

# Ecological site R065XY011NE Sandy Low P.Z .14-17

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## 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.

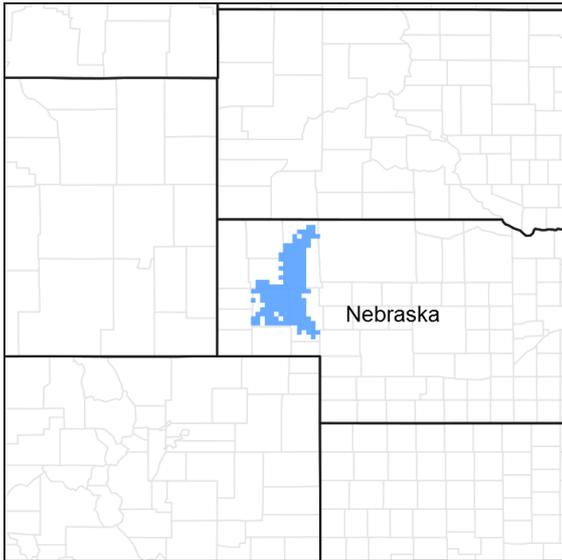


Figure 1. Mapped extent

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.

## Associated sites

R065XY012NE	<b>Sands Low P.Z.14-17</b> Sands 14-17" P.Z.
R065XY024NE	<b>Subirrigated</b> Subirrigated

## Similar sites

R065XY012NE	<b>Sands Low P.Z.14-17</b> Sands 14-17" P.Z. [steeper slope; lower production; sand bluestem dominant.]
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Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Andropogon hallii</i> (2) <i>Calamovilfa longifolia</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 frequency	None
Ponding frequency	None
Elevation	3,500–4,000 ft
Slope	0–3%
Aspect	Aspect is not a significant factor

## Climatic features

The mean average annual precipitation varies from 14 to 17 inches, but has varied from 12 to 20 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 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)	138 days
Freeze-free period (average)	159 days
Precipitation total (average)	16 in

### Influencing water features

None

### Soil features

The features common to all soils in this site are the loamy fine sand textured surface soils and slopes of 0 to 3 percent. The soils in this site are somewhat excessively drained and formed in eolian sand or alluvium. The surface layer is 3 to 10 inches thick. The texture of the subsurface is sand, fine sand, or loamy 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 the 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 percent of the plants.

More information can be found in the various soil survey reports. Contact the local USDA Service Center for reports that include more detail specific to your location.

Major soil series correlated to this ecological site include: Valent.

Other soil series that have been correlated to this site include: Dailey, Duda, Jayem and Vetal.

**Table 4. Representative soil features**

Surface texture	(1) Loamy fine sand
Family particle size	(1) Sandy
Drainage class	Somewhat excessively drained
Permeability class	Moderately rapid
Soil depth	80 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	4 in
Calcium carbonate equivalent (0-40in)	0-5%

Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	6.1–7.8
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

## Ecological dynamics

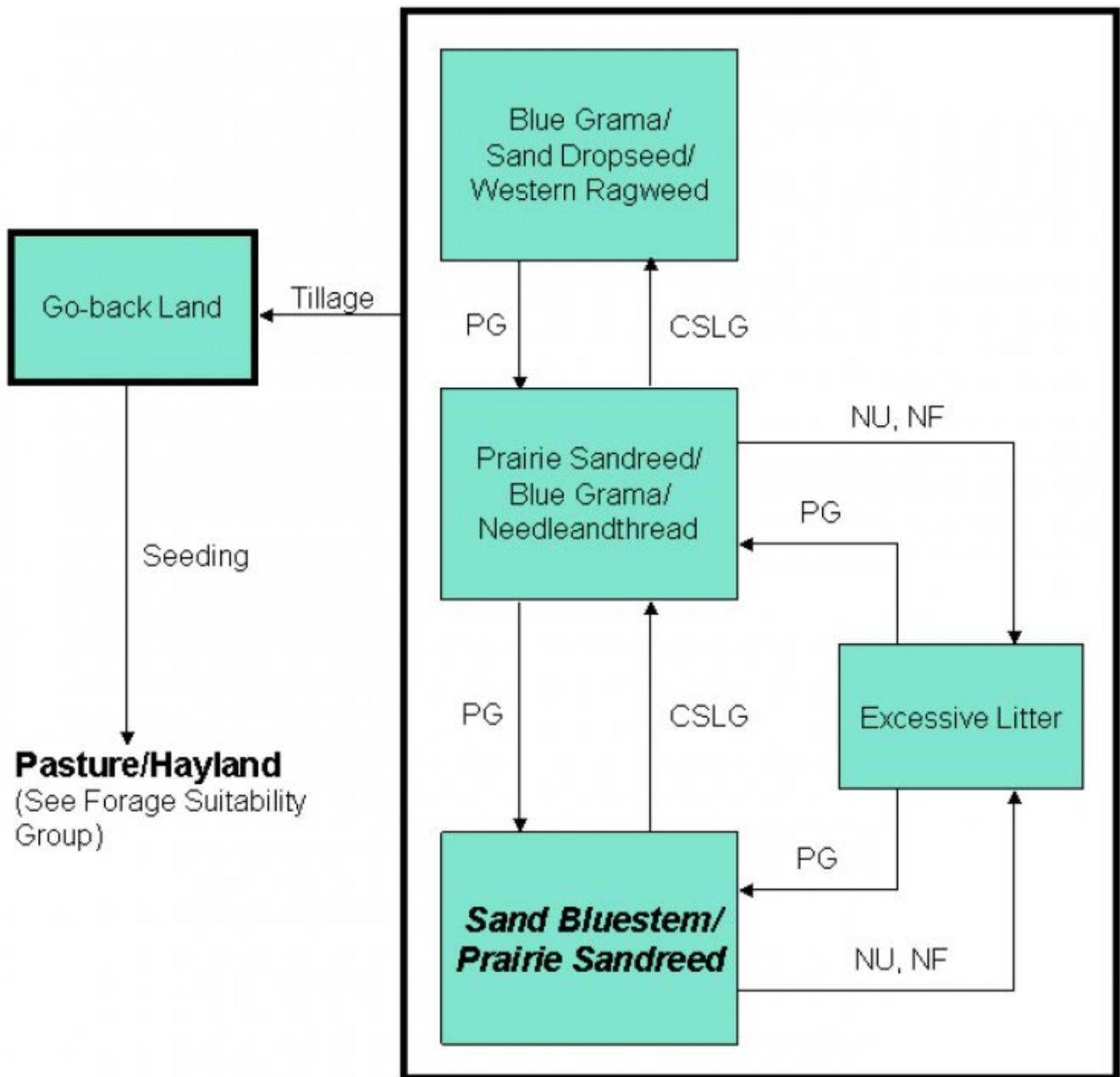
Historically, large areas of blowing sand resulted in the active movement of the sand dunes. Evaporation from the soil surface was extremely high due to the large areas of bare ground, lack of litter and sparse plant populations. The transpiration rate of these sparse plant populations was also high 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, sand dropseed, and blue grama will increase. Species such as sand bluestem and switchgrass will decrease in frequency and production. The site is extremely 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 Sand Bluestem/Prairie Sandreed Plant Community. It has been determined by study of rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily grazed to lightly grazed areas, seasonal use pastures, and historical accounts also have been used. 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



**CSLG** - continuous season-long grazing  
**NF** - no fire  
**NU** - non-use  
**PG** - prescribed grazing

## State 1

### Sand Bluestem/Prairie Sandreed Plant Community

Interpretations are primarily based on the Sand 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 is found on areas that are properly managed. The potential vegetation is about 80 percent grasses or grass-like plants, 10 percent forbs, and 10 percent shrubs. Mid and tall warm-season grasses dominate the plant community. Principal grasses are prairie sandreed and sand 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. 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 this plant community to the Prairie Sandreed/Blue Grama/Needleandthread Plant Community. Non-use and no fire will convert this plant community to the Excessive Litter Plant Community.

### Community 1.1

#### Sand Bluestem/Prairie Sandreed Plant Community

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Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1495	1653	2110
Shrub/Vine	15	105	195
Forb	90	143	195
<b>Total</b>	<b>1600</b>	<b>1901</b>	<b>2500</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

### Prairie Sandreed/Blue Grama/Needleandthread Plant Community

This plant community developed under continuous season-long grazing. It is made up of a mixture of warm and cool season grasses. The potential vegetation is about 80% grasses or grass-like plants, 10 percent forbs, and 10 percent shrubs. The dominant grasses include prairie sandreed, blue grama, and needleandthread. Other grasses include sand bluestem, switchgrass, and sand dropseed. Dominant forbs include spiderwort, Cumin (western) ragweed, and scurfpeas. Dominant shrubs include prairie (fringed) sagewort and cactus. Compared to the Sand Bluestem/Prairie Sandreed Plant Community, sand bluestem, little bluestem, and switchgrass have decreased. Blue grama, needleandthread, and sand dropseed have increased. Plant diversity is high. This plant community is not resistant to change. It is resilient due to the high plant diversity. Soil erosion is low. The water cycle is functioning, infiltration is high and runoff is low. 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: With heavy continuous season-long grazing, this plant community will move toward the Blue Grama/Sand Dropseed/Western Ragweed Plant Community. Forage production, species diversity and ground cover will decrease. With prescribed grazing, this plant community will move toward the Sand Bluestem/Prairie Sandreed Plant Community. Non-use and no fire will convert this plant community to the Excessive Litter Plant Community.

## Community 2.1

### Prairie Sandreed/Blue Grama/Needleandthread Plant Community

This plant community developed under continuous season-long grazing. It is made up of a mixture of warm and cool season grasses. The potential vegetation is about 80% grasses or grass-like plants, 10 percent forbs, and 10 percent shrubs. The dominant grasses include prairie sandreed, blue grama, and needleandthread. Other grasses include sand bluestem, switchgrass, and sand dropseed. Dominant forbs include spiderwort, Cumin (western) ragweed, and scurfpeas. Dominant shrubs include prairie (fringed) sagewort and cactus. Compared to the Sand Bluestem/Prairie Sandreed Plant Community, sand bluestem, little bluestem, and switchgrass have decreased. Blue grama, needleandthread, and sand dropseed have increased. Plant diversity is high. This plant community is not resistant to change. It is resilient due to the high plant diversity. Soil erosion is low. The water cycle is functioning, infiltration is high and runoff is low. 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: With heavy continuous season-long grazing, this plant community will move toward the Blue Grama/Sand Dropseed/Western Ragweed Plant Community. Forage production, species diversity and ground cover will decrease. With prescribed grazing, this plant community will move toward the Sand Bluestem/Prairie Sandreed Plant Community. Non-use and no fire will convert this plant community to the Excessive Litter Plant Community.

Table 6. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1270	1424	1870
Shrub/Vine	15	88	165
Forb	15	88	165
<b>Total</b>	<b>1300</b>	<b>1600</b>	<b>2200</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		

## Blue Grama/Sand Dropseed/Western Ragweed Plant Community

This plant community develops under continuous season-long grazing for long periods of time. It is made up of short, grazing tolerant, warm season grasses and forbs. The potential vegetation is about 75 percent grasses or grass-like plants, 15 percent forbs, and 10 percent shrubs. The dominant grasses include blue grama and sand dropseed. Needleandthread, sedges, and western wheatgrass are also found. Dominant forbs include Cumin (western ragweed), annual eriogonum, and green sagewort. Dominant shrubs include fringed sagewort and cactus. Compared to the Sand Bluestem/Prairie Sandreed Plant Community, sand bluestem, prairie sandreed and switchgrass have decreased. Blue grama, western wheatgrass, and Cumin (western) ragweed have increased. Plant diversity is low. This plant community is fairly resistant to change. If disturbed, it is not resilient due to the low species diversity. Soil erosion is low. The water cycle is reduced because of the lack of surface litter. Infiltration is moderate due to soil texture, which also reduces runoff. 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: NE6535 Growth curve name: Nebraska/South Dakota Sandhills, Grama Growth curve description: Warm-season dominant, short grass. Transitional pathways and/or community pathways leading to other plant communities are as follows: Prescribed grazing will shift this plant community toward the Prairie Sandreed/Blue Grama/Needleandthread Plant Community.

### Community 3.1

## Blue Grama/Sand Dropseed/Western Ragweed Plant Community

This plant community develops under continuous season-long grazing for long periods of time. It is made up of short, grazing tolerant, warm season grasses and forbs. The potential vegetation is about 75 percent grasses or grass-like plants, 15 percent forbs, and 10 percent shrubs. The dominant grasses include blue grama and sand dropseed. Needleandthread, sedges, and western wheatgrass are also found. Dominant forbs include Cumin (western) ragweed, annual eriogonum, and green sagewort. Dominant shrubs include fringed sagewort and cactus. Compared to the Sand Bluestem/Prairie Sandreed Plant Community, sand bluestem, prairie sandreed and switchgrass have decreased. Blue grama, western wheatgrass, and Cumin (western ragweed) have increased. Plant diversity is low. This plant community is fairly resistant to change. If disturbed, it is not resilient due to the low species diversity. Soil erosion is low. The water cycle is reduced because of the lack of surface litter. Infiltration is moderate due to soil texture, which also reduces runoff. 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: NE6535 Growth curve name: Nebraska/South Dakota Sandhills, Grama Growth curve description: Warm-season dominant, short grass. Transitional pathways and/or community pathways leading to other plant communities are as follows: Prescribed grazing will shift this plant community toward the Prairie Sandreed/Blue Grama/Needleandthread Plant Community.

Table 7. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	745	930	1115
Forb	50	110	170
Shrub/Vine	5	61	115
<b>Total</b>	<b>800</b>	<b>1101</b>	<b>1400</b>

Figure 11. Plant community growth curve (percent production by month). NE6535, NE/SD Sandhills Blue Grama dominant. Warm-season dominant, short grass.

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

## State 4

### Excessive Litter Plant Community

This plant community developed under many years of no grazing or fire to disturb the vegetation. Plant litter accumulates rapidly as this community first develops. Eventually, litter levels become high enough that plants are

crowded out and bare ground areas develop. These bare ground areas are commonly filled by annual grasses and forbs. Typically bunchgrasses develop dead centers and rhizomatous grasses form small colonies because of a lack of tiller stimulation. The potential vegetation is about 85 percent grasses or grass-like plants, 10 percent forbs, and 5 percent shrubs. Dominant grasses include prairie sandreed, sand bluestem, and needleandthread. Other grasses include switchgrass and sand dropseed. Dominant forbs include annual sunflower and ten-petal blazingstar (mentzelia). Dominant shrubs include cactus and prairie(fringed) sagewort. Compared to the Sand Bluestem/Prairie Sandreed Plant Community, sand bluestem, prairie sandreed, and perennial forbs have decreased, while needleandthread, sedges, and annual forbs have increased. This plant community will change rapidly if plant manipulation is allowed to occur (grazing by domestic livestock or possibly periodic fire). If the intensity and duration of the disturbance is not great enough, it will return to this plant community somewhat easily. Soil erosion is low when the surface litter is high, but then increases as the litter disappears. The water cycle is functioning. Infiltration is high and runoff is low. 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: NE6536 Growth curve name: Nebraska/South Dakota Sandhills, Native Grasslands, Non-Use Growth curve description: Warm-season dominant, cool-season subdominant, excessive litter. Transitional pathways and/or community pathways leading to other plant communities are as follows: Prescribed grazing or prescribed grazing with fire will convert the plant community to the Sand Bluestem/Prairie Sandreed Plant Community. Depending on the length of time non-use occurred and the composition of the plant species prior to removal of use and/or fire, these practices will move this plant community to the Sand Bluestem/Prairie Sandreed Plant Community or the Prairie Sandreed/Blue Grama/Needleandthread Plant Community.

### Community 4.1 Excessive Litter Plant Community

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Table 8. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1170	1464	1550
Forb	15	88	165
Shrub/Vine	15	48	85
<b>Total</b>	<b>1200</b>	<b>1600</b>	<b>1800</b>

Figure 13. Plant community growth curve (percