

United States Department of Agriculture Natural Resources Conservation Service

Ecological Site Description

Site Type: Rangeland

Site Name: Subirrigated

Site ID: R064XY024NE

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



Physiographic Features

This site occurs on nearly level valleys adjacent to streams, springs, and ponds.

Landform: alluvial fan, floodplain, stream terrace **Aspect:** N/A

	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	2,900	4,000
Slope (percent):	0	3
Water Table Depth (inches):	18	36
Flooding:		
Frequency:	Occasional	Frequent
Duration:	Brief	Brief
Ponding:		
Depth (inches):	None	None
Frequency:	None	None
Duration:	None	None
Runoff Class:	Negligible	Medium

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>
Frost-free period (days):	115	143
Freeze-free period (days):	137	163
Mean Annual Precipitation (inches):	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

This ecological site has a combination of physical and hydrological features that: 1) provide season-long ground water within 3.5 feet of the surface, 2) allows relatively free movement of water and air in the upper part of the soil, and 3) are rarely, or occasionally flooded.

Wetland Description:	<u>System</u>	<u>Subsystem</u>	<u>Class</u>	<u>Sub-class</u>
Cowardin, et al., 1979	Palustrine	N/A	Emergent Wetland	Persistent

Representative Soil Features

The features common to soils in this site are the silt loam to fine sandy loam textured surface layers and slopes of zero to three percent. These soils have water tables below the surface for all of the growing season. The water table is nonsaline and nonalkaline. The soils in this site are somewhat poorly drained and formed in loamy or sandy alluvium. The surface layer is 4 to 15 inches thick. The texture of the subsurface soils ranges from silty clay loam to sand. This site should show no evidence of rills, wind scoured areas, or pedestalled plants. Water flow paths are typically indistinguishable. The soil surface is stable and intact. Subsurface soil layers are not restrictive to water movement and root penetration.

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

specific to your location.

Parent Material Kind: alluvium
Parent Material Origin: mixed
Surface Texture: silt loam, very fine sandy loam, fine sandy loam
Surface Texture Modifier: none
Subsurface Texture Group: sandy
Surface Fragments ≤3" (% Cover): 0
Surface Fragments >3" (%Cover): 0
Subsurface Fragments ≤3" (% Volume): 0-6
Subsurface Fragments >3" (% Volume): 0

	<u>Minimum</u>	<u>Maximum</u>
Drainage Class:	somewhat poorly	somewhat poorly
Permeability Class:	moderately slow	rapid
Depth (inches):	80	80
Electrical Conductivity (mmhos/cm)*:	0	4
Sodium Absorption Ratio*:	0	0
Soil Reaction (1:1 Water)*:	5.6	8.4
Soil Reaction (0.1M CaCl₂)*:	NA	NA
Available Water Capacity (inches)*:	3	8
Calcium Carbonate Equivalent (percent)*:	0	15

*These attributes represent 0-40 inches in depth 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.

