6	0 - 14	0 - 1							
Scribner panicum	DIOLS	6	0 - 38	0 - 2	6	0 - 28	0 - 2							
sandhill muhly	MUPU2	6	0 - 95	0 - 5	6	0 - 70	0 - 5							
sedge	CAREX	6	19 - 190	1 - 10	6	14 - 140	1 - 10	6	45 - 90	5 - 10	6	25 - 50	5 - 10	
<b>NON-NATIVE</b>		<b>7</b>			<b>7</b>	<b>0 - 70</b>	<b>0 - 5</b>	<b>7</b>	<b>0 - 45</b>	<b>0 - 5</b>	<b>7</b>	<b>0 - 50</b>	<b>0 - 10</b>	
cheatgrass	BRTE	7			7	0 - 70	0 - 5	7	0 - 45	0 - 5	7	0 - 50	0 - 10	
<b>FORBS</b>		<b>8</b>	<b>38 - 190</b>	<b>2 - 10</b>	<b>8</b>	<b>28 - 140</b>	<b>2 - 10</b>	<b>8</b>	<b>45 - 90</b>	<b>5 - 10</b>	<b>8</b>	<b>25 - 100</b>	<b>5 - 20</b>	
annual eriogonum	ERAN4							8	0 - 18	0 - 2	8	0 - 15	0 - 3	
annual sunflower	HEAN3	8	0 - 19	0 - 1	8	0 - 14	0 - 1	8	0 - 18	0 - 2	8	0 - 75	0 - 15	
cudweed sagewort	ARLU	8	0 - 19	0 - 1	8	0 - 14	0 - 1	8	0 - 9	0 - 1	8	0 - 25	0 - 5	
cutleaf ironplant	MAPI	8	0 - 19	0 - 1	8	0 - 14	0 - 1	8	0 - 9	0 - 1	8	0 - 5	0 - 1	
false boneset	BREU	8	0 - 19	0 - 1	8	0 - 14	0 - 1	8	0 - 9	0 - 1	8	0 - 5	0 - 1	
gayfeather	LIATR	8	0 - 19	0 - 1	8	0 - 14	0 - 1	8	0 - 9	0 - 1	8	0 - 5	0 - 1	
goldenrod	SOLID	8	0 - 19	0 - 1	8	0 - 14	0 - 1	8	0 - 9	0 - 1	8	0 - 5	0 - 1	
green sagewort	ARDR4	8	0 - 19	0 - 1	8	0 - 14	0 - 1	8	0 - 9	0 - 1	8	0 - 5	0 - 1	
heath aster	SYER	8	0 - 19	0 - 1	8	0 - 14	0 - 1	8	0 - 9	0 - 1	8	0 - 5	0 - 1	
penstemon	PENST	8	0 - 19	0 - 1	8	0 - 14	0 - 1	8	0 - 9	0 - 1	8	0 - 5	0 - 1	
scurfpea	PSORA2	8	0 - 19	0 - 1	8	0 - 14	0 - 1	8	0 - 18	0 - 2	8	0 - 5	0 - 1	
spiderwort	TRADE	8	0 - 19	0 - 1	8	0 - 14	0 - 1	8	0 - 9	0 - 1	8	0 - 5	0 - 1	
tenpetal blazingstar	MEDE2	8	0 - 19	0 - 1	8	0 - 14	0 - 1	8	0 - 9	0 - 1	8	0 - 5	0 - 1	
thistle	CIRSI	8	0 - 19	0 - 1	8	0 - 14	0 - 1	8	0 - 9	0 - 1	8	0 - 5	0 - 1	
western ragweed	AMPS	8	0 - 19	0 - 1	8	0 - 14	0 - 1	8	0 - 18	0 - 2	8	0 - 50	0 - 10	
other perennial forbs	ZFP	8	0 - 38	0 - 2	8	0 - 28	0 - 2	8	0 - 18	0 - 2	8	0 - 10	0 - 2	
<b>SHRUBS</b>		<b>9</b>	<b>19 - 95</b>	<b>1 - 5</b>	<b>9</b>	<b>28 - 140</b>	<b>2 - 10</b>	<b>9</b>	<b>27 - 135</b>	<b>3 - 15</b>	<b>9</b>	<b>25 - 75</b>	<b>5 - 15</b>	
cactus	OPUNT	9	0 - 19	0 - 1	9	0 - 28	0 - 2	9	0 - 45	0 - 5	9	0 - 25	0 - 5	
fringed sagewort	ARFR4	9	0 - 19	0 - 1	9	0 - 28	0 - 2	9	0 - 45	0 - 5	9	0 - 25	0 - 5	
leadplant	AMCA6	9	0 - 19	0 - 1	9	0 - 14	0 - 1	9	0 - 9	0 - 1				
poison ivy	TORY	9	0 - 19	0 - 1	9	0 - 14	0 - 1	9	0 - 9	0 - 1	9	0 - 5	0 - 1	
rose	ROSA5	9	0 - 19	0 - 1	9	0 - 14	0 - 1				9	0 - 5	0 - 1	
sand sagebrush	ARFI2	9	0 - 19	0 - 1	9	0 - 70	0 - 5	9	0 - 90	0 - 10	9	0 - 50	0 - 10	
sandcherry	PRPU3	9	0 - 19	0 - 1	9	0 - 14	0 - 1	9	0 - 9	0 - 1				
small soapweed	YUGL	9	0 - 19	0 - 1	9	0 - 28	0 - 2	9	0 - 45	0 - 5	9	0 - 25	0 - 5	
<b>Annual Production lbs./acre</b>			<b>LOW</b>	<b>RV</b>	<b>HIGH</b>	<b>LOW</b>	<b>RV</b>	<b>HIGH</b>	<b>LOW</b>	<b>RV</b>	<b>HIGH</b>	<b>LOW</b>	<b>RV</b>	<b>HIGH</b>
<b>GRASSES &amp; GRASS-LIKES</b>			1450	1729	2205	750	1232	1410	535	752	965	260	388	515
<b>FORBS</b>			35	114	195	25	84	145	40	68	95	20	63	105
<b>SHRUBS</b>			15	57	100	25	84	145	25	81	140	20	50	80
<b>TOTAL</b>			1500	1900	2500	800	1400	1700	600	900	1200	300	500	700

