

United States Department of Agriculture Natural Resources Conservation Service

Ecological Site Description

Site Type: Rangeland

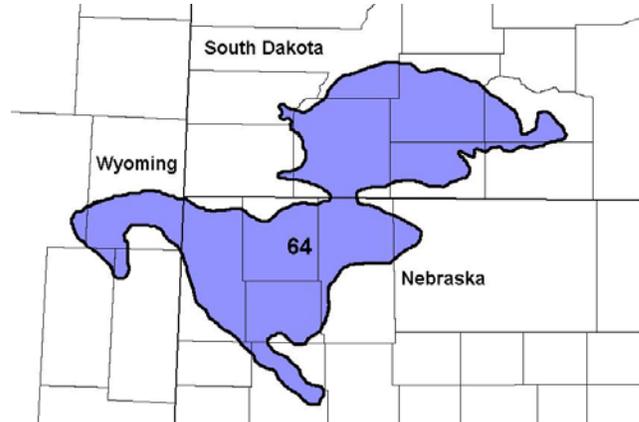
Site Name: Loamy Terrace

Site ID: R064XY028NE

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

Physiographic Features

This site is nearly level to gently sloping and occurs on alluvial fans and low terraces.



Landform: alluvial fan, stream terrace

Aspect: N/A

	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	2900	4000
Slope (percent):	0	3
Water Table Depth (inches):	80	80
Flooding:		
Frequency:	None	Rare
Duration:	Very brief	Very brief
Ponding:		
Depth (inches):	None	None
Frequency:	None	None
Duration:	None	None
Runoff Class:	Negligible	High

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, SD) to about 25° F (Hemingford, NE). July is the warmest month with temperatures averaging from about 70° F (Keeline 3 W, 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 annually, ranging from about 13 miles per hour during the spring to about 10 miles per hour during the summer. Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 50 miles per hour.

Growth of 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. Green up 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):	138	143
Freeze-free period (days):	161	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

Stream Type: B6, C6

(Rosgen System)

Representative Soil Features

The common features of soils in this site are the loamy very fine sand to silty clay textured subsoils and slopes of 0 to 3 percent. The soils in this site are well drained and formed in alluvium. The very fine sandy loam to silty clay surface layer is 3 to 25 inches thick. The soils have a slow to moderate infiltration rate. This site should show no evidence of rills, wind scoured areas or pedestalled plants. Water flow paths are broken, irregular in appearance or discontinuous with numerous debris dams or vegetative barriers. The soil surface is stable and intact.

These soils are mainly susceptible to water erosion. The hazard of water erosion increases where vegetative cover is not adequate. A drastic loss of the soil surface layer 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 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, loam, clay loam, very fine sandy loam, silty clay
Surface Texture Modifier: none
Subsurface Texture Group: loamy
Surface Fragments $\leq 3''$ (% Cover): 0
Surface Fragments $> 3''$ (%Cover): 0
Subsurface Fragments $\leq 3''$ (% Volume): 0-10
Subsurface Fragments $> 3''$ (% Volume): 0-5

	<u>Minimum</u>	<u>Maximum</u>
Drainage Class:	well	well
Permeability Class:	slow	moderate
Depth (inches):	80	80
Electrical Conductivity (mmhos/cm)*:	0	8
Sodium Absorption Ratio*:	0	10
Soil Reaction (1:1 Water)*:	6.1	9.0
Soil Reaction (0.1M CaCl₂)*:	NA	NA
Available Water Capacity (inches)*:	6	8
Calcium Carbonate Equivalent (percent)*:	3	25

* - 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.

This site is located on old floodplain terraces that are no longer susceptible to flooding except under extreme events. On many sites, old remnant cottonwood galleries or ash/shrub overstory communities still exist, however, little if any regeneration is present.