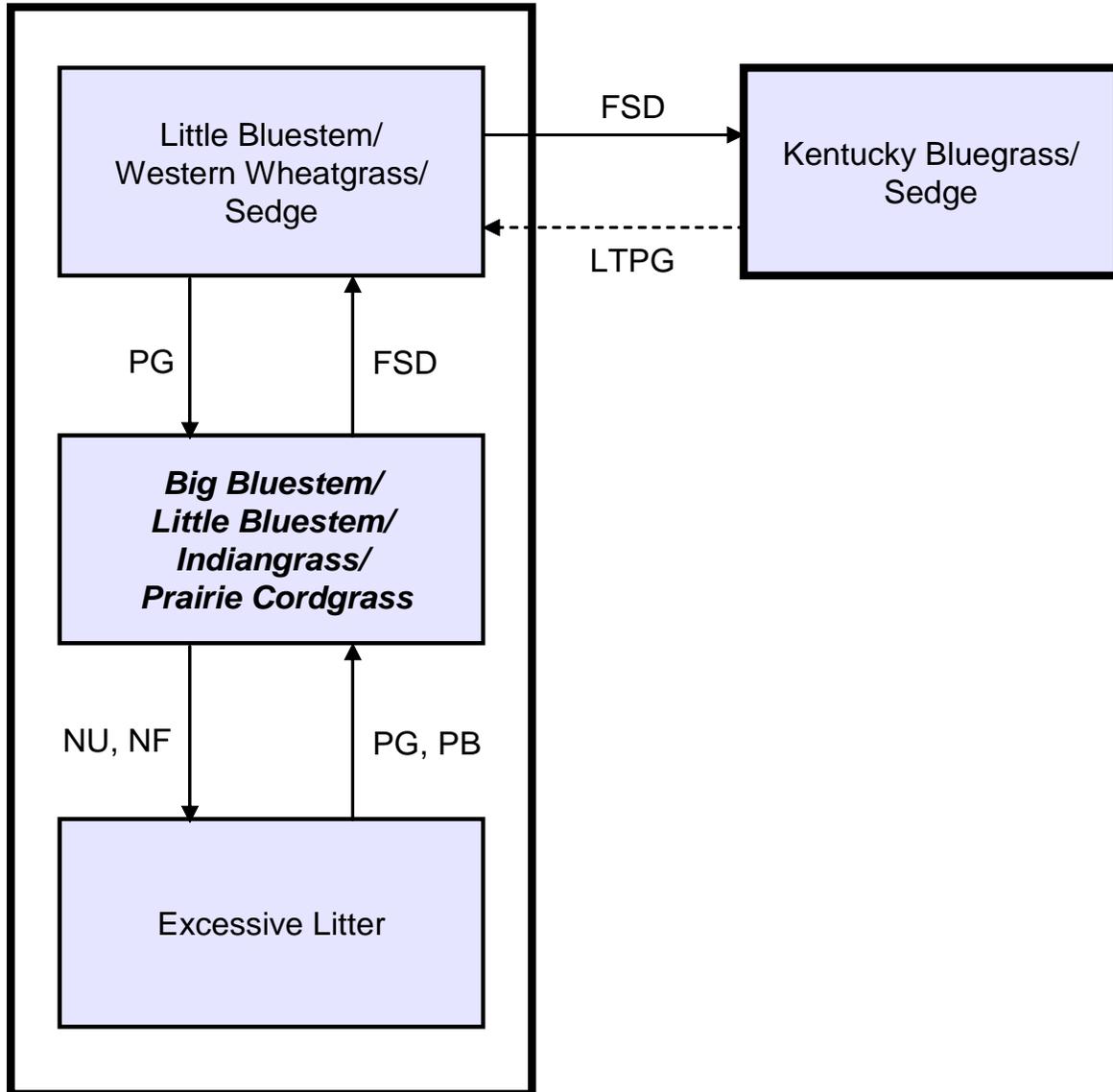
Continuous season-long grazing (during the typical growing season of May through October), and/or repeated seasonal grazing (e.g., every spring, every summer) without adequate recovery periods following each grazing occurrence causes this site to depart from the Big Bluestem/Little Bluestem/Indiangrass/Prairie Cordgrass Plant Community. Species such as sand dropseed, needleandthread, and blue grama will increase, while sand bluestem, prairie sandreed, and little bluestem will decrease. Species such as Kentucky bluegrass, Baltic rush, scouring rush, and other various grass-likes will increase forming a cool-season dominated plant community. Grasses such as big bluestem, prairie cordgrass, Indiangrass, and switchgrass will decrease in frequency and production and can eventually be removed from the site. Little bluestem and western wheatgrass will initially increase and then begin to decrease. Kentucky bluegrass and sedges will continue to increase and eventually become sod-bound. Plants such as Dalmatian toadflax, kochia, and leafy spurge will invade the site. Excessive litter, decadence, and plant mortality can result from the lack of fire or nonuse.

