United States Department of Agriculture
Natural Resources Conservation Service

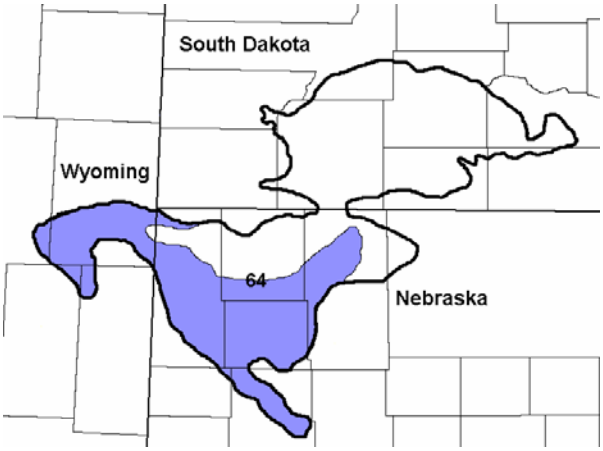
Ecological Site Description

Site Type: Rangeland

Site Name: Loamy 14-17" P.Z.

Site ID: R064XY015NE

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



Physiographic Features
This site occurs on gently undulating to rolling plains and low hills.

Landform: alluvial fan, alluvial flat, hill, plain **Aspect:** N/A

	Minimum	Maximum
Elevation (feet):	2900	4000
Slope (percent):	0	30
Water Table Depth (inches):	None	None
Flooding:		
Frequency:	None	None
Duration:	None	None
Ponding:		
Depth (inches):	0	0
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 17 inches per year. The normal average annual temperature is about 46°F. January is the coldest month with average temperatures ranging from about 22°F (Keeline 3 W, Wyoming (WY)), to about 25°F (Hemingford, Nebraska (NE)). July is the warmest month with temperatures averaging from about 70°F (Keeline 3 W, WY), to about 72°F (Hemingford, NE). The range of normal average monthly temperatures between the coldest and warmest months is about 50°F. This large annual range attests to the continental nature of this area's climate. Hourly winds are estimated to average about 11 miles per hour annually, ranging from about 13 miles per hour during the spring to about 10 miles per hour during the summer. Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 50 miles per hour.

Growth of 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.

	Minimum	Maximum
Frost-free period (days):	115	139
Freeze-free period (days):	137	163
Mean Annual Precipitation (inches):	14	17

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

	Precip. Min.	Precip. Max	Temp. Min.	Temp. Max.
January	0.46	0.52	10.0	35.8
February	0.48	0.55	15.1	40.7
March	0.90	1.00	21.0	47.5
April	1.83	1.95	28.9	56.8
May	2.22	3.26	38.3	67.4
June	2.05	2.89	47.3	78.2
July	1.63	2.38	53.9	86.5
August	1.09	1.59	52.3	84.6
September	1.09	1.33	42.4	74.6
October	0.80	1.02	32.6	62.4
November	0.56	0.64	20.4	46.8
December	0.42	0.49	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

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 very fine sandy loam to loam textured surface soils and slopes of 0 to 30 percent. The soils in this site are well to somewhat excessively drained and formed in soft siltstone, sandstone or alluvium. The surface layer is 5 to 25 inches thick. The texture of the profile ranges from loamy very fine sand to clay loam. The soils have a moderate infiltration rate. This site should show slight to no evidence of rills, wind scoured areas or pedestalled plants. Water flow paths are broken, irregular in appearance or discontinuous with numerous debris dams or vegetative barriers. The soil surface is stable and intact. Subsurface soil layers are not restrictive to water movement and root penetration.

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 USDA Service Center for soil survey reports that include more detail specific to your location.

Parent Material Kind: alluvium, limestone, sandstone
Parent Material Origin: mixed
Surface Texture: very fine sandy loam, loam
Surface Texture Modifier: none
Subsurface Texture Group: loamy
Surface Fragments ≤ 3" (% Cover): 0
Surface Fragments > 3" (%Cover): 0
Subsurface Fragments ≤ 3" (% Volume): 0-30
Subsurface Fragments > 3" (% Volume): 0-15

	Minimum	Maximum
Drainage Class:	well	somewhat excessively
Permeability Class:	moderately slow	moderate
Depth to Bedrock (inches):	20	80
Electrical Conductivity (mmhos/cm)*:	0	2
Sodium Absorption Ratio*:	0	5
Soil Reaction (1:1 Water)*:	6.1	9.0
Soil Reaction (0.1M CaCl2)*:	NA	NA
Available Water Capacity (inches)*:	5	9
Calcium Carbonate Equivalent (percent)*:	0	15

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

Plant Communities

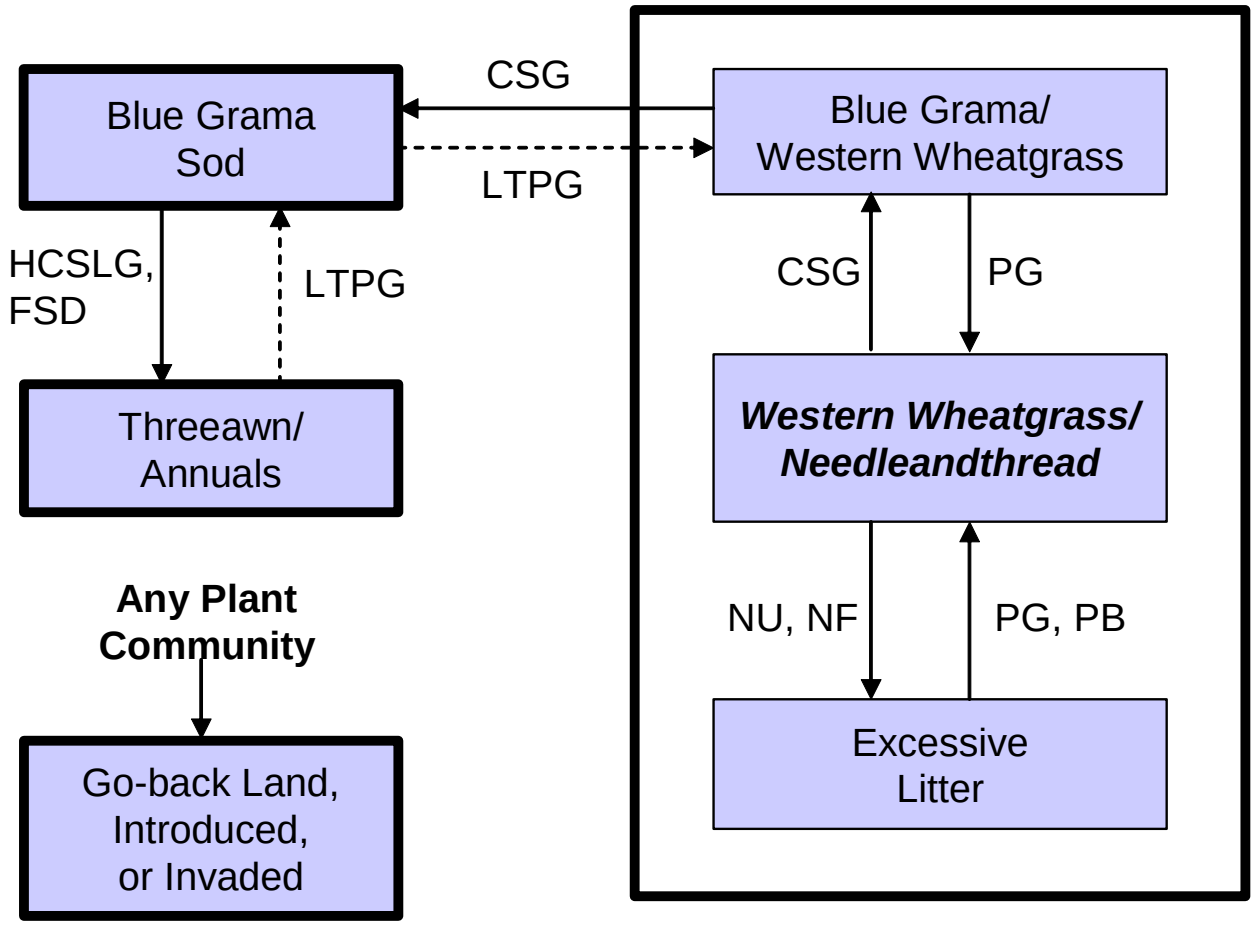
Ecological Dynamics of the Site:
This site developed under Northern Great Plains climatic conditions, light to severe grazing by bison and other large herbivores, sporadic natural or man-caused wildfire (often of light intensities), and other biotic and abiotic factors that typically influence soil/site 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 Western Wheatgrass/Needleandthread Plant Community. Blue grama will increase and eventually develop into a sod. Western wheatgrass will increase initially and then begin to decrease. Needleandthread, green needlegrass, sideoats grama and big bluestem will decrease in frequency and production. Frequent and severe defoliation or heavy continuous season long grazing will cause threeawns and annuals to increase and dominate the site. Extended periods of non-use and/or lack of fire or continuous seasonal grazing will result in a plant community dominated by cool season grasses and excessive litter and annuals.