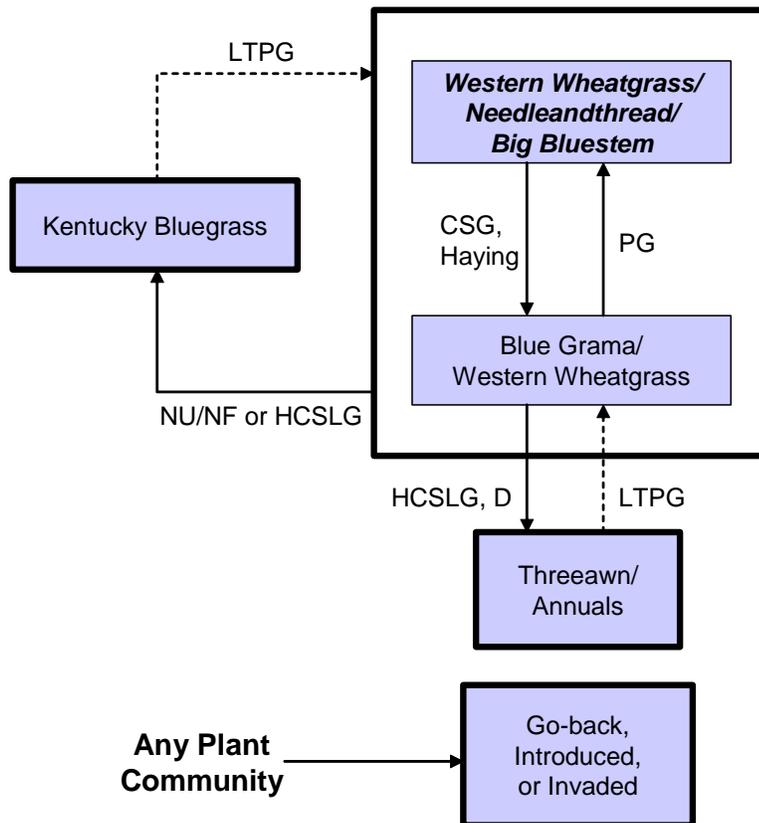
Continuous season-long grazing (during the typical growing season of May through October) and/or repeated seasonal grazing (e.g., every spring, every summer) without adequate recovery periods following each grazing occurrence causes this site to depart from the Western Wheatgrass/Needleandthread/Big Bluestem Plant Community. Species such as blue grama will initially increase. Big bluestem, needleandthread, and western wheatgrass will decrease in frequency and production. Extended periods of non-use and/or lack of fire will result in a plant community having high litter levels, which favors an increase in Kentucky bluegrass and/or annual brome grass. Extended periods of heavy continuous grazing without adequate recovery periods will also favor an increase of Kentucky bluegrass and/or annual brome grass. Trees species such as cottonwood, green ash, American elm, hackberry and shrub species such as American plum and chokecherry will eventually disappear over time because of lack of regeneration. Snowberry and rose will continue to be a component in the plant communities.

This site is often used for hay production or is in some type of cropping rotation because of high soil productivity. Continuous haying will result in the plant community becoming dominated by shortgrass species. Cultivation and/or seeding to introduced forage species will result in a plant community that would require significant inputs of capital and time to move back to the Western Wheatgrass/Needleandthread/Big Bluestem Plant Community, and may not be achievable after long-term cultivation.

Interpretations are primarily based on the Western Wheatgrass/Needleandthread/Big Bluestem 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