Interpretations are primarily based on the Big Bluestem/Little Bluestem/Indiangrass/Prairie Cordgrass 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 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



FSD - Frequent severe defoliation; **LTPG** - Long-term prescribed grazing (>20 years); **NF, NU** - No fire, non-use; **PB** - Prescribed burning; **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	Big Bluestem/Little Bluestem/Indiangrass/Prairie Cordgrass			Little Bluestem/Western Wheatgrass/Sedge			Excessive Litter			Kentucky Bluegrass/Sedge		
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp
GRASSES													
2580 - 3655 60 - 85 1800 - 2250 60 - 75 2160 - 2700 60 - 75 960 - 1200 60 - 75													
WARM SEASON MID-TALL GRASS													
big bluestem	ANGE	1	2150 - 3225	50 - 75	1	600 - 1350	20 - 45	1	180 - 360	5 - 10	1	32 - 160	2 - 10
little bluestem	SCSC	1	430 - 645	10 - 15	1	150 - 600	5 - 20	1	180 - 540	5 - 15	1	32 - 160	2 - 10
prairie cordgrass	SPPE	1	430 - 645	10 - 15	1	150 - 300	5 - 10	1	180 - 360	5 - 10	1	0 - 80	0 - 5
Indiangrass	SONU2	1	430 - 645	10 - 15	1	0 - 150	0 - 5	1	180 - 360	5 - 10	1	0 - 32	0 - 2
switchgrass	PAV12	1	215 - 645	5 - 15	1	150 - 300	5 - 10	1	180 - 360	5 - 10	1	0 - 80	0 - 5
COOL SEASON MID-GRASS													
western wheatgrass	PASM	2	0 - 430	0 - 10	2	150 - 450	5 - 15	2	0 - 360	0 - 10	2	0 - 160	0 - 10
slender wheatgrass	ELTRT	2	0 - 430	0 - 10	2	0 - 60	0 - 2	2	0 - 180	0 - 5	2	0 - 16	0 - 1
Canada wildrye	ELCA4	2	0 - 215	0 - 5	2	0 - 150	0 - 5	2	0 - 180	0 - 5	2	0 - 16	0 - 1
SEDGES AND RUSHES													
sedge	CAREX	3	215 - 430	5 - 10	3	150 - 600	5 - 20	3	180 - 720	5 - 20	3	160 - 480	10 - 30
Baltic rush	JUBA	3	0 - 86	0 - 2	3	0 - 60	0 - 2	3	0 - 72	0 - 2	3	0 - 80	0 - 5
bulrush	SCHOE6	3	0 - 86	0 - 2	3	0 - 60	0 - 2	3	0 - 72	0 - 2	3	0 - 32	0 - 2
horsetail	EOLA	3	0 - 86	0 - 2	3	0 - 60	0 - 2	3	0 - 72	0 - 2	3	0 - 32	0 - 2
rush	JUNCU	3	0 - 86	0 - 2	3	0 - 60	0 - 2	3	0 - 72	0 - 2	3	0 - 80	0 - 5
spikerush	ELEOC	3	0 - 86	0 - 2	3	0 - 60	0 - 2	3	0 - 180	0 - 5	3	80 - 160	5 - 10
MISCELLANEOUS GRASSES													
alkali sacaton	SPAI	4	0 - 215	0 - 5	4	150 - 450	5 - 15	4	180 - 540	5 - 15	4	320 - 640	20 - 40
foxtail barley	HOJU	4	0 - 215	0 - 5	4	0 - 150	0 - 5	4	0 - 180	0 - 5	4	80 - 160	5 - 10
green muhly	MURA	4	0 - 215	0 - 5	4	0 - 150	0 - 5	4	0 - 180	0 - 5	4	0 - 80	0 - 5
Kentucky bluegrass	POPR	4			4	150 - 450	5 - 15	4	180 - 540	5 - 15	4	240 - 640	15 - 40
other perennial grasses	2GP	4	0 - 215	0 - 5	4	0 - 150	0 - 5	4	0 - 180	0 - 5	4	0 - 80	0 - 5
FORBS													
American licorice	GLLE3	5	0 - 86	0 - 2	5	30 - 150	1 - 5	5	36 - 180	1 - 5	5	16 - 80	1 - 5
arrowgrass	TRPA6	5	0 - 86	0 - 2	5	0 - 60	0 - 2	5	0 - 72	0 - 2	5	0 - 32	0 - 2
clover	TRIFO	5	0 - 86	0 - 2	5	0 - 150	0 - 5	5	0 - 72	0 - 2	5	0 - 32	0 - 2
cudweed sagewort	ARLU	5	0 - 86	0 - 2	5	0 - 60	0 - 2	5	0 - 72	0 - 2	5	0 - 80	0 - 5
false boneset	BREU	5	0 - 86	0 - 2	5	0 - 60	0 - 2	5	0 - 72	0 - 2	5	0 - 32	0 - 2
heath aster	SYER	5	0 - 86	0 - 2	5	0 - 150	0 - 5	5	0 - 180	0 - 5	5	0 - 80	0 - 5
Maximilian sunflower	HEMA2	5	0 - 86	0 - 2	5	0 - 30	0 - 1	5	0 - 36	0 - 1	5	0 - 16	0 - 1
milkvetch	ASTRA	5	0 - 86	0 - 2	5	0 - 60	0 - 2	5	0 - 72	0 - 2	5	0 - 16	0 - 1
smartweed	POLYG4	5	0 - 86	0 - 2	5	0 - 150	0 - 5	5	0 - 180	0 - 5	5	0 - 80	0 - 5
western ragweed	AMPS	5	0 - 86	0 - 2	5	0 - 150	0 - 5	5	0 - 180	0 - 5	5	16 - 160	1 - 10
goldenrod	SOLID	5	0 - 86	0 - 2	5	0 - 150	0 - 5	5	0 - 180	0 - 5	5	0 - 80	0 - 5
shootingstar	DODEC	5	0 - 86	0 - 2	5	0 - 60	0 - 2	5	0 - 72	0 - 2	5	0 - 16	0 - 1
other perennial forbs	2FP	5	0 - 86	0 - 2	5	0 - 60	0 - 2	5	0 - 72	0 - 2	5	0 - 32	0 - 2
SHRUBS													
rose	ROSA5	6	0 - 215	0 - 5	6	0 - 150	0 - 5	6	0 - 180	0 - 5	6	0 - 80	0 - 5
silver buffaloberry	SHAR	6	0 - 215	0 - 5	6	0 - 150	0 - 5	6	0 - 180	0 - 5	6	0 - 80	0 - 5
western snowberry	SYOC	6	0 - 215	0 - 5	6	0 - 150	0 - 5	6	0 - 180	0 - 5	6	0 - 80	0 - 5
other shrubs	2SHRUB	6	0 - 215	0 - 5	6	0 - 90	0 - 3	6	0 - 108	0 - 3	6	0 - 16	0 - 1
TREES													
willow	SALIX	7	0 - 215	0 - 5	7	0 - 150	0 - 5	7	0 - 360	0 - 10	7	0 - 32	0 - 2
Annual Production lbs./acre													
3290 - 3763 - 4110 2255 - 2625 - 2965 2825 - 3060 - 3265 1125 - 1384 - 2030													
GRASSES & GRASS-LIKES													
210 - 323 - 450 145 - 225 - 325 175 - 270 - 375 75 - 160 - 250													
FORBS													
0 - 108 - 220 0 - 75 - 155 0 - 90 - 185 0 - 40 - 85													
SHRUBS													
0 - 108 - 220 0 - 75 - 155 0 - 180 - 375 0 - 16 - 35													
TREES													
3500 - 4300 - 5000 2400 - 3000 - 3600 3000 - 3600 - 4200 1200 - 1600 - 2400													