This list of plants and their relative proportions are based on near normal years. Fluctuations in species composition and relative production may change from year to year dependent upon precipitation or other climatic factors. RV = Representative value. Refer to PLANTS database for scientific names and codes: <http://plants.usda.gov>

## Plant Community and Vegetation State Narratives

Following are the narratives for each of the described plant communities. These plant communities may not represent every possibility but they are the most prevalent and repeatable plant communities. The plant composition tables shown above have been developed from the best available knowledge at the time of this revision. As more data is 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 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.

### Sand Bluestem/Prairie Sandreed Plant Community

Interpretations are based primarily on the Sand Bluestem/Prairie Sandreed Plant Community (this is also considered to be climax). This site can be found on areas that are properly managed with grazing and/or prescribed burning, and on areas receiving occasional short periods of rest.

The potential vegetation is about 85 percent grasses or grass-likes, 10 percent forbs, and 5 percent shrubs. The site is dominated by tall and mid-grasses. The major grasses include sand bluestem, prairie sandreed, little bluestem, and needleandthread. Other species occurring on the site include sand dropseed, hairy grama, blue grama, switchgrass, and sedge. Forbs and shrubs such as penstemon, gayfeather, rose, leadplant, and sand sagebrush are significant.

This plant community is well adapted to the Northern Great Plains climatic conditions. 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 high plant diversity allows for high drought tolerance.

The following growth curve shows the estimated monthly percentages of total annual growth of the dominant species expected during an average year:

Growth curve number: NE6405

Growth curve name: Pine Ridge/Badlands, warm-season dominant.

Growth curve description: Warm-season dominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	7	15	20	30	15	5	5	0	0

Transitions or pathways leading to other plant communities are as follows:

- Continuous season-long grazing will convert the plant community to the *Prairie Sandreed/Needleandthread Plant Community*.

### Prairie Sandreed/Needleandthread Plant Community

This plant community typically develops under continuous season-long grazing. The plant community has a reduced component of mid-grasses with an understory of short sod-forming grasses. Dominant grasses include prairie sandreed, needleandthread, hairy grama, and blue grama. Other species may include sand dropseed and sedge. Forbs commonly found in this plant community include dotted gayfeather, cudweed sagewort, scurfpeas, and western ragweed. Shrubs in the community include small soapweed, sand sagebrush, cactus, and rose.

Compared to the Sand Bluestem/Prairie Sandreed Plant Community hairy grama, blue grama, sand dropseed, and annual forbs have increased. Sand bluestem and little bluestem have decreased. Plant diversity remains high, despite the decrease in sand bluestem and little bluestem. This plant

community is not resistant to change. Changes in grazing management can result in a shift to another plant community. This community is fairly resilient following normal disturbances because of the high diversity of plant species and the high amount of litter. Soil erosion is low. The water cycle is functioning due to the litter cover on the soil surface. Infiltration is high because of the soil texture and surface litter.

The following growth curve shows the estimated monthly percentages of total annual growth of the dominant species expected during an average year:

Growth curve number: NE6404

Growth curve name: Pine Ridge/Badlands, warm-season dominant, cool-season subdominant.

Growth curve description: Warm-season dominant, cool-season subdominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	5	8	15	24	23	15	5	5	0	0

Transitions or pathways leading to other plant communities are as follows:

- Prescribed grazing will convert this plant community to the *Sand Bluestem/Prairie Sandreed Plant Community*.
- Frequent and severe defoliation throughout the growing season will move this plant community to the *Needleandthread/Sand Dropseed Plant Community*.

### **Needleandthread/Sand Dropseed Plant Community**

This plant community typically develops over a period of several years, under frequent and severe defoliation during the warm-season grass growing period. The dominant grasses are needleandthread, sand dropseed, hairy grama, and blue grama. Significant forbs include western ragweed, annual sunflower, tenpetal mentzelia, and annual eriogonum. Dominant shrubs in this community include sand sagebrush, small soapweed, and cactus.

Compared to the Sand Bluestem/Prairie Sandreed Plant Community, sand dropseed, sandhill muhly, blue grama, and hairy grama have greatly increased. Needleandthread and prairie sandreed are limited to areas in the sagebrush. Sand bluestem and little bluestem are absent. Desirable plant species have decreased.

This plant community is not resistant to change due to the higher percentage of bare ground and increased sand sagebrush component. The water cycle is impaired due to a reduction in litter and the potential for higher runoff and decreased infiltration. The risk for soil erosion increases.

The following growth curve shows the estimated monthly percentages of total annual growth of the dominant species expected during an average year:

Growth curve number: NE6404

Growth curve name: Pine Ridge/Badlands, warm-season dominant, cool-season subdominant.

Growth curve description: Warm-season dominant, cool-season subdominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	5	8	15	24	23	15	5	5	0	0

Transitions or pathways leading to other plant communities are as follows:

- Prescribed grazing will move this plant community to the *Prairie Sandreed/Needleandthread Plant Community*.

- Continued frequent and severe defoliation, throughout the growing season of the mid-grasses, will move this plant community to the *Annual/Pioneer Perennial Plant Community*.

### Annual/Pioneer Perennial Plant Community

This plant community develops under frequent and severe defoliation and/or excessive disturbance. This can result from heavy livestock or wildlife concentration (i.e., water locations, bedding, or loafing grounds, feeding areas, etc.) or cropping abandonment (go-back land). The dominant vegetation includes pioneer annual grasses and forbs and early successional biennial and perennial species. Grasses may include blue grama, sand dropseed, sedge, sixweeks fescue, and cheatgrass. The dominant forbs may include green sagewort, western ragweed, annual sunflower, and annual eriogonum. Shrubs that may be present include cactus, small soapweed, and sand sagebrush.

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. The community also is susceptible to invasion of nonnative annual and perennial forbs due to severe soil disturbances and relatively high percent of bare ground. Reduced surface cover, low plant density, low plant vigor, and loss of root biomass, all contribute to decreased water infiltration, increased runoff, and accelerated erosion rates. If left without management, blowouts may occur.

Significant economic inputs 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 following growth curve represents monthly percentages of total annual growth of the dominant species expected during an average year:

Growth curve number: NE6403

Growth curve name: Pine Ridge/Badlands, 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	5	10	20	25	20	10	5	5	0	0

Transitions or pathways leading to other plant communities are as follows:

- Long-term prescribed grazing (including adequate rest periods) may move this plant community through the successional stages leading to the *Sand Bluestem/Prairie Sandreed Plant Community*.