CSG - Continuous seasonal grazing (grazing a unit for an entire portion of a growing season, and the same season every year); **D** - Defoliation; **HCSLG** - Heavy, continuous season-long grazing; **LTPG** - Long-term prescribed grazing; **NU/NF** - Extended period of non-use & no fire; **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/GRASS NAME	SYMBOL	Western Wheatgrass/Needle-and-thread/Big Bluestem			Blue Grama/ Western Wheatgrass			Kentucky Bluegrass			Threeawn/Annuals		
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp
GRASSES & GRASS-LIKES													
western wheatgrass	PASM	1	1950 - 2210	75 - 85	1	1120 - 1360	70 - 85	1	715 - 880	65 - 80	1	360 - 630	40 - 70
needlegrass	HECOC8	2	260 - 650	10 - 25	2	32 - 160	2 - 10	2	11 - 165	1 - 15	2	0 - 45	0 - 5
green needlegrass	NAW4	2	52 - 208	2 - 8	2	32 - 128	2 - 8	2	11 - 110	1 - 10	2	0 - 45	0 - 5
SHORT WARM-SEASON													
blue grama	BOGR2	3	52 - 130	2 - 5	3	240 - 560	15 - 35	3	11 - 88	1 - 8	3	0 - 90	0 - 10
hairy grama	BOHI2	3	0 - 130	0 - 5	3	0 - 160	0 - 10	3	0 - 55	0 - 5	3	0 - 45	0 - 5
buffalograss	BUDA	3	26 - 130	1 - 5	3	128 - 320	8 - 20	3	0 - 55	0 - 5	3	0 - 45	0 - 5
OTHER WARM-SEASON													
big bluestem	ANGE	4	52 - 390	2 - 15	4	16 - 48	1 - 3	4	0 - 33	0 - 3			
sideoats grama	BOCU	4	26 - 208	1 - 8	4	16 - 80	1 - 5	4	0 - 33	0 - 3			
OTHER NATIVE GRASSES													
prairie sandreed	CALO	5	52 - 260	2 - 10	5	18 - 48	1 - 3	5	11 - 33	1 - 3			
prairie junegrass	KOMA	5	26 - 78	1 - 3	5	16 - 64	1 - 4	5	11 - 22	1 - 2	5	0 - 27	0 - 3
tall dropseed	SPCOC2	5	52 - 130	2 - 5	5	32 - 80	2 - 5	5	11 - 33	1 - 3			
sand dropseed	SPCR	5	0 - 78	0 - 3	5	16 - 48	1 - 3	5	11 - 22	1 - 2	5	9 - 45	1 - 5
inland saltgrass	DISP	5	0 - 52	0 - 2	5	0 - 32	0 - 2	5	0 - 11	0 - 1	5	9 - 27	1 - 3
switchgrass	PAV12	5	0 - 52	0 - 2	5	0 - 16	0 - 1	5	0 - 11	0 - 1			
threeawn	ARIST	5			5	16 - 80	1 - 5	5	11 - 55	1 - 5	5	180 - 270	20 - 30
other perennial grasses	ZOP	5	26 - 78	1 - 3	5	0 - 64	0 - 4	5	0 - 44	0 - 4	5	0 - 18	0 - 2
GRASS-LIKES													
sedge	CAREX	6	130 - 260	5 - 10	6	80 - 240	5 - 15	6	22 - 110	2 - 10	6	0 - 90	0 - 10
other grass-likes	ZGL	6	0 - 26	0 - 1	6	0 - 80	0 - 5	6	0 - 33	0 - 3	6	0 - 27	0 - 3
NON-NATIVE GRASSES													
Kentucky bluegrass	POPR	7			7	16 - 160	1 - 10	7	165 - 550	15 - 50	7	18 - 90	2 - 10
cheatgrass	BRTE	7			7	0 - 80	0 - 5	7	22 - 110	2 - 10	7	18 - 45	2 - 5
smooth bromegrass	BRIN2	7			7	0 - 80	0 - 5	7	0 - 110	0 - 10			
FORBS													
American licorice	GLLE3	8	26 - 52	1 - 2	8	80 - 240	5 - 15	8	110 - 220	10 - 20	8	180 - 450	20 - 50
American vetch	VIAM	8	26 - 52	1 - 2	8	0 - 16	0 - 1	8	0 - 11	0 - 1			
cudweed sagewort	ARLU	8	52 - 130	2 - 5	8	16 - 48	1 - 3	8	11 - 55	1 - 5	8	0 - 27	0 - 3
curlycup gumweed	GRSQ	8			8	0 - 48	0 - 3	8	0 - 55	0 - 5	8	0 - 90	0 - 10
deathcamas	ZIGAD	8	0 - 26	0 - 1	8	0 - 16	0 - 1	8	0 - 11	0 - 1	8	0 - 9	0 - 1
dotted gayfeather	LIPU	8	0 - 26	0 - 1	8	0 - 16	0 - 1	8	0 - 11	0 - 1			
false boneset	BREU	8	0 - 78	0 - 3	8			8	0 - 11	0 - 1			
goldenrod	SOLID	8	0 - 52	0 - 2	8	0 - 32	0 - 2	8	0 - 22	0 - 2			
green sagewort	ARDR4	8	0 - 26	0 - 1	8	16 - 32	1 - 2	8	11 - 55	1 - 5	8	9 - 90	1 - 10
groundplum milkvetch	ASCR2	8	0 - 26	0 - 1	8	0 - 16	0 - 1	8	0 - 11	0 - 1			
heath aster	SYER	8	26 - 130	1 - 5	8	16 - 80	1 - 5	8	11 - 55	1 - 5	8	0 - 9	0 - 1
