

## Ecological site R065XY032NE Sandy Medium P.Z. 17-22

Accessed: 04/23/2024

### General information

**Provisional.** A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

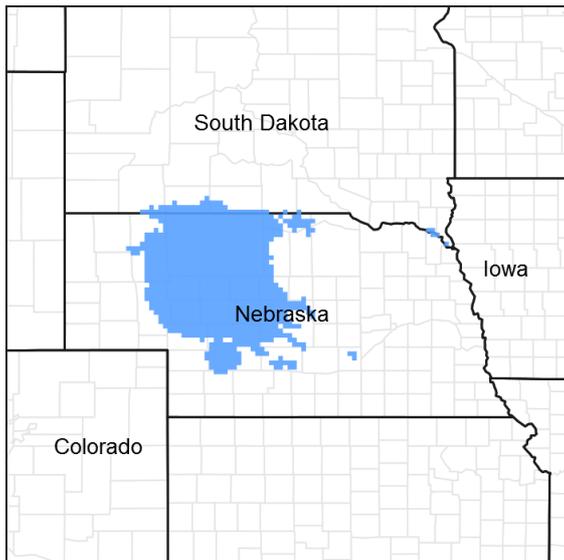


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

### MLRA notes

Major Land Resource Area (MLRA): 065X–Nebraska Sand Hills

This PROVISIONAL ECOLOGICAL SITE has been developed to meet the standards established in the National Ecological Site Handbook. The information associated with this ecological site does not meet the Approved Ecological Site Description Standard, but it has been through a Quality Control and Quality Assurance processes to assure consistency and completeness. Further investigations, reviews and correlations are necessary before it becomes an Approved Ecological Site Description.

### Classification relationships

Major Land Resource Area (MLRA): Major Land Resource Area (MLRA) and Land Resource Unit (LRU) (USDA-Natural Resources Conservation Service, 2006)

#### Revision Notes:

A PROVISIONAL ECOLOGICAL SITE is a conceptual grouping of soil map unit components within a Major Land Resource Area (MLRA) based on the similarities in response to management. Although there may be wide variability in the productivity of the soils grouped into a Provisional Site, the soil vegetation interactions as expressed in the State and Transition Model are similar and the management actions required to achieve objectives, whether maintaining the existing ecological state or managing for an alternative state, are similar. Provisional Sites are likely

to be refined into more precise group during the process of meeting the APPROVED ECOLOGICAL SITE DESCRIPTION criteria.

## Ecological site concept

Landform/landscape position: Interdune , or a dune /hill.

Edaphic: The soil texture is Sandy Loam or finer, or a dark colored surface greater than 10 inches thick. For the dune position, slopes are greater than 3 percent, but catsteps are not evident.

Sandy sites that are interdune features have less than 3 percent slope.

Vegetation Dynamics: This primary plant community for this site is the warm season mid-grass community with a native shrub component. A shift towards a cool-season and shorter warm season grasses will occur with excessive long-term grazing pressure. Eastern red cedars spreading from introduced windbreaks will increase and potentially dominate the grasslands in the absence of fire or other brush control practices.

## Associated sites

R065XY024NE	<b>Subirrigated</b> Subirrigated
R065XY033NE	<b>Sands Medium P.Z. 17-22</b> Sands 17-22" P.Z.
R065XY041NE	<b>Shallow To Gravel</b> Shallow to Gravel 17-22" P.Z.

## Similar sites

R065XY033NE	<b>Sands Medium P.Z. 17-22</b> Sands 17-22" P.Z. (steeper slope; lower production; sand bluestem dominant; less little bluestem)
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**Table 1. Dominant plant species**

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Andropogon hallii</i>

## Physiographic features

This area consists of Quaternary sand dunes. The sands are derived from the underlying Tertiary Ogallala and Arikaree Groups. These units formed when rivers deposited sediments that originated as erosional detritus following the uplift of the Rocky Mountains to the west. The Ogallala aquifer underlies this area. It is the most extensive and heavily used aquifer on the high plains between the Rocky Mountains and the Mississippi River. The major recharge area for this aquifer is the Sand Hills.

**Table 2. Representative physiographic features**

Landforms	(1) Interdune
Flooding duration	Extremely brief (0.1 to 4 hours)
Flooding frequency	None to very rare
Ponding frequency	None
Elevation	2,600–4,000 ft
Slope	3%
Water table depth	54–72 in
Aspect	Aspect is not a significant factor

## Climatic features

The mean average annual precipitation varies from 17 to 22 inches, but has varied from 13 to 27 inches in the driest to wettest season. Approximately 70 percent of the annual precipitation occurs during the growing season of mid-April to late September. The average annual snowfall varies from about 34 inches to about 42 inches. The wind velocity is high throughout the year, averaging 10 to 12 miles per hour. Maximum wind velocities generally occur in the spring.