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

Big Bluestem/Little Bluestem/Indiangrass/Prairie Cordgrass Plant Community

Interpretations are based primarily on the Big Bluestem/Little Bluestem/Indiangrass/Prairie Cordgrass Plant Community (this is also considered to be climax). This plant community can be found on areas that are grazed and where the grazed plants receive adequate periods of rest during the growing

season in order to recover. Historically, fires occurred infrequently. The potential vegetation is about 80-95 percent grasses and grass-likes, 5-10 percent forbs, and 0-10 percent woody plants by air-dry weight.

Tall and mid-warm-season grasses dominate this community. The major grasses include big bluestem, little bluestem, prairie cordgrass, Indiangrass, and switchgrass. Other grasses and grass-likes occurring on the community include western wheatgrass, Canada wildrye, Baltic rush, spikerushes, and bulrushes. Key forbs and shrubs include American licorice, Maximilian sunflower, clovers, milk vetches, and willows.

This plant community is diverse, stable, productive, and well adapted to the Northern Great Plains. The high water table supplies much of the moisture for plant growth. Plant litter is properly distributed with little movement and natural plant mortality is very low. This is a sustainable plant community in terms of soil stability, watershed function, and biologic integrity.

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: NE6410

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

Growth curve description: Warm-season dominant, lowland.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	7	15	25	25	17	6	2	0	0

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

- Frequent and severe defoliation will shift this plant community *Little Bluestem/Western Wheatgrass/Sedge Plant Community*.
- Nonuse and no fire will convert this plant community to the *Excessive Litter Plant Community*. Initially, excess litter begins to build-up. Eventually native plants can show signs of mortality and decadence.

Little Bluestem/Western Wheatgrass/Sedge Plant Community

This plant community developed under frequent and severe defoliation without periodic rest. Big bluestem, prairie cordgrass, Indiangrass, switchgrass, and Canada wildrye have been significantly reduced. Little bluestem may initially increase or decrease depending upon the season of use.

Kentucky bluegrass has begun to invade. This plant community is at risk of losing tall warm-season grasses, palatable forbs, and shrubs.

This community indicates key management concerns. Prescribed grazing at this point will stabilize the community at or near the Big Bluestem/Little Bluestem/Indiangrass/Prairie Cordgrass Plant Community, while increased disturbance can easily move the community to a more degraded state.

While plant diversity has been reduced, the soil is stable. The water cycle, nutrient cycle, and energy flow is slightly reduced but continues to adequately function.

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: NE6408

Growth curve name: Pine Ridge/Badlands, lowland cool-season/warm-season codominant.

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

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	5	12	20	25	19	11	5	3	0	0

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

- Frequent and severe defoliation shifts this plant community to the *Kentucky Bluegrass/Sedge Plant Community*.
- Prescribed grazing with adequate recovery opportunity between grazing events will restore this community back to the *Big Bluestem/Little Bluestem/Indiangrass/Prairie Cordgrass Plant Community*.

Excessive Litter Plant Community

This plant community occurs after an extended period of nonuse and where fire has been eliminated. The dominant plants tend to be similar to those found in the Big Bluestem/Little Bluestem/Indiangrass/Prairie Cordgrass Plant Community; however, in advanced stages, frequency and production can be lower.

Litter amounts have increased causing plants to become decadent. Much of the plant nutrients are tied up in excessive litter. Organic matter oxidizes in the air rather than being incorporated into the soil due to the absence of animal impact. Typically, bunchgrasses (little bluestem) develop dead centers and rhizomatous grasses (prairie cordgrass) form small colonies because of a lack of tiller stimulation.

This plant community is not resistant to change. Grazing or fire can easily move it toward the Big Bluestem/Little Bluestem/Indiangrass/Prairie Cordgrass Plant Community. Soil erosion is not a concern due to increased litter levels and landscape position.

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: NE6409

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

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

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	8	18	27	23	12	6	3	0	0

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

- Prescribed grazing, or prescribed burning followed by prescribed grazing will shift this plant community towards the *Big Bluestem/Little Bluestem/Indiangrass/Prairie Cordgrass Plant Community*.