mare's tail	COCA5	8			8	16 - 32	1 - 2	8	11 - 33	1 - 3	8	0 - 90	0 - 10
mullein	VERBA	8			8	0 - 32	0 - 2	8	0 - 55	0 - 5	8	0 - 90	0 - 10
penstemon	PENST	8	0 - 26	0 - 1									
prairie coneflower	RACO3	8	0 - 26	0 - 1	8	16 - 32	1 - 2	8	0 - 11	0 - 1			
purple coneflower	ECAN2	8	0 - 26	0 - 1	8	0 - 48	0 - 3	8	0 - 11	0 - 1			
purple prairie clover	DAPU5	8	26 - 52	1 - 2	8	0 - 16	0 - 1	8	0 - 11	0 - 1			
pussytoes	ANTEN	8	0 - 26	0 - 1	8	16 - 32	1 - 2	8	0 - 11	0 - 1	8	9 - 45	1 - 5
rush skeletonweed	L'YJU	8	0 - 26	0 - 1	8	16 - 48	1 - 3	8	11 - 33	1 - 3	8	0 - 27	0 - 3
salsify	TRAGO	8			8	16 - 48	1 - 3	8	22 - 55	2 - 5	8	9 - 45	1 - 5
scarlet gaura	GACO5	8	0 - 26	0 - 1									
scarlet globemallow	SPCO	8	0 - 52	0 - 2	8	16 - 32	1 - 2	8	0 - 11	0 - 1	8	0 - 9	0 - 1
silverleaf scurfpea	PEAR6	8	26 - 52	1 - 2	8	16 - 48	1 - 3	8	11 - 22	1 - 2	8	0 - 9	0 - 1
textile onion	ALTE	8	0 - 26	0 - 1	8	0 - 16	0 - 1	8	0 - 11	0 - 1			
verbena	VERBE	8	0 - 26	0 - 1	8	16 - 48	1 - 3	8	11 - 55	1 - 5	8	9 - 27	1 - 3
wavyleaf thistle	CIUN	8	0 - 26	0 - 1	8	0 - 32	0 - 2	8	0 - 22	0 - 2	8	0 - 45	0 - 5
western ragweed	AMPS	8	0 - 52	0 - 2	8	16 - 48	1 - 3	8	11 - 55	1 - 5	8	0 - 45	0 - 5
western wallflower	ERCAC	8	0 - 26	0 - 1									
western yarrow	ACM12	8	26 - 52	1 - 2	8	16 - 32	1 - 2	8	11 - 55	1 - 5	8	9 - 45	1 - 5
wild parsley	MUDI	8	0 - 26	0 - 1	8	0 - 16	0 - 1	8	0 - 11	0 - 1			
other perennial forbs	ZFP	8	0 - 26	0 - 1	8	0 - 32	0 - 2	8	0 - 22	0 - 2	8	0 - 45	0 - 5
other annual forbs	ZFA	8			8	16 - 160	1 - 10	8	11 - 22	1 - 2	8	9 - 90	1 - 10
SHRUBS													
American plum	PRAM	9	130 - 990	5 - 15	9	80 - 160	5 - 10	9	55 - 110	5 - 10	9	18 - 90	2 - 10
broom snakeweed	GUSA2	9	26 - 78	1 - 3	9	16 - 48	1 - 3	9	11 - 33	1 - 3			
chokecherry	PRV1	9	26 - 78	1 - 3	9	0 - 48	0 - 3	9	0 - 33	0 - 3	9	9 - 72	1 - 8
currant	RIBES	9	0 - 52	0 - 2	9	0 - 32	0 - 2	9	0 - 22	0 - 2			
false indigo	AMFR	9	0 - 26	0 - 1									
fringed sagewort	ARFR4	9	26 - 78	1 - 3	9	16 - 80	1 - 5	9	11 - 55	1 - 5	9	9 - 45	1 - 5
leadplant	AMCA6	9	0 - 52	0 - 2	9	0 - 16	0 - 1	9	0 - 11	0 - 1			
rose	ROSA5	9	26 - 78	1 - 3	9	16 - 48	1 - 3	9	22 - 33	2 - 3	9	0 - 27	0 - 3
silver buffaloberry	SHAR	9	0 - 52	0 - 2	9	0 - 48	0 - 3	9	0 - 33	0 - 3			
silver sagebrush	ARCA13	9	0 - 260	0 - 10	9	0 - 80	0 - 5	9	0 - 55	0 - 5	9	0 - 18	0 - 2
western snowberry	SYOC	9	52 - 260	2 - 10	9	16 - 128	1 - 8	9	22 - 110	2 - 10			
other shrubs	ZSHRUB	9	0 - 26	0 - 1	9	0 - 32	0 - 2	9	0 - 11	0 - 1	9	0 - 9	0 - 1
TREES													
American elm	ULAM	10	26 - 130	1 - 5	10	0 - 80	0 - 5	10	0 - 55	0 - 5	10	0 - 18	0 - 2
boxelder	ACNE2	10	0 - 26	0 - 1	10	0 - 16	0 - 1	10	0 - 11	0 - 1	10	0 - 9	0 - 1
green ash	FRPE	10	26 - 52	1 - 2									
hackberry	CEOC	10	0 - 26	0 - 1	10	0 - 32	0 - 2	10	0 - 22	0 - 2			
plains cottonwood	PODEM	10	0 - 52	0 - 2	10	0 - 32	0 - 2	10	0 - 22	0 - 2	10	0 - 9	0 - 1
other trees	ZTREE	10	0 - 26	0 - 1	10	0 - 16	0 - 1	10	0 - 11	0 - 1	10	0 - 9	0 - 1
Annual Production lbs./acre													
GRASSES & GRASS-LIKES			LOW	RV	HIGH		LOW	RV	HIGH		LOW	RV	HIGH
FORBS			1345	-	1963	-	2615		1050	-	1280	-	1500
SHRUBS			205	-	299	-	425		75	-	160	-	250
TREES			125	-	260	-	425		75	-	120	-	165
TOTAL			25	-	78	-	135		0	-	40	-	85
			1700	-	2600	-	3600		1200	-	1600	-	2000
									700	-	1100	-	2200
											400	-	900
												-	1400