The average length of the growing season is 138 days, but the growing season has varied from 114 to 168 days. The average date of first frost in the fall is September 25, and the last frost in the spring is about May 8. July is the hottest month and January is the coldest. It is not uncommon for the temperature to reach 100 degrees Fahrenheit during the summer. Summer humidity is low and evaporation is high. The winters are characterized with frequent northerly winds, producing severe cold with temperatures dropping to as low as negative 30 degrees Fahrenheit.

Growth of native cool season plants begins mid to late March and continues to late June. Native warm season plants begin growth in early May and continue to late August. Green up of cool season plants may occur in September and October when adequate soil moisture is present.

**Table 3. Representative climatic features**

Frost-free period (average)	129 days
Freeze-free period (average)	148 days
Precipitation total (average)	22 in

## Climate stations used

- (1) KINGSLEY DAM [USC00254455], Keystone, NE
- (2) MERRIMAN [USC00255470], Merriman, NE
- (3) VALENTINE NWR [USC00258755], Valentine, NE
- (4) NORTH PLATTE RGNL AP [USW00024023], Maxwell, NE
- (5) ARTHUR [USC00250365], Arthur, NE
- (6) MULLEN [USC00255700], Mullen, NE
- (7) MULLEN 21 NW [USC00255702], Whitman, NE

## Influencing water features

There are no water features influencing this site.

## Soil features

The features common to all soils in this site are the loam to fine sand textured surface soils and slopes of 0 to 3 percent. The soils in this site are from moderately well drained (Calamus soils) to excessively drained. They formed primarily in eolian sand. Calamus and Pivot soils are formed in sandy and gravelly alluvium. Jansen soils formed in loamy eolian material over sandy and gravelly alluvium. Anselmo, Doughboy, and Hersh soils formed in mixed loamy and sandy eolian material. The surface layer is 3 to 10 inches thick. The texture of the subsurface generally ranges from loam to fine sand. Runoff as evidenced by patterns of rill, gully or other water flow is generally low due to the moderate to low slope gradient and high intake rate of these soils. Cryptobiotic crusts are present, but their function is not well understood. Some pedestalling of plants occurs, but it is not very evident on casual observation and occurs on less than 5% of the plants.

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.

Major soil series correlated to this ecological site include: Anselmo, Dunday, Sandose, and Vetal.

Other soil series that have been correlated to this site include: Calamus, Doger, Doughboy, Duda, Hersh, Jansen Variant, Pivot, Ustorthents, Valent, and Valentine.

**Table 4. Representative soil features**

Surface texture	(1) Fine sandy loam (2) Loamy fine sand (3) Fine sand
Family particle size	(1) Sandy
Drainage class	Moderately well drained to excessively drained
Permeability class	Moderately slow to rapid
Soil depth	80 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	3-6 in
Calcium carbonate equivalent (0-40in)	0-5%
Electrical conductivity (0-40in)	0-4 mmhos/cm
Sodium adsorption ratio (0-40in)	0-5
Soil reaction (1:1 water) (0-40in)	5.1-8.4
Subsurface fragment volume <=3" (Depth not specified)	0-28%
Subsurface fragment volume >3" (Depth not specified)	0%

## Ecological dynamics

Historically, large areas of blowing sand resulted in the active movement of the sand dunes. Evaporation from the soil surface was extremely high due to the large areas of bare ground, lack of litter, and sparse plant populations. The transpiration rate of these sparse plant populations was also high due to the harsh soil environment. Occasional wild fires, severe grazing by transient bison herds, and drought contributed to the lack of stability of the sand dunes. This lack of stability caused the dunes to go back and forth through multiple stages of plant succession over the course of time. Early perennial plants such as sandhill muhly, blowout grass, and blowout penstemon were common due to their ability to tolerate the movement of the sand and droughty conditions. As these plants began to colonize and stabilize the sand movement, other perennials such as prairie sandreed, sand bluestem, hairy grama, lemon scurfpea, and rose slowly became evident on the site. Annual plants such as sandbur, Texas croton, and annual sunflower eventually colonized the areas between the perennials.