Kentucky Bluegrass/Sedge Plant Community

This plant community developed with further frequent and severe defoliation. The plant community is predominantly cool-season grasses and grass-like. Kentucky bluegrass has fully invaded the community and persists in a sod-bound condition. Baltic rush, various sedges, and foxtail barley have increased. Remnant amounts of western wheatgrass may still persist in localized colonies. Big bluestem, little bluestem, prairie cordgrass, Indiangrass, and switchgrass have been removed. Forbs such as kochia and Russian thistle have also increased. Invasive species such as leafy spurge and downy brome can invade the site if prescribed grazing management is not implemented.

This community remains stable but has lost much of its production and diversity. The nutrient cycle is impaired due to the loss of warm-season grass species, deep-rooted forbs (legumes and others), and shrubs. Soil compaction can be a concern if continuously grazed during wet cycles. It will take a long time to bring this plant community back to the Big Bluestem/Little Bluestem/Indiangrass/Prairie Cordgrass Plant Community with management alone. Renovation would be very costly due to high salt/alkali content and water table.

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: NE6407

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

Growth curve description: Cool-season dominant, warm-season subdominant, lowland.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	5	8	25	30	15	10	2	5	0	0

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

- Long-term prescribed grazing will move this plant community to the *Little Bluestem/Western Wheatgrass/Sedge Plant Community* and will eventually return to the *Big Bluestem/Little Bluestem/Indiangrass/Prairie Cordgrass Plant Community* or associated successional plant stages assuming an adequate seed/vegetative source is available. This process may require a long period of time to accomplish and may be difficult to attain depending on the degree of degradation.

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 Subirrigated Ecological Site (ES) provides upland grassland cover with an

associated forb, shrub, and tree component. It was typically part of an expansive grassland landscape that included combinations of Badlands, Thin Breaks, Clayey, Claypan, Dense Clay, Loamy, Saline, Sandy, Shallow, Overflow, 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 Subirrigated ES has remained relatively intact but may be subject to haying under drier conditions. This site receives surface and subsurface water from adjacent upland sites during precipitation events. The site provides important wetter habitat for birds, small rodents, bats, mammalian predators, reptiles, amphibians, and insects. These sites may provide forage sites for sharp-tailed grouse broods.

Big Bluestem/Little Bluestem/Indiangrass/Prairie Cordgrass (HCPC) and Excessive Litter: This site is dominated by big bluestem, little bluestem, Indiangrass, and prairie Cordgrass with a shrub community generally dominated by willow species. The robust forb and shrub community may contain species likely to occur in wetlands. Raptors such as red-tailed hawk, Swainson's hawk, American kestrel, and great-horned owl may use this site. Insects, such as pollinators, play a limited role in maintaining the forb community but provide a significant forage base for birds and other species. Sharp-tailed grouse may benefit from this site. Diverse prey populations are available for grassland raptors and mammalian predators, especially bobcat.

The diversity of grasses, forbs, and shrubs provide high nutrition levels for small and large herbivores including voles, mice, spotted ground squirrel, desert cottontail, white-tailed and black-tailed jackrabbit, and deer. This ES provides excellent fawning habitat for white-tailed deer. The relatively tall stature of this plant community provides suitable thermal, protective, and escape cover for small and large mammals. Predators utilizing this plant community include coyote, American badger, red fox, and short- 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, and prairie rattlesnake to this site.

Resulting from extended periods of nonuse or no fire, the plant community will become decadent and buildup litter. As plant litter accumulates, the grassland nesting bird composition may shift to favor those species that prefer dense litter (nonshort grass species), otherwise the wildlife community will remain largely unchanged.

Little Bluestem/Western Wheatgrass/Sedge: Resulting from frequent and severe defoliation without periodic grazing deferment, little bluestem and western wheatgrass species will dominate. The reduction of the tall warm-season grasses, increase in sedge species plus the invasion of Kentucky bluegrass limits wildlife forage and cover. Forb diversity and abundance remains relatively unchanged. The shift to shorter plants and additional sedge favors short-grass nesting songbirds and seed-eating small mammals. Sharp-tailed grouse may benefit from this site. Mammalian and raptor predation may increase at this site due to the increase in prey and increase in grassland patchiness. The shrub component of the plant community has not changed and wildlife will continue to benefit similar to the HCPC.

Kentucky Bluegrass/Sedge: Resulting from frequent and severe defoliation, Kentucky bluegrass will dominate. Both warm- and cool-season tall and medium height plant communities have been removed or significantly diminished. Forb and grass-like (e.g., sedges and rushes) species

abundance has increased. Plant species from adjacent ESs may become minor components of this plant community. The community is susceptible to invasion of annual brome grasses and other nonnative species due to severe soil disturbances and relatively high percent of bare ground. The shorter cover favors short grass nesting bird species. Small mammals continue to use these sites due to the continued prevalence of grass and weed seeds. However, limited prey populations limit predator use of these sites. Pollinators may increase use of these sites due to the increase in flowering forb abundance. Sharp-tailed grouse may use the sites as lek areas if adequate habitat is available at adjacent sites.

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

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
Grasses and Grass-likes							
alkali sacaton	U D D U	N U N N	U D D U	N U N N	N U N N	U D D U	U D D U
Baltic rush	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
big bluestem	U D P D	U D U U	U D P D	U D U U	U D U U	U D P D	U D P D
bulrush	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	U U U U
Canada wildrye	U D U U	N U N N	U D U U	N U N N	N U N N	U D U U	U D U U
foxtail barley	U D N N	N P N N	U D N N	N P N N	N P N N	U D N N	U D N N
green muhly	U D D U	N U N N	U D D U	N U N N	N U N N	U D D U	U D D U
horsetail	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
Indiangrass	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
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
prairie cordgrass	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
rush	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
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
slender wheatgrass	U P U U	N D U N	U P U U	N D U N	N D U N	U P U U	U P U U
spikerush	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
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
western wheatgrass	U P D U	N D N N	U P D U	N D N N	N D N N	U P D U	U P D U
Forbs							
American licorice	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
arrowgrass	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
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
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
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
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
Maximilian sunflower	U D P U	U D P U	U D P U	U D P U	U D P U	U D P U	U D P U
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
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
Shrubs							
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
silver buffaloberry	D U U U	D U U U	D U U U	P U D P	U U U U	D U U U	D U U U
western snowberry	U U U U	U U U U	U U U U	D U D D	U U U U	U U U U	D U U U
Trees							
willow	P U D P	P U D P	P U D P	P U D P	U U U U	P U D P	P U D P

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

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

Animal Community – Grazing Interpretations

The following table lists 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.

Plant Community	Average Annual Production (lbs./acre, air-dry)	Stocking Rate* (AUM/acre)
Big Bluestem/Little Bluestem/Indiangrass/Prairie Cordgrass	4,300	1.34
Little Bluestem/Western Wheatgrass/Sedge	3,000	0.95
Excessive Litter	3,600	1.16
Kentucky Bluegrass/Sedge	1,600	0.51

*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

Moisture conditions are ideal for forage production on this site. Soils on this site are mostly in Hydrologic Soil Group C but may include soils in Group D, and local areas in Group A. Although most of these soils are very permeable, water tables provide subirrigation of grasses and other vegetation. Surrounding upland areas tend to also have permeable soils and surface inflow peaks on these sites are often muted. These sites are rarely to occasionally flooded. Refer to Section 4, NRCS National Engineering Handbook for runoff quantities and hydrologic curves.

Recreational Uses

This site provides hunting, hiking, photography, bird watching, and other opportunities. The wide varieties of plants that 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

(064XY022NE) – Wet Land

(064XY029NE) – Sandy Lowland

Similar Sites

(064XY025NE) – Saline Subirrigated [more salt tolerant species]

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