This list of plants and their relative proportions are based on near normal years. Fluctuations in species composition and relative production may change from year to year dependent upon precipitation or other climatic factors. RV = Representative value. 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 are collected, some of these plant communities may be revised or removed, and new ones may be added. None of these plant communities should necessarily be thought of as “Desired Plant Communities”. According to the USDA NRCS National Range and Pasture Handbook, Desired Plant Communities (DPC’s) will be determined by the decision-makers and will meet minimum quality criteria established by the NRCS. The main purpose for including any description of a plant community here is to capture the current knowledge and experience at the time of this revision.

Western Wheatgrass/Needleandthread/Big Bluestem Plant Community

Interpretations are based primarily on the Western Wheatgrass/Needleandthread/Big Bluestem Plant Community (this is also considered to be climax). This community evolved with grazing by large herbivores and occasional prairie fire, and can be found on areas that are properly managed with prescribed grazing. The potential vegetation is about 80% grasses and grass-like plants, 10% forbs, 10% shrubs, and 2% trees. Major grasses include western wheatgrass, needleandthread and big bluestem. Other grasses occurring on this community include prairie sandreed, green needlegrass, blue grama and sedges. Major forbs and shrubs include cudweed sagewort, American vetch, American licorice, heath aster, western yarrow, western snowberry, wild rose, American plum, chokecherry and fringed sagewort. Scattered plains cottonwood, green ash, and other tree species may occur.

This plant community is well adapted to the Northern Great Plains climatic conditions. Individual species can vary greatly in production depending on growing conditions (timing and amount of precipitation and temperature). Community dynamics, nutrient cycle, water cycle and energy flow are functioning properly. Plant litter is properly distributed with very little movement off-site and natural plant mortality is very low. The diversity in plant species allows for high drought tolerance. Run-off from adjacent sites and moderate or high available water capacity provides a favorable soil-water-plant relationship.

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

Growth curve number: NE6402

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

Growth curve description: Cool-season dominant, warm-season sub-dominant.