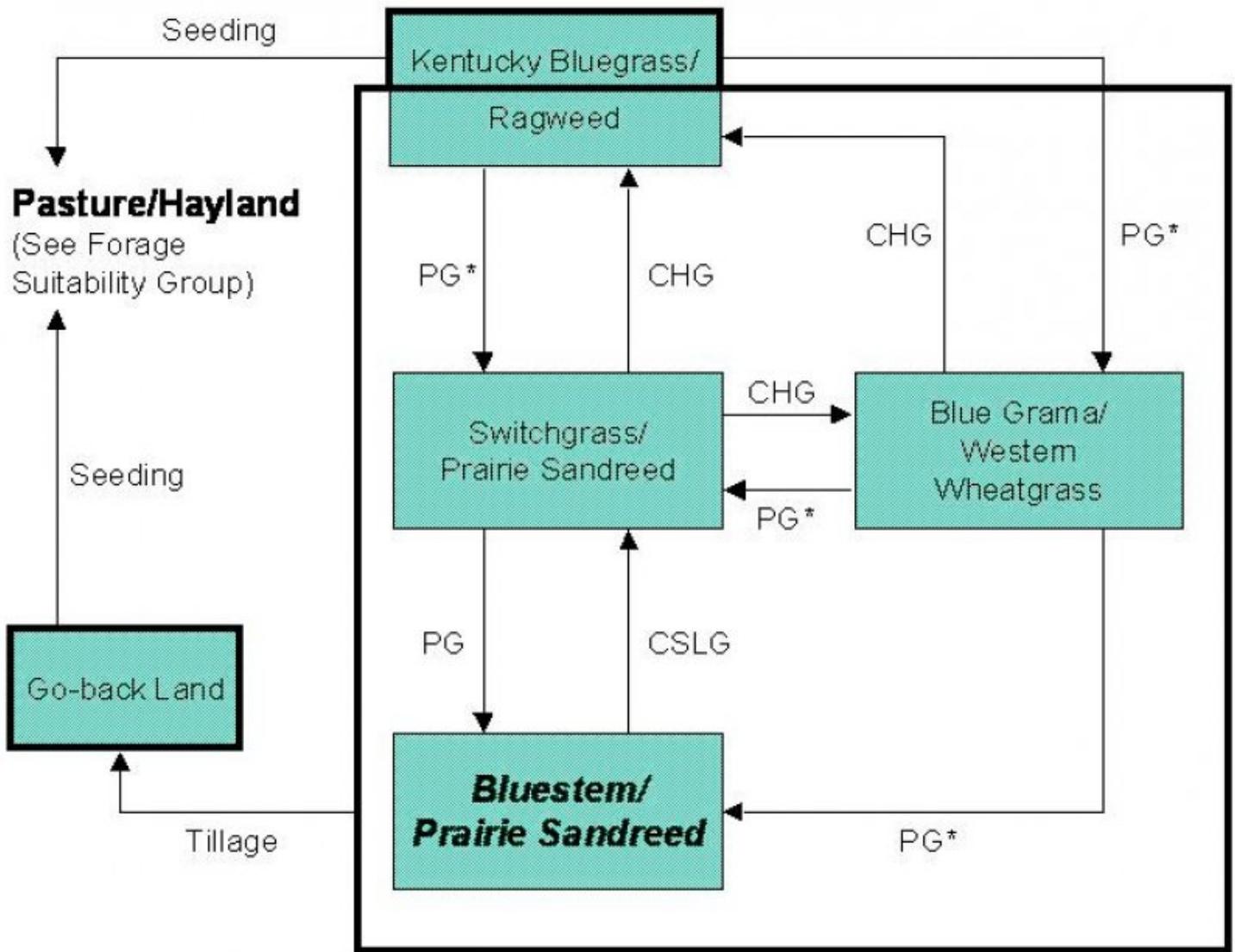
As this site deteriorates, species such as prairie sandreed, little bluestem, sand dropseed, and blue grama will increase initially. Species such as sand and/or big bluestem and switchgrass will decrease in frequency and production. With continued improper management, prairie sandreed and little bluestem will also decrease. The site is resilient and well adapted to the Northern Great Plains climatic conditions. The diversity in plant species allows for high drought resistance.

Interpretations are primarily based on the Bluestem/Prairie Sandreed Plant Community. It has been determined by study of rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily grazed to lightly grazed areas, seasonal use pastures, and historical accounts also have been used. Subclimax 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.

## State and transition model



**CHG** - continuous heavy grazing; **CSLG**- continuous season-long grazing; **PG** - prescribed grazing w/ adequate recovery period; \*If tall warm-season grass remnants are present

### State 1

#### Bluestem/Prairie Sandreed Plant Community

##### Community 1.1

#### Bluestem/Prairie Sandreed Plant Community

Interpretations are primarily based on the Bluestem/Prairie Sandreed Plant Community (this is also considered climax). The site evolved with grazing by large herbivores and is well suited for grazing by domestic livestock. This plant community can be found on areas that are properly managed. The potential vegetation is about 85% grasses or grass-like plants, 10% forbs, and 5% shrubs. Warm season mid and tall grasses dominate this plant community. Principal grasses are prairie sandreed, sand bluestem, big bluestem, and little bluestem. The cool season grasses, needleandthread and western wheatgrass are important. Grama grasses and sedges occur as an understory. Forbs and shrubs are not abundant. Natural fire played a significant role in the succession of this site by limiting eastern redcedar from becoming established. Wildfires have been actively controlled in recent times, allowing occasional eastern redcedar encroachment. The diversity in plant species allows for high drought tolerance. This is a healthy

and sustainable plant community (site/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 a normal year: Growth curve number: NE6534 Growth curve name: Nebraska/South Dakota Sandhills, Native Grasslands Growth curve description: Warm-season dominant, cool-season subdominant, mid & tall grasses. Transitional pathways and/or community pathways leading to other plant communities are as follows: Continuous season-long grazing will convert the plant community to the Switchgrass/Prairie Sandreed Plant Community.