Interpretations are primarily based on the Western Wheatgrass/Needleandthread 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 transitions between communities. The ecological processes will be discussed in more detail in the plant community narratives 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); **HCSLG** - Heavy, continuous season-long grazing (grazing a unit for an entire growing season well above recommended stocking rates); **LTPG** - Long-term prescribed grazing; **NU, NF** - Non-use and no fire; **PB** - Prescribed burning, followed by 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

		Western Wheatgrass/ Needleandthread			Blue Grama/ Western Wheatgrass			Blue Grama Sod			Threeawn/Annuals		
COMMON/GROUP NAME	**SYMBOL**	**Grp**	**lbs./acre**	**% Comp**	**Grp**	**lbs./acre**	**% Comp**	**Grp**	**lbs./acre**	**% Comp**	**Grp**	**lbs./acre**	**% Comp**
GRASSES & GRASS-LIKES			*1350 - 1620*	*75 - 90*		*900 - 1020*	*75 - 85*		*450 - 510*	*75 - 85*		*360 - 480*	*60 - 80*
western wheatgrass	PASM	1	360 - 540	20 - 30	1	60 - 240	5 - 20	1	6 - 30	1 - 5	1	0 - 30	0 - 5
NEEDLEGRASS		**2**	**270 - 450**	**15 - 25**	**2**	**24 - 120**	**2 - 10**	**2**	**0 - 12**	**0 - 2**	**2**		
needleandthread	HECOC8	2	270 - 360	15 - 20	2	24 - 120	2 - 10	2	0 - 12	0 - 2			
green needlegrass	NAVI4	2	90 - 180	5 - 10	2	0 - 60	0 - 5						
WARM-SEASON SHORT GRASSES		**3**	**90 - 270**	**5 - 15**	**3**	**240 - 480**	**20 - 40**	**3**	**240 - 390**	**40 - 65**	**3**	**0 - 60**	**0 - 10**
blue grama	BOGR2	3	90 - 270	5 - 15	3	120 - 360	10 - 30	3	120 - 300	20 - 50	3	0 - 60	0 - 10
buffalograss	BUDA	3	0 - 90	0 - 5	3	120 - 180	10 - 15	3	90 - 150	15 - 25	3	0 - 18	0 - 3
NATIVE GRASSES & GRASS-LIKES		**4**	**90 - 360**	**5 - 20**	**4**	**60 - 240**	**5 - 20**	**4**	**60 - 120**	**10 - 20**	**4**	**240 - 450**	**40 - 75**
little bluestem	SCSC	4	0 - 90	0 - 5	4	0 - 24	0 - 2						
sideoats grama	BOCU	4	0 - 90	0 - 5	4	0 - 36	0 - 3						
big bluestem	ANGE	4	0 - 90	0 - 5	4	0 - 24	0 - 2						
prairie junegrass	KOMA	4	0 - 36	0 - 2	4	12 - 48	1 - 4	4	6 - 30	1 - 5	4	0 - 30	0 - 5
threeawn	ARIST				4	0 - 24	0 - 2	4	6 - 30	1 - 5	4	60 - 210	10 - 35
sixweeks fescue	VUOC				4	0 - 12	0 - 1	4	0 - 12	0 - 2	4	0 - 30	0 - 5
plains muhly	MUCU3				4	0 - 24	0 - 2						
sand dropseed	SPCR				4	0 - 60	0 - 5	4	0 - 30	0 - 5	4	0 - 6	0 - 1
Sandberg bluegrass	POSE				4	0 - 24	0 - 2						
sedge	CAREX	4	90 - 180	5 - 10	4	60 - 120	5 - 10	4	6 - 30	1 - 5	4	0 - 18	0 - 3
NON-NATIVE GRASSES		**5**			**5**	**0 - 60**	**0 - 5**	**5**	**6 - 30**	**1 - 5**	**5**	**6 - 60**	**1 - 10**