## Ecological Site Interpretations

### Animal Community – Wildlife Interpretations

MLRA 64 lies within the drier portion of 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, instream 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. The bison was a historical keystone species but have been extirpated as a free-ranging herbivore. The loss of the bison and reduction of prairie dog populations 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 64, the Sands Ecological Site (ES) provides upland grassland cover with an associated forb and shrub component. It was typically part of a an expansive grassland landscape that included combinations of Badlands, Thin Breaks, Clayey, Claypan, Dense Clay, Loamy, Saline, Sandy, Shallow, Overflow, Subirrigated, and Terrace ESs. This site provided habitat for species requiring unfragmented grassland. Important habitat features and components found commonly or exclusively on this site may include 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 this ES remains intact and provides increasingly important habitat for grassland and shrub steppe nesting birds, small rodents, coyote, and a variety of reptiles, amphibians, and insects. Invasive species such as cheatgrass have impacted the biological integrity of the site for some grassland birds. Changes in historic fire regime and domestic grazing have impacted the forb/shrub/grass percentages.

**Sand Bluestem/Prairie Sandreed (HCPC) and Prairie Sandreed/ Needleandthread:** 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. Grasshopper sparrow, lark bunting, western meadowlark, and sharp-tailed grouse are common and benefit from the structure and composition this plant community provides. Diverse prey populations are available for grassland raptors such as 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, spotted ground squirrel, white-tailed and black-tailed jackrabbit, and deer. The higher stature of this plant community provides thermal, protective, and escape cover for herbivores and grassland birds. Predators utilizing this plant community include coyote, American badger, red fox, and long-tailed weasel. This plant community provides limited habitat for amphibians, mostly toads (i.e., Great Plains, Woodhouse's, and Plains spadefoot). Prey abundance and shade opportunities may attract multiple reptile species such as gopher snake, milk snake, prairie rattlesnake, and western ornate box turtle to this site. Several species of sand loving lizards such as the lesser earless lizard, prairie lizard, many-lined skink, and six-lined racerunner utilize this site.

Resulting from continuous season-long grazing, the shift to a needleandthread and prairie sandreed community occurs. The forb and shrub diversity has not substantially decreased. The shift from the HCPC to the needleandthread/prairie sandreed community does not result in a significant change to the wildlife community.

**Needleandthread/Sand Dropseed:** Resulting from frequent and severe defoliation, needleandthread and blue grama will dominate. Forb and shrub abundance increases. This increase along with the abundance of western ragweed and dropseed provide a substantial high quality seed source for small herbivores including voles, mice, and spotted ground squirrels.

A shift to shorter plant structure will favor prairie dog expansion and associate species such as ferruginous hawk, burrowing owl, tiger salamander, and swift fox. Species such as horned lark, long-billed curlew, upland sandpiper, and white-tailed and black-tailed jackrabbit will increase due to the loss of the tall grass component. Reptile species such as gopher snake, milk snake, prairie rattlesnake, western ornate box turtle, lesser earless lizard, prairie lizard, many-lined skink, and six-lined racerunner will continue utilize this site.

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

**Annual/Pioneer Plant Community:** This plant community develops under severe disturbance and/or excessive defoliation. This can result from heavy livestock or prairie dog concentration or cropping abandonment (go-back land). The dominant vegetation includes pioneer annual grasses, forbs, invaders, and early successional biennial and perennial species. Plant species from adjacent ESs may become minor components of this plant community. The community is susceptible to invasion of annual brome grasses, crested wheatgrass, and other nonnative species due to severe soil disturbances and relatively high percent of bare ground.

Soil erosion is potentially high, impacting offsite aquatic habitats through increased runoff, nutrient, and sediment loads. Reduced surface cover, low plant density, low plant vigor, loss of root biomass, and soil compaction, all contribute to decreased wildlife abundance and diversity.

Since secondary succession is highly variable plant and wildlife species will vary. This plant community provides habitat for generalist or early successional species.

### Animal Preferences (Quarterly – 1,2,3,4<sup>†</sup>)

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
<b>Grasses and Grass-likes</b>							
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
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
Indian ricegrass	D P U D	N P N D	D P U D	N P N D	N P N D	D P U D	D P U D
little bluestem	U D D U	N D N N	U D D U	N D N N	N D N N	U D D U	U D D U
needleandthread	U D U D	N D N U	U D U D	N D N U	N D N U	U D U D	U D U D
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 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
sand lovegrass	U D D U	N N N N	U D D U	N N N N	N N N N	U D D U	U D D U
sand paspalum	N U U N	N U N N	N U U N	N U N N	N U N N	N U U N	N U U N
Sandhill muhly	N U N N	N N N N	N U N N	N N N N	N N N N	D U U D	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
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
switchgrass	U D D U	U D U U	U D D U	N N N N	N N N N	U D D U	U D D U
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
<b>Forbs</b>							
annual sunflower	U U D U	U D U U	U U D U	U D U U	U D U U	U U D U	U D 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
false boneset	U U D U	N D U N	U U D U	N D U N	N D U N	U U D U	N D U N
gayfeather	U U D U	U P P U	U U D U	U P P U	U P P U	U U D U	U P P U
goldenrod	U U D U	N U U N	U U D U	N U U N	N U U N	U U D U	N U U N
green sagewort	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U
heath aster	U U D U	U U P U	U U D U	U U P U	U U P U	U U D U	U U P U
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
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
tenpetal blazingstar	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
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 ragweed	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
<b>Shrubs</b>							
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
leadplant	U P D U	U P D U	U P D U	U P D U	U P D U	U P D U	U P D U
poison ivy	N N N N	U U U U	N N N N	U U U U	U U U U	N N N N	U U U U
rose	U D D U	U D D U	U D D U	U D D U	U D D U	U D D U	U D D U
sand sagebrush	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
sandcherry	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
small soapweed	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

<sup>†</sup>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 ES 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.

<b>Plant Community</b>	<b>Average Annual Production (lbs./acre, air-dry)</b>	<b>Stocking Rate* (AUM/acre)</b>
Sand Bluestem/Prairie Sandreed	1,900	0.60
Prairie Sandreed/Needleandthread	1,400	0.44
Needleandthread/Sand Dropseed	900	0.28
Annual/Pioneer Perennial	500	0.16

\*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 forage production on this site. This site is dominated by soils in hydrologic group A. Infiltration ranges from high to very high. Runoff potential for this site varies from very low to low depending on soil hydrologic group, slope, and ground cover. In many cases, areas with greater than 75 percent ground cover have the greatest potential for high infiltration and lower runoff. An example of an exception would be where short grasses form a strong sod and dominate the site. Areas where ground cover is less than 50 percent have the greatest potential to have reduced infiltration and higher runoff (refer to Section 4, NRCS National Engineering Handbook for detailed information).

## 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

(064XY011NE) – Sandy 14-17” P.Z.  
(064XY024NE) – Subirrigated

(064XY032NE) – Sandy 17-20” P.Z.

### Similar Sites

(064XY011NE & 064XY032NE) – Sandy 14-17” P.Z. & Sandy 17-20” P.Z. [More prairie sandreed; more level terrain]

### 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 include: Stan Boltz, Range Management Specialist (RMS), NRCS; Jill Epley, RMS, NRCS; Rick Peterson, RMS, NRCS; David Steffen, RMS, NRCS; Jeff Vander Wilt; RMS, NRCS; and Phil Young, Soil Scientist, 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 with NE, SD, and WY in MLRA 64.

### Field Offices/Counties

Alliance, NE	Box Butte	Kadoka, SD	Jackson	Rushville, NE	Sheridan
Bridgeport, NE	Morrill	Lusk, WY	Niobrara	Scottsbluff, NE	Scottsbluff
Chadron, NE	Dawes/Sioux	Martin, SD	Bennett/Shannon	Torrington, WY	Goshen
Custer, SD	Custer	Pine Ridge, SD	Pine Ridge IR	Valentine, NE	Cherry
Douglas, WY	Converse	Rapid City, SD	Pennington	Wall, SD	East Pennington
Hot Springs, SD	Fall River	Rosebud, SD	Rosebud IR	Wheatland, WY	Platte
White River, SD	Mellette/Todd				

### Relationship to Other Established Classifications

Level IV Ecoregions of the Conterminous United States: 25a – Pine Ridge Escarpment, 43h – White River Badlands, and 43i – Keya Paha Tablelands.

### 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. 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**

\_\_\_\_\_  
NE, State Range Management Specialist

\_\_\_\_\_  
Date

\_\_\_\_\_  
SD, State Range Management Specialist

\_\_\_\_\_  
Date

\_\_\_\_\_  
WY, State Range Management Specialist

\_\_\_\_\_  
Date