**Table 5. Annual production by plant type**

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1760	2196	2625
Forb	20	132	250
Shrub/Vine	20	72	125
<b>Total</b>	<b>1800</b>	<b>2400</b>	<b>3000</b>

**Figure 7. Plant community growth curve (percent production by month). NE6534, NE/SD Sandhills, Native Grasslands. Warm-season dominant, cool-season subdominant, mid- and tallgrasses.**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		5	5	15	25	30	10	7	3		

## State 2 Switchgrass/Prairie Sandreed Plant Community

### Community 2.1 Switchgrass/Prairie Sandreed Plant Community

This plant community is resilient and can be found on areas that have been properly managed with grazing for long periods of time. The potential vegetation is about 80% grasses or grass-like plants, 10% forbs, and 10% shrubs. Dominant grasses include prairie sandreed, little bluestem, and switchgrass. Other grasses include sand bluestem and needleandthread. Dominant forbs include white sagebrush (cudweed sagewort), blazing star (gayfeather), and Cuman (western) ragweed. Dominant shrubs include leadplant and rose. The bluestems and needlegrass have decreased, while prairie sandreed and switchgrass have increased. Forbs remain in balance similar to the Bluestem/Prairie Sandreed Plant Community and shrubs, such as rose and leadplant, show a moderate increase under current management conditions. This plant community maintains diversity while sustaining production. The following growth curve shows the estimated monthly percentages of total annual growth of the dominant species expected during a normal year: Growth curve number: NE6534 Growth curve name: Nebraska/South Dakota Sandhills, Native Grasslands Growth curve description: Warm-season dominant, cool-season subdominant, mid & tall grasses. Transitional pathways and/or community pathways leading to other plant communities are as follows: Continuous heavy grazing will convert the plant community to the Kentucky Bluegrass/Ragweed Plant Community or the Blue Grama/Western Wheatgrass Plant Community. Excessive stocking rates will convert it directly to the Kentucky Bluegrass/Ragweed Plant Community. Prescribed grazing will move this plant community back to the Bluestem/Prairie Sandreed Plant Community.

**Table 6. Annual production by plant type**

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1370	1780	2190
Shrub/Vine	16	110	205
Forb	15	110	205
<b>Total</b>	<b>1401</b>	<b>2000</b>	<b>2600</b>

**Figure 9. Plant community growth curve (percent production by month). NE6534, NE/SD Sandhills, Native Grasslands. Warm-season dominant, cool-**

season subdominant, mid- and tallgrasses.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		5	5	15	25	30	10	7	3		

**State 3**  
**Blue Grama/Western Wheatgrass Plant Community**

**Community 3.1**  
**Blue Grama/Western Wheatgrass Plant Community**

This plant community develops with heavy livestock grazing, usually season-long. Plant diversity is diminished as the bluestems, prairie sandreed, switchgrass, and Indiangrass are removed from the plant community. Small isolated plants may exist in a prostrate form to avoid defoliation. The potential vegetation is about 80% grasses or grass-like plants, 10% forbs, and 10% shrubs. Dominant grasses include blue grama, western wheatgrass, Scribner's panicum, and sand dropseed. Other grasses or grass-likes include prairie sandreed, needleandthread, and sedges. Dominant forbs include green sagewort, common sunflower, and Cuman (western) ragweed. Cool season plants such as western wheatgrass, prairie junegrass, and Scribner's panicum increase. Blue grama will actually increase due to its ability to avoid grazing because of its short growth form. Forbs such as Cuman(western)ragweed and green sagewort will tend to increase, especially in periods of favorable moisture. Rose, leadplant, and western sandcherry will diminish while small soapweed, cactus, and other less palatable shrubs will increase. The following growth curve shows the estimated monthly percentages of total annual growth of the dominant species expected during a normal year: Growth curve number: NE6540 Growth curve name: Nebraska/South Dakota Sandhills, Native Grasslands, Grama/Wheatgrass Growth curve description: Warm-season and cool-season co-dominant, short and mid grasses. Transitional pathways and/or community pathways leading to other plant communities are as follows: Continuous heavy grazing will convert the plant community to the Kentucky Bluegrass/Ragweed Plant Community. This is a relatively stable plant community that requires a considerable amount of input to return this plant community to the Bluestem/Prairie Sandreed Plant Community. Prescribed grazing will move this plant community to the Switchgrass/Prairie Sandreed or the Bluestem/Prairie Sandreed Plant Community, depending on the number and species of tall warm-season grass remnants remaining.

Table 7. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1025	1218	1410
Shrub/Vine	10	77	145
Forb	65	105	145
<b>Total</b>	<b>1100</b>	<b>1400</b>	<b>1700</b>

Figure 11. Plant community growth curve (percent production by month). NE6540, NE/SD Sandhills, Native Grass, Grama/Wheatgrass. Warm-season and cool-season co-dominant, short and mid grasses.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	10	20	25	20	15	5	0	0	0

**State 4**  
**Kentucky Bluegrass/Ragweed Plant Community**

**Community 4.1**  
**Kentucky Bluegrass/Ragweed Plant Community**

With sustained heavy stocking during the summer months the plant community will become dominated by cool season grasses and forbs. The potential vegetation is about 70% grasses or grass-like plants, 20% forbs, and 10% shrubs. Dominant grasses include Kentucky bluegrass, blue grama, Scribner's panicum, and sand dropseed. Other grasses or grass-likes include needleandthread, sedges, and cheatgrass. Dominant forbs include green sagewort,

Cuman (western ragweed), Rocky Mountain beeplant, and thistles. The palatable warm season grasses are replaced by blue grama and sand dropseed. Cool season grasses such as Scribner's panicum, annual brome, and bluegrass will increase and fill the void left by the disappearing warm season tall grasses. Sedges will flourish in the understory. Cuman (western) ragweed and green sagewort increase in abundance along with other less-palatable forbs. Invader thistles and annual forbs increase along with grazing resistant shrubs such as cactus and small soapweed. Once this plant community is reached, time and external resources will be needed to see any immediate recovery in the diversity of this plant community. The following growth curve shows the estimated monthly percentages of total annual growth of the dominant species expected during a normal year: Growth curve number: NE6541 Growth curve name: Nebraska/South Dakota Sandhills, Native Grasslands, Cool Seasons/Forbs. Growth curve description: Cool-season dominant, warm-season subdominant, short & mid grasses. Transitional pathways and/or community pathways leading to other plant communities are as follows: Prescribed grazing will convert the plant community to either the Switchgrass/Prairie Sandreed Plant Community or the Blue Grama/Western Wheatgrass Plant Community. The direction this plant community moves depends on the remnant species present. Reseeding will be required if no remnant species are present.

**Table 8. Annual production by plant type**

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	555	738	920
Forb	40	113	185
Shrub/Vine	5	50	95
<b>Total</b>	<b>600</b>	<b>901</b>	<b>1200</b>

**Figure 13. Plant community growth curve (percent production by month). NE6541, NE/SD Sandhills, Native Grass, Cool Seasons/Forbs. Cool-season dominant, warm-season subdominant, short & mid grasses.**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	10	30	25	15	5	5	5	0	0

## State 5 Go-back Land Plant Community

### Community 5.1 Go-back Land Plant Community

This plant community can be reached whenever severe mechanical disturbance occurs. The vegetation on this plant community varies greatly, sometimes being dominated by Scribner's panicum, bluegrass, three-awn, sand dropseed, marestalk, green sagewort, and/or ragweed. Other plants that commonly occur on this plant community include six-weeks fescue, prairie sandreed, witchgrass, little bluestem, switchgrass, and needleandthread. Compared to the Bluestem/Prairie Sandreed Plant Community, warm season natives have decreased. Annual grasses and forbs have become established in the plant community. This plant community is variable in its resistance to change and is resilient depending on past management practices. The water cycle is not greatly affected.

### Additional community tables

**Table 9. Community 1.1 plant community composition**

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Bluestem</b>			360–720	
	sand bluestem	ANHA	<i>Andropogon hallii</i>	360–720	–
	big bluestem	ANGE	<i>Andropogon gerardii</i>	0–240	–
2	<b>Prairie Sandreed</b>			360–720	

	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	360–720	–
3	<b>Little Bluestem</b>			240–480	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	240–480	–
4	<b>Needleandthread</b>			240–480	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	240–480	–
5	<b>Gramma</b>			120–360	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	120–360	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	0–120	–
6	<b>Other Warm-Season Grasses</b>			120–480	
	switchgrass	PAVI2	<i>Panicum virgatum</i>	0–240	–
	Indiangrass	SONU2	<i>Sorghastrum nutans</i>	0–120	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	0–120	–
	Fendler threeawn	ARPUL	<i>Aristida purpurea var. longiseta</i>	0–120	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	0–120	–
	purple lovegrass	ERSP	<i>Eragrostis spectabilis</i>	0–120	–
	sand lovegrass	ERTR3	<i>Eragrostis trichodes</i>	0–120	–
	thin paspalum	PASE5	<i>Paspalum setaceum</i>	0–120	–
7	<b>Miscellaneous Grass/Grass-Likes</b>			48–240	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	0–120	–
	sedge	CAREX	<i>Carex</i>	0–120	–
	Scribner's rosette grass	DIOLS	<i>Dichantherium oligosanthes var. scribnerianum</i>	0–120	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–120	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	0–120	–
	fall rosette grass	DIWI5	<i>Dichantherium wilcoxianum</i>	0–48	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–48	–
<b>Forb</b>					
9	<b>Forbs</b>			24–240	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–48	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	0–48	–
	tarragon	ARDR4	<i>Artemisia dracunculus</i>	0–24	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	0–24	–
	thistle	CIRSI	<i>Cirsium</i>	0–24	–
	stiff sunflower	HEPA19	<i>Helianthus pauciflorus</i>	0–24	–
	blazing star	LIATR	<i>Liatris</i>	0–24	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–24	–
	silverleaf Indian breadroot	PEAR6	<i>Pediomelum argophyllum</i>	0–24	–
	beardtongue	PENST	<i>Penstemon</i>	0–24	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	0–24	–
	Missouri goldenrod	SOMI2	<i>Solidago missouriensis</i>	0–24	–
	spiderwort	TRADE	<i>Tradescantia</i>	0–24	–
	Forb, annual	2FA	<i>Forb, annual</i>	0–24	–

**Shrub/Vine**

10	<b>Shrubs</b>			24–120	
	rose	ROSA5	<i>Rosa</i>	0–48	–
	Shrub (>.5m)	2SHRUB	<i>Shrub (&gt;.5m)</i>	0–48	–
	leadplant	AMCA6	<i>Amorpha canescens</i>	0–48	–
	pricklypear	OPUNT	<i>Opuntia</i>	0–24	–
	western sandcherry	PRPUB	<i>Prunus pumila var. besseyi</i>	0–24	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	0–24	–

Table 10. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Bluestem</b>			200–400	
	sand bluestem	ANHA	<i>Andropogon hallii</i>	200–400	–
	big bluestem	ANGE	<i>Andropogon gerardii</i>	0–200	–
2	<b>Prairie Sandreed</b>			400–600	
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	400–600	–
3	<b>Little Bluestem</b>			200–600	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	200–600	–
4	<b>Needleandthread</b>			100–400	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	100–400	–
5	<b>Grama</b>			100–300	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	100–300	–
6	<b>Other Warm-Season Grasses</b>			100–300	
	switchgrass	PAVI2	<i>Panicum virgatum</i>	100–300	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	0–200	–
	Indiangrass	SONU2	<i>Sorghastrum nutans</i>	0–100	–
	purple lovegrass	ERSP	<i>Eragrostis spectabilis</i>	0–100	–
	thin paspalum	PASE5	<i>Paspalum setaceum</i>	0–100	–
7	<b>Miscellaneous Grass/Grass-Likes</b>			40–300	
	sedge	CAREX	<i>Carex</i>	0–200	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	0–200	–
	Scribner's rosette grass	DIOLS	<i>Dichanthelium oligosanthes var. scribnerianum</i>	0–100	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–100	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–40	–
8	<b>Non-Native Grasses</b>			0–100	
	cheatgrass	BRTE	<i>Bromus tectorum</i>	0–100	–
	bluegrass	POA	<i>Poa</i>	0–100	–
<b>Forb</b>					
9	<b>Forbs</b>			20–200	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–40	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	0–40	–
	tarragon	ARDR4	<i>Artemisia dracuncululus</i>	0–20	–

	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	0–20	–
	thistle	CIRSI	<i>Cirsium</i>	0–20	–
	blazing star	LIATR	<i>Liatris</i>	0–20	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–20	–
	silverleaf Indian breadroot	PEAR6	<i>Pediomelum argophyllum</i>	0–20	–
	beardtongue	PENST	<i>Penstemon</i>	0–20	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	0–20	–
	Missouri goldenrod	SOMI2	<i>Solidago missouriensis</i>	0–20	–
	spiderwort	TRADE	<i>Tradescantia</i>	0–20	–
	Forb, annual	2FA	<i>Forb, annual</i>	0–20	–
<b>Shrub/Vine</b>					
10	<b>Shrubs</b>			20–200	
	leadplant	AMCA6	<i>Amorpha canescens</i>	0–100	–
	rose	ROSA5	<i>Rosa</i>	0–60	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	0–40	–
	Shrub (>.5m)	2SHRUB	<i>Shrub (&gt;.5m)</i>	0–40	–
	pricklypear	OPUNT	<i>Opuntia</i>	0–20	–
	western sandcherry	PRPUB	<i>Prunus pumila var. besseyi</i>	0–20	–

Table 11. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Bluestem</b>			0–70	
	big bluestem	ANGE	<i>Andropogon gerardii</i>	0–70	–
	sand bluestem	ANHA	<i>Andropogon hallii</i>	0–70	–
2	<b>Prairie Sandreed</b>			70–210	
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	70–201	–
3	<b>Little Bluestem</b>			0–140	
4	<b>Needleandthread</b>			70–210	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	70–210	–
5	<b>Grama</b>			280–490	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	280–490	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	0–70	–
6	<b>Other Warm-Season Grasses</b>			70–350	
	purple lovegrass	ERSP	<i>Eragrostis spectabilis</i>	0–210	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	70–210	–
	thin paspalum	PASE5	<i>Paspalum setaceum</i>	0–70	–
	switchgrass	PAVI2	<i>Panicum virgatum</i>	0–70	–
	mat sandbur	CELO3	<i>Cenchrus longispinus</i>	0–70	–
7	<b>Miscellaneous Grass/Grass-Likes</b>			210–490	
	Scribner's rosette grass	DIOLS	<i>Dichanthelium oligosanthes var. scribnerianum</i>	70–350	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	70–210	–

	sedge	CAREX	<i>Carex</i>	70–210	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–140	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–28	–
8	<b>Non-Native Grasses</b>			0–210	
	bluegrass	POA	<i>Poa</i>	0–210	–
	cheatgrass	BRTE	<i>Bromus tectorum</i>	0–140	–
<b>Forb</b>					
9	<b>Forbs</b>			70–140	
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	0–42	–
	tarragon	ARDR4	<i>Artemisia dracunculus</i>	0–28	–
	Forb, annual	2FA	<i>Forb, annual</i>	0–28	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–28	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	0–14	–
	thistle	CIRSI	<i>Cirsium</i>	0–14	–
	Rocky Mountain beepplant	CLSE	<i>Cleome serrulata</i>	0–14	–
	Texas croton	CRTE4	<i>Croton texensis</i>	0–14	–
	common sunflower	HEAN3	<i>Helianthus annuus</i>	0–14	–
	blazing star	LIATR	<i>Liatris</i>	0–14	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–14	–
	silverleaf Indian breadroot	PEAR6	<i>Pediomelum argophyllum</i>	0–14	–
	beardtongue	PENST	<i>Penstemon</i>	0–14	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	0–14	–
	Missouri goldenrod	SOMI2	<i>Solidago missouriensis</i>	0–14	–
	spiderwort	TRADE	<i>Tradescantia</i>	0–14	–
	vervain	VERBE	<i>Verbena</i>	0–14	–
<b>Shrub/Vine</b>					
10	<b>Shrubs</b>			14–140	
	Shrub (>.5m)	2SHRUB	<i>Shrub (&gt;.5m)</i>	0–70	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	0–42	–
	pricklypear	OPUNT	<i>Opuntia</i>	0–28	–

Table 12. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
2	<b>Prairie Sandreed</b>			0–45	
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	0–45	–
4	<b>Needleandthread</b>			45–135	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	45–135	–
5	<b>Grama</b>			90–225	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	90–225	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	0–90	–

6	<b>Other Warm-Season Grasses</b>			90–225	
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	90–180	–
	purple lovegrass	ERSP	<i>Eragrostis spectabilis</i>	0–90	–
	mat sandbur	CELO3	<i>Cenchrus longispinus</i>	0–45	–
7	<b>Miscellaneous Grass/Grass-Likes</b>			180–315	
	Scribner's rosette grass	DIOLS	<i>Dichanthelium oligosanthes</i> var. <i>scribnerianum</i>	135–225	–
	sedge	CAREX	<i>Carex</i>	45–135	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	0–90	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–45	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–18	–
8	<b>Non-Native Grasses</b>			45–270	
	cheatgrass	BRTE	<i>Bromus tectorum</i>	0–180	–
	Kentucky bluegrass	POPR	<i>Poa pratensis</i>	45–180	–
<b>Forb</b>					
9	<b>Forbs</b>			45–180	
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	0–45	–
	tarragon	ARDR4	<i>Artemisia dracunculus</i>	0–45	–
	thistle	CIRSI	<i>Cirsium</i>	0–27	–
	Rocky Mountain beeplant	CLSE	<i>Cleome serrulata</i>	0–27	–
	Texas croton	CRTE4	<i>Croton texensis</i>	0–27	–
	vervain	VERBE	<i>Verbena</i>	0–27	–
	Forb, annual	2FA	<i>Forb, annual</i>	0–18	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–18	–
	common sunflower	HEAN3	<i>Helianthus annuus</i>	0–18	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–9	–
	silverleaf Indian breadroot	PEAR6	<i>Pediomelum argophyllum</i>	0–9	–
	beardtongue	PENST	<i>Penstemon</i>	0–9	–
	Missouri goldenrod	SOMI2	<i>Solidago missouriensis</i>	0–9	–
<b>Shrub/Vine</b>					
10	<b>Shrubs</b>			9–90	
	Shrub (>.5m)	2SHRUB	<i>Shrub (&gt;.5m)</i>	0–45	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	0–27	–
	pricklypear	OPUNT	<i>Opuntia</i>	0–18	–

## Animal community

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.

## Hydrological functions

Water is the principal factor limiting forage production on well drained portions of this site. Normal rainfall is limited

to 17-22 inches per year. Soils on this site are in Hydrologic Soil Group A and B. Some areas have high water tables. On well drained portions of this site, infiltration potential is high. On well drained areas, significant runoff is expected to occur only during intense storms (refer to Section 4, NRCS National Engineering Handbook for runoff quantities and hydrologic curves).

For the interpretive plant community, rills and gullies should not typically be present. Water flow patterns should be barely distinguishable if at all present. Pedestals are only slightly present in association with bunchgrasses such as little bluestem. Litter typically falls in place, and signs of movement are not common. Chemical and physical crusts are rare to non-existent. Cryptogamic crusts are present but only cover 1-2% of the soil surface. Overall this site has the appearance of being very stable and productive.

### **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.

### **Other information**

Revision Notes: "This PROVISIONAL ecological site concept has been QC'd and QA'd to ensure that the site meets the NESH standards for a provisional ecological site that provides basic compiled information in one location. This site should not be considered an Approved ESD until further data entry and editing is completed.

### **Inventory data references**

Information presented here has been derived from NRCS clipping data and other inventory data. Field observations from range trained personnel was also used. Those involved in developing this site include: Dave Cook, Rangeland Management Specialist, NRCS; Dwight Hale, Engineer, NRCS; Sheila Luoma, Resource Conservationist, NRCS; Marla Shelbourn, Rangeland Management Specialist, NRCS; Dave Steffen, Rangeland Management Specialist, NRCS.

There are 15 SCS-RANGE-417 records from Cherry, Grant, Keith, Lincoln, Logan, Sheridan, Thomas, and Todd counties. The sample period was from 1968 to 1983.

### **Other references**

Other references used include: USDA NRCS Water & Climate Center, USDA NRCS National Range and Pasture Handbook, USDA NRCS Soil Surveys from various counties, Atlas of the Sandhills.

Site Development and Testing Plan:

Future work is needed to validate the information in this Provisional Ecological Site Description. Additional data collection and evaluation may also be needed to develop this ESD to the Approved, then Correlated level. This could include field activities to collect low, medium and high intensity sampling, soil correlations, and analysis of that data. Field reviews of the project plan should be done by soil scientists and vegetation specialists. A final field review, peer review, quality control, and quality assurance reviews of the ESD will be needed to produce the final document.

The State and Transitional Model and corresponding pathways and associated vegetative communities will need to be reviewed and upgraded to adhere to the new guidelines.

Annual reviews of the Project Plan are to be conducted by the Ecological Site Technical Team. The project plan is: ES- R065XY032NE - MLRA 65 -

## Contributors

Kim Stine

## Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	Stan Boltz
Contact for lead author	Stan Boltz, stanley.boltz@sd.usda.gov, 605-352-1236
Date	10/31/2001
Approved by	Stan Boltz
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

## Indicators

1. **Number and extent of rills:** None.

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2. **Presence of water flow patterns:** None, or barely visible and discontinuous.

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3. **Number and height of erosional pedestals or terracettes:** Typically non-existent, but steeper areas may have limited pedestalling of bunchgrasses. No exposed roots should be present.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 0 to 5 percent is typical.

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5. **Number of gullies and erosion associated with gullies:** None should be present.

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6. **Extent of wind scoured, blowouts and/or depositional areas:** None.

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7. **Amount of litter movement (describe size and distance expected to travel):** Litter should fall in place. Slight amount of movement of smallest size class litter is possible, but not normal.

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil aggregate stability ratings should typically be 5 to 6, normally 6. Surface organic matter adheres to the soil surface. Soil surface fragments will typically retain structure indefinitely when dipped in distilled water.

- 
9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** A-horizon should be 4 to 8 inches thick with mollic (dark) colors when moist. Structure typically is medium to fine granular at least in the upper A-horizon.
- 
10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Combination of shallow and deep rooted species (mid & tall rhizomatous and tufted perennial cool- and warm-season grasses) with fine and coarse roots positively influences infiltration.
- 
11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None.
- 
12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**
- Dominant: Tall warm-season rhizomatous grasses > Mid warm-season bunchgrasses >
- Sub-dominant: Mid cool-season bunchgrasses > Short warm-season grasses >
- Other: Rhizomatous wheatgrass = Forbs = Shrubs > Short cool-season grasses/grass-likes > Trees
- Additional: Other grasses in other functional groups occur in minor amounts.
- 
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Very little evidence of decadence or mortality. Bunch grasses have strong, healthy centers and shrubs are vigorous.
- 
14. **Average percent litter cover (%) and depth ( in):** Litter cover typically 50 to 70 percent, with depth 0.25 to 0.5 inches.
- 
15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Total annual production ranges from 1,800 to 3,000 pounds/acre, with the reference value being 2,400 pounds/acre (air-dry basis).
- 
16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** State and local noxious weeds, Kentucky bluegrass.
- 
17. **Perennial plant reproductive capability:** All species exhibit high vigor relative to climatic conditions. Do not rate based

solely on seed production. Perennial grasses should have vigorous rhizomes or tillers.

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