cheatgrass	BRTE				5	0 - 60	0 - 5	5	6 - 30	1 - 5	5	6 - 60	1 - 10
Kentucky bluegrass	POPR				5	0 - 60	0 - 5	5	0 - 6	0 - 1			
FORBS		*6*	*90 - 180*	*5 - 10*	*6*	*60 - 180*	*5 - 15*	*6*	*30 - 120*	*5 - 20*	*6*	*60 - 180*	*10 - 30*
bush morningglory	IPLE	6	0 - 36	0 - 2	6	0 - 12	0 - 1						
cudweed sagewort	ARLU	6	0 - 36	0 - 2	6	0 - 36	0 - 3	6	0 - 30	0 - 5	6	0 - 18	0 - 3
curlycup gumweed	GRSQ				6	0 - 24	0 - 2	6	0 - 30	0 - 5	6	0 - 6	0 - 1
cutleaf ironplant	MAPI	6	0 - 18	0 - 1	6	0 - 12	0 - 1	6	0 - 6	0 - 1			
dotted gayfeather	LIPU	6	0 - 18	0 - 1	6	0 - 12	0 - 1						
false boneset	BREU	6	0 - 18	0 - 1	6	0 - 12	0 - 1						
goldenrod	SOLID	6	0 - 36	0 - 2	6	0 - 12	0 - 1						
green sagewort	ARDR4	6	0 - 18	0 - 1	6	0 - 36	0 - 3	6	0 - 30	0 - 5	6	0 - 6	0 - 1
gromwell	BUAR3	6	0 - 18	0 - 1	6	0 - 12	0 - 1						
hairy goldaster	HEVI4	6	0 - 36	0 - 2	6	0 - 24	0 - 2	6	0 - 18	0 - 3			
heath aster	SYER	6	0 - 18	0 - 1	6	0 - 12	0 - 1	6	0 - 6	0 - 1			
milkvetch	ASTRA	6	0 - 36	0 - 2	6	0 - 24	0 - 2	6	0 - 6	0 - 1	6	0 - 6	0 - 1
mullein	VERBA				6	0 - 24	0 - 2	6	0 - 18	0 - 3			
penstemon	PENST	6	0 - 18	0 - 1	6	0 - 12	0 - 1						
prairie coneflower	RACO3	6	0 - 18	0 - 1	6	0 - 12	0 - 1						
purple coneflower	ECAN2	6	0 - 36	0 - 2	6	0 - 12	0 - 1						
pussytoes	ANTEN	6	0 - 36	0 - 2	6	0 - 24	0 - 2				6	0 - 30	0 - 5
rush skeletonweed	LYJU	6	0 - 18	0 - 1	6	0 - 12	0 - 1						
salsify	TRAGO				6	0 - 24	0 - 2	6	0 - 12	0 - 2			
scarlet gaura	GACO5	6	0 - 18	0 - 1	6	0 - 12	0 - 1	6	0 - 6	0 - 1			
scarlet globemallow	SPCO	6	0 - 36	0 - 2	6	0 - 24	0 - 2	6	0 - 6	0 - 1			
scurfpea	PSORA2	6	0 - 36	0 - 2	6	0 - 24	0 - 2	6	0 - 30	0 - 5			
stiff sunflower	HEPA19	6	0 - 18	0 - 1	6	0 - 12	0 - 1						
sweetclover	MELIL				6	0 - 60	0 - 5	6	0 - 30	0 - 5			
thistle	CIRSI										6	0 - 90	0 - 15
verbena	VERBE	6	0 - 18	0 - 1	6	0 - 60	0 - 5	6	0 - 30	0 - 5	6	0 - 30	0 - 5
western ragweed	AMPS	6	0 - 36	0 - 2	6	0 - 120	0 - 10	6	0 - 60	0 - 10	6	0 - 30	0 - 5
SHRUBS		*7*	*0 - 180*	*0 - 10*	*7*	*0 - 120*	*0 - 10*	*7*	*0 - 60*	*0 - 10*	*7*	*30 - 120*	*5 - 20*
broom snakeweed	GUSA2				7	0 - 60	0 - 5	7	0 - 30	0 - 5	7	6 - 60	1 - 10
cactus	OPUNT	7	0 - 18	0 - 1	7	0 - 60	0 - 5	7	0 - 30	0 - 5	7	6 - 60	1 - 10
fringed sagewort	ARFR4	7	0 - 36	0 - 2	7	0 - 60	0 - 5	7	0 - 30	0 - 5	7	12 - 90	2 - 15
leadplant	AMCA6	7	0 - 90	0 - 5	7	0 - 12	0 - 1						
rose	ROSA5	7	0 - 90	0 - 5	7	0 - 24	0 - 2						
small soapweed	YUGL	7	0 - 36	0 - 2	7	0 - 60	0 - 5	7	0 - 30	0 - 5			
snowberry	SYMPH	7	0 - 36	0 - 2	7	0 - 60	0 - 5						

Annual Production lbs./acre	LOW RV HIGH	LOW RV HIGH	LOW RV HIGH	LOW RV HIGH
GRASSES & GRASS-LIKES	915 - 1575 - 2130	745 - 1020 - 1290	275 - 495 - 710	220 - 405 - 590
FORBS	85 - 135 - 185	55 - 120 - 185	25 - 75 - 125	55 - 120 - 185
SHRUBS	0 - 90 - 185	0 - 60 - 125	0 - 30 - 65	25 - 75 - 125
TOTAL	1000 - 1800 - 2500	800 - 1200 - 1600	300 - 600 - 900	300 - 600 - 900

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" (DPC's). According to the USDA Natural Resources Conservation Service (NRCS) National Range and Pasture Handbook, 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 Plant Community

Interpretations are based primarily on the Western Wheatgrass/Needleandthread Plant Community (this is also considered to be climax). The plant community can be found on areas that are properly managed with grazing and/or prescribed burning, and sometimes on areas receiving occasional short periods of rest.

The potential vegetation is about 75 percent grasses, 10 percent grass-like plants, 10 percent forbs, and 5 percent shrubs. The dominant grasses include western wheatgrass, needleandthread, and blue grama. Other grasses/grass-likes may include buffalograss, green needlegrass, and threadleaf sedge. The dominant forbs include fringed sagewort, western ragweed, and prairie coneflower. Dominant shrubs in this community include rose, leadplant, cactus and occasionally snowberry.

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). Plant litter is properly distributed with some movement off-site and natural plant mortality is low. The diversity in plant species allows for high drought tolerance. This is a sustainable plant community in terms of soil stability and watershed function. Moderate or high available water capacity provides a favorable soil-water-plant relationship.

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: 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:

- Early continuous seasonal grazing during the onset of every cool season growing period will lead to the *Blue Grama/Western Wheatgrass Plant Community*.

- Non-use and no fire will lead to the *Excessive Litter Plant Community*.

Blue Grama/Western Wheatgrass Plant Community

This plant community develops with early continuous seasonal grazing (i.e., grazing at the onset of the growth curve every year). The potential vegetation is made up of approximately 75 percent grasses, 10 percent grass-likes, 10 percent forbs, and 5 percent shrubs. The dominant grasses include blue grama and western wheatgrass. Other grasses or grass-like species are threadleaf sedge, buffalograss, and needleandthread. Forbs include scarlet globemallow, scurfpea, western

ragweed, fringed sagewort, and perennial aster species. Shrubs include rose, broom snakeweed, and pricklypear.

Compared to the Western Wheatgrass/Needleandthread Plant Community, blue grama, and threadleaf sedge have increased. Western wheatgrass and needleandthread have decreased in composition. Annual bromes and annual forbs can invade the site. Plant diversity is moderate. Short grasses dominate the structure of the community.

The plant community tends to be resilient if disturbance is not long-term. Species such as blue grama and threadleaf sedge are very adapted to grazing; however, western wheatgrass, needleandthread, and the more palatable forbs will decrease in the community with recurrent disturbance and/or climatic fluctuations. Soil erosion is low. Compared to the Western Wheatgrass/Needleandthread Plant Community, water infiltration is slightly lower, and runoff is somewhat higher. Typically the runoff is very clean because of the low potential for soil erosion.

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: 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 which allows adequate recovery periods between grazing events and includes moderate grazing pressure during mid- to late summer will move this plant community towards the *Western Wheatgrass/Needleandthread Plant Community*. Periods of non-use or deferment may be a management option to reach this plant community.

- Continuous use throughout the growing season will move this plant community across an ecological threshold towards the *Blue Grama Sod Plant Community*. This transition will result in decreased forage production and plant species diversity.

Excessive Litter Plant Community

This plant community developed under extended periods of non-use and no fire. Initially, the dominant grasses include western wheatgrass and needleandthread. Other grasses may include blue grama, buffalograss, threeawn, and prairie junegrass. With continued non-use and no fire, the plant community becomes dominated by annual brome and other annual grasses and less palatable forbs. Forbs include western ragweed, scurfpeas, cudweed sagewort, and verbenas. Shrubs in this community include broom snakeweed, rose, and plains pricklypear. Western wheatgrass and blue grama decrease in production and vigor. Soil erosion is low.

The total annual production (air-dry weight) is about 1,500 pounds per acre, but it can range from about 800 pounds per acre in unfavorable years to about 2,100 pounds per acre in above average years.

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: 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:

- With prescribed grazing, or prescribed burning followed by prescribed grazing, this plant community will move toward the *Western Wheatgrass/Needleandthread Plant Community*. Managed high stock densities and stocking rates during the growing season, or burning, will remove heavy buildup of litter.

Blue Grama Sod Plant Community

This plant community develops with frequent and severe disturbance. It is a dense sod, made up of primarily warm-season short grasses. The cool-season mid-grasses have been significantly reduced. The dominant grass is blue grama. Other grasses include threadleaf sedge, buffalograss, and threeawn. Palatable forbs initiate avoidance mechanisms and are difficult to find on the site. Species such as scarlet globemallow, western ragweed, and cudweed sagewort increase.

When compared to the Western Wheatgrass/Needleandthread Plant Community, blue grama and threadleaf sedge increase significantly. The mid grasses have declined dramatically. Annual brome and other non-native species may invade this plant community. Annual production has decreased significantly.

This plant community is resistant to change. The thick sod prevents other species from establishing. Oftentimes, a seed source is not readily available. Infiltration decreases as runoff increases. The hydrologic cycle is impaired. There is less than 10 percent bare ground.

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

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

- Long-term prescribed grazing, will move this plant community towards the *Blue Grama/Western Wheatgrass Plant Community.* Without a seed source available this could take generations. Periods of non-use or deferment may be a management option. If intensive management is not applied, range or pasture planting may be an option to return this community to a productive condition in a realistic time frame. However, this may not be economically feasible.

- With heavy continuous use during the growing season or severe defoliation, this plant community will move toward the *Threeawn/Annuals Plant Community.* Forage production, species diversity, and ground cover will decrease.

Threeawn/Annuals Plant Community

This plant community developed with heavy continuous use and/or frequent and severe defoliation. The plant composition is made up of annuals with a few species of perennial forbs and grasses that are tolerant to frequent and severe defoliation. Grasses and grass-like species include threeawn, annual brome, blue grama, threadleaf sedge, sixweeks fescue and scattered patches of buffalograss.

The dominant perennial forbs include curlycup gumweed, hairy goldaster, verbena, and fringed sagewort. Broom snakeweed, cactus, and green sagewort increase. This plant community is also 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 Plant Community, all perennial plant species have been greatly reduced with only remnants of the most grazing tolerant species present. Desirable native plant (i.e., those plants that maintain a healthy soil and plant community) diversity is low.

This plant community is resistant to change because of the loss of plant diversity and overall soil disturbance. Wind and water erosion is high due to increased bare ground and the shallow rooted herbaceous plant community. Loss of root mass and rodent related soil disturbance has altered the hydrology.

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: 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

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

- Long-term prescribed grazing will move this plant community back towards the *Blue Grama Sod Plant Community.* The rate of this transition can be extremely variable depending on the species present and the availability of a seed source. Without careful management, this can take several years, even if the soil is not significantly eroded.

Go-back Land, Introduced, or Invaded

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 successionally. Infiltration, runoff and soil erosion varies depending on the vegetation present on the site.

The **Go-back Land** 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, sweet clover, 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

Western Wheatgrass/Needleandthread Plant Community: The predominance of grasses in this vegetative state favors grazers and mixed-feeders, such as bison and antelope. Suitable thermal and escape cover for deer may be limited due to the low quantities of woody plants. However, topographical variations could provide some escape cover. Portions along woody vegetative states may provide brood rearing/foraging areas for sage grouse, as well as lek sites. Other birds that would frequent this plant community include Western meadowlarks, horned larks, and golden eagles. Many grassland obligate small mammals would occur here. Swift fox and a number of non-game grassland bird species will do better in some of the other plant communities on this site that have less height/density of the cool season grasses.

Blue Grama/Western Wheatgrass Plant Community: Wildlife, such as shortgrass prairie bird species, and swift fox would benefit from the reduced cover. Upland game bird habitat quality would decline. The diversity of this plant community is still high enough to support many of the species that would be present with the Western Wheatgrass/Needleandthread Plant Community.

Blue Grama Sod Plant Community: This plant community provides limited foraging for antelope and other grazers. It may be used as a foraging site by sage grouse if proximal to woody cover and if the Western Wheatgrass/Needleandthread Plant Community or the Western Wheatgrass/Bluegrass Plant Community are limiting. Generally, this plant community is not a target for wildlife habitat management. Wildlife, such as shortgrass prairie bird species and swift fox would benefit from the reduced cover. Upland game bird habitat quality would decline.

Threeawn/Annuals Plant Community: Benefits to other wildlife are largely due to the subterranean structure created by the prairie dogs. It may be a desirable plant community if the goal is to provide habitat for burrowing owls or black-footed ferrets, or if maintenance of the dogtown is desired for sport shooting purposes. Many native grassland wildlife species are directly or indirectly reliant on prairie dog habitat. As a result, this type of habitat is very important from an ecosystem management basis.

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
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 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
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
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							
bush morningglory	U D P U	U D D U	U D P U	U D D U	U D D U	U D P U	U D D 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
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
gromwell	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
hairy goldaster	U U D U	N N N N	U U D U	N N N N	N N N N	U U D U	N N N N
heath aster	U U D U	U U P U	U U D U	U U P U	U U P U	U U D U	U U P U
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
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
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 skeletonplant	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
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
stiff 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
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
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							
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
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
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
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

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.

As this site improves in condition through proper management (from the more short grass dominated plant communities to the Western Wheatgrass/Needleandthread Plant Community), the advantage for livestock production includes: higher forage production from cool season grasses, improved early spring forage production and higher water infiltration. The disadvantage for livestock include: reduction in cool/warm season grass mix which would provides better management flexibility, less plant diversity, and a potential increase in soil erosion. The Threeawn/Annuals Plant Community is of limited value for livestock production.

Plant Community	Average Annual Production (lbs./acre, air-dry)	Stocking Rate* (AUM/acre)
Western Wheatgrass/Needleandthread	1800	0.50 – 0.60
Blue Grama/Western Wheatgrass	1200	0.32 – 0.42
Blue Grama Sod	600	0.13 – 0.23
Excessive Litter	1500	**
Threeawn/Annuals	600	0.13 – 0.23

* 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).
** Highly variable; stocking rate needs to be determined onsite.

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 B. 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 percent ground cover have the greatest potential for high infiltration and lower runoff. An example of an exception would be where shortgrasses 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 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

(064XY026NE) – Loamy Overflow
(064XY040NE) – Shallow
(064XY011NE) – Sandy 14-17" P.Z.
(064XY037NE) – Thin Upland

Similar Sites

(064XY014NE) – Clayey 14-17" P.Z. [green needlegrass dominant; needleandthread minor]
(064XY026NE) – Loamy Overflow [less needleandthread; more big bluestem; more productive]

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; and Phil Young, Soil Scientist, NRCS.

Data Source	Number of Records	Sample Period	State	County
SCS-RANGE-417	5	1969 – 1975	NE	Box Butte & Sioux

State Correlation

This site has been correlated with NE and WY in MLRA 64.

Field Offices/Counties

Alliance, NE	Box Butte	Douglas, WY	Converse	Scottsbluff, NE	Scottsbluff
Bridgeport, NE	Morrill	Lusk, WY	Niobrara	Torrington, WY	Goshen
Chadron, NE	Dawes/Sioux	Rushville, NE	Sheridan	Wheatland, WY	Platte

Relationship to Other Established Classifications

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

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
WY, State Range Management Specialist	Date		