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

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

- Non-use and no fire for an extended period of time will convert this plant community to the *Kentucky Bluegrass Plant Community*.
- Heavy continuous grazing will convert the plant community to the *Kentucky Bluegrass Plant Community*.
- Continuous seasonal grazing and/or haying will convert the plant community to the *Blue Grama/Western Wheatgrass Plant Community*.

Blue Grama/Western Wheatgrass Plant Community

This plant community can develop from the adverse effects of continuous grazing without adequate recovery periods between each grazing event during the growing season, or continuous haying. Recognition of this plant community will enable the land user to implement key management decisions before a significant ecological threshold is crossed. Blue grama and western wheatgrass are the dominant species. Needleandthread, big bluestem and sideoats grama have been greatly reduced. Common forb species include western yarrow, asters, prairie coneflower, silverleaf scurfpea, wavyleaf thistle and western salsify. American plum, chokecherry and western snowberry can be reduced in composition especially with native haying operations. Regeneration of shrubs would be greatly reduced while mature plants would tend to be heavily browsed.

This plant community is relatively stable and less productive than the Western Wheatgrass/Needleandthread/Big Bluestem Plant Community. Reduction of litter and short plant heights result in higher soil temperatures, poor water infiltration rates, increased runoff and high evapo-transpiration rates. This plant community can occur throughout the site, on spot grazed areas, and around water sources where season-long grazing patterns occur. Soil erosion will be minimal due to the sod forming habit of blue grama.

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

Growth curve number: NE6403

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

Growth curve description: Cool-season, warm-season co-dominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	5	10	20	25	20	10	5	5	0	0

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

- Prescribed grazing with adequate recovery periods following each grazing event and proper stocking will shift this plant community back to the *Western Wheatgrass/Needleandthread/Big Bluestem Plant Community*.
- Non-use and no fire for extended periods of time will convert this plant community to the *Excessive Litter and/or Kentucky Bluegrass Plant Community*.
- Heavy continuous grazing will convert the plant community to the *Kentucky Bluegrass Plant Community*.
- Heavy continuous season-long grazing, or severe defoliation, will move this plant community toward the *Threeawn/Annuals Plant Community*.

Kentucky Bluegrass Plant Community

This plant community develops after an extended period of non-use and exclusion of fire, or under heavy continuous grazing. With non-use and no fire, eventually litter levels become high enough to reduce native grass vigor, diversity and density. Kentucky bluegrass dominates this plant community. Common forbs include verbena, western ragweed, mullein and salsify. Shrubs such as western snowberry, rose, American plum and chokecherry may increase if climatic conditions exist for regeneration. Remnant tree will persist but little if any regeneration will occur.

With heavy continuous grazing the native grass vigor, diversity and density will decline. Kentucky bluegrass will dominate this plant community. Common forbs include verbena, western ragweed, mullein and salsify. Common shrubs will include western snowberry, rose, American plum and chokecherry. Regeneration of shrubs will be greatly reduced while mature plants would tend to be heavily browsed. Remnant tree, including green ash and plains cottonwood will persist but little if any regeneration will occur.

This plant community is resistant to change without prescribed grazing and/or fire. The combination of both grazing and fire is most effective in moving this plant community toward the Western Wheatgrass/Needleandthread/Big Bluestem Plant Community. Soil erosion is low. Runoff is similar to the Western Wheatgrass/Needleandthread/Big Bluestem Plant Community. Once the advanced stage of this plant community is reached, time and external resources will be needed to see a recovery in the diversity of the site.

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

Growth curve number: NE6401

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

Growth curve description: Cool-season dominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	5	15	28	30	10	2	5	5	0	0

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

- Long-term prescribed grazing and/or fire with adequate recovery periods following each grazing event and proper stocking over long periods of time may move this plant community toward the *Western Wheatgrass/Needleandthread/Big Bluestem Plant Community* or associated successional plant community stages assuming an adequate seed/vegetative source is available. This will require long-term management and/or prescribed burning under controlled conditions.

Threeawn/Annuals Plant Community

This plant community developed under continuous heavy grazing and/or disturbance. The potential plant community is made up of approximately 50% grasses and grass-like species, 40% forbs and 10% shrubs. The dominant grasses include threeawn, blue grama, sedge and cheatgrass. Other grasses may include western wheatgrass, buffalograss, sand dropseed and inland saltgrass. The dominant forbs include green sagewort, cudweed sagewort, western ragweed, fetid marigold, pussytoes, prostrate verbena and a number of invader species. Other plant species, from adjacent ecological sites, can become minor components of this plant community. This plant community is susceptible to invasion of Canada thistle and other non-native species because of the relatively high percent of bare ground. Compared to the Western Wheatgrass/Needleandthread/Big Bluestem Plant Community, threeawn, cheatgrass, and percent of bare ground have increased. Western wheatgrass, needlegrasses and other cool season grasses have decreased as have the warm season species including big bluestem, sideoats grama, and prairie sandreed.

This plant community is difficult to return back to the Western Wheatgrass/Needleandthread/Big Bluestem Plant Community because of the loss of plant diversity and overall soil disturbance. It is very susceptible to invasion of non-native plant species, and overall plant diversity is low. Soil erosion is potentially very high because of the bare ground and shallow rooted herbaceous plant community. Water runoff will increase and infiltration will decrease due to animal related soil compaction and loss of root mass due to low plant diversity and vigor. This plant community will require significant economic inputs and time to move towards another plant community. This movement is highly variable in its succession. This is due to the loss of diversity (including the loss of the seed bank), within the existing plant community, and the plant communities on adjacent sites. This site can be renovated to improve the production capability, however if management changes are not made the vegetation could revert back to a threeawn/annual community.

The following growth curve is an estimate of the 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 co-dominant.

Growth curve description: Cool-season, warm-season co-dominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	5	10	20	25	20	10	5	5	0	0

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

- Under long-term prescribed grazing, including adequate rest periods, this plant community will move through the successional stages leading to the *Western Wheatgrass/Needleandthread/Big Bluestem Plant Community*. Depending on the slope, aspect, and size, and if adequate perennial plants exist, this change can occur more rapidly. This will likely take a long period of time (10+ years) and intensive management.

Go-back, Introduced, or Invaded Plant Community

This group includes three separate vegetation states that are highly variable in nature. They are derived through three distinct management scenarios, and are not related successionaly. Infiltration, runoff and soil erosion varies depending on the vegetation present on the site.

The **Go-back** state can be reached whenever severe mechanical disturbance occurs (e.g., tilled and abandoned land, either past or present). During the early successional stages, the species that mainly dominate are annual grasses and forbs, later being replaced by both native and introduced perennials. The vegetation on this site varies greatly, sometimes being dominated by three-awn, annual brome, crested wheatgrass, buffalograss, dropseeds, broom snakeweed, verbena, mullein, sweetclover and non-native thistles. Other plants that commonly occur on the site include western wheatgrass, deathcamas, prickly lettuce, marestail, kochia, foxtail and sunflowers. Bare ground is prevalent due to the loss of organic matter and lower overall soil health.

The **Introduced** state is normally those areas seeded to crested wheatgrass, pubescent, intermediate wheatgrass and alfalfa, or other introduced species. It may require considerable investment. Refer to the associated Forage Suitability Group description for adapted species.

The **Invaded** state includes areas that have been invaded by species such as smooth brome, Kentucky bluegrass, non-native thistles, field bindweed, knapweeds, leafy spurge, hoary cress and other introduced species.

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

-- Under Development --

Western Wheatgrass/Needleandthread/Big Bluestem Plant Community:

Blue Grama/Western Wheatgrass Plant Community:

Kentucky Bluegrass Plant Community:

Threeawn/Annuals Plant Community:

Go-back, Introduced or Invaded Plant Community:

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

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
Grasses and Grass-likes							
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
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
buffalograss	U U D U	N U D U	U U D U	N U D U	N U D U	U U D U	U U D U
green needlegrass	U P U D	N P N P	U P U D	N P N P	N P N P	U P U D	U P U D
hairy grama	U D P U	D P P D	U D P U	D P P D	D P P D	U D P U	U D P U
inland saltgrass	N U U N	N N N N	N U U N	N N N N	N N N N	N U U N	N U U N
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 cottonwood	D U U D	D U U D	D U U D	D U D D	D U U D	D U U D	D U U D
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
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
sideoats grama	U D P U	U P D U	U D P U	U P D U	U P D U	U D P U	U D P U
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
tall 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
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
American vetch	U D P U	U P P U	U D P U	U P P U	U P P U	U D P U	U P P U
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
deathcamas	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
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
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
green sagewort	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U
groundplum milkvetch	U D U U	U D D U	U D U U	U D D U	U D D U	U D U U	U D D U
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
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
silverleaf scurfpea	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
textile 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
verbena	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
wavyleaf thistle	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N
western 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
western wallflower	U D U U	N U U N	U D U U	N U U N	N U U N	U D U U	N U U N
western yarrow	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
wild parsley	U D U U	U D D U	U D U U	U D D U	U D D U	U D U U	U D D U
Shrubs							
American plum	D U U D	D U U D	D U U D	P U D D	D U U D	D U U D	D U U D
chokecherry	D T T D	D T T D	D T T D	P U D P	D U U D	D T T D	P U U P
currant	D U U D	D U U D	D U U D	D U U D	U U U U	D U U D	D U U D
false indigo	D U U D	D U U D	D U U D	P U D D	D U U D	D U U D	D U U D
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
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
silver sagebrush	D U U D	D U U D	D U U D	P D D P	P P P P	D U U D	D U U D
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							
American elm	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
boxelder	D U U D	D U U D	D U U D	D U D D	D U U D	D U U D	D U U D
green ash	D U U D	D U U D	D U U D	D U D D	D U U D	D U U D	D U U D
hackberry	D U U D	D U U D	D U U D	D U D D	D U U D	D U U D	D U U D
plains cottonwood	D U U D	D U U D	D U U D	D U D D	D U U D	D U U 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)
Western Wheatgrass/Needleandthread/Big Bluestem	2600	0.80
Blue Grama/Western Wheatgrass	1600	0.50
Excessive Litter and/or Kentucky Bluegrass	1100	0.35**
Threeawn/Annuals	900	0.28**
Go-back, Introduced, or Invaded	700	**

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

** Highly variable; stocking rate needs to be determined on site.

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 groups B and C. Infiltration and runoff potential for this site varies from moderate to high depending on soil hydrologic group, slope and ground cover. In many cases, areas with greater than 75% ground cover have the greatest potential for high infiltration and lower runoff. An exception would be where shortgrasses form a dense sod and dominate the site. Areas where ground cover is less than 50% have the greatest potential to have reduced infiltration and higher runoff (refer to Section 4, NRCS National Engineering Handbook for runoff quantities and hydrologic curves).

Recreational Uses

This site provides hunting opportunities for upland game species. The wide variety of plants which bloom from spring until fall have an esthetic value that appeals to visitors.

Wood Products

No appreciable wood products are present on the site.

Other Products

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

Supporting Information

Associated Sites

(064XY015NE) – Loamy 14-17" P.Z.

(064XY036NE) – Loamy 17-20" P.Z.

(064XY026NE) – Loamy Overflow

Similar Sites

(064XY026NE) – Loamy Overflow [more big bluestem; higher production]
 (064XY015NE) or (064XY0036NE) – Loamy 14-17" P.Z. or Loamy 17-20" P.Z.
 [less big bluestem; lower 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 include: Stan Boltz, Range Management Specialist, NRCS; Jill Epley, Range Management Specialist, NRCS; Rick Peterson, Range Management Specialist, NRCS; David Steffen, Range Management Specialist, NRCS; Jeff Vander Wilt, Range Management Specialist, NRCS; 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 Nebraska, South Dakota and Wyoming 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://hpccsun.unl.edu>)

USDA, NRCS. National Water and Climate Center, 101 SW Main, Suite 1600, Portland, OR 97204-3224. (<http://wcc.nrcs.usda.gov>)

USDA, NRCS. National Range and Pasture Handbook, September 1997

USDA, NRCS. National Soil Information System, Information Technology Center, 2150 Centre Avenue, Building A, Fort Collins, CO 80526. (<http://nasis.nrcs.usda.gov>)

USDA, NRCS. 2001. The PLANTS Database, Version 3.1 (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

USDA, NRCS, Various Published Soil Surveys.

Site Description Approval

NE, State Range Management Specialist	Date	SD, State Range Management Specialist	Date
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WY, State Range Management Specialist	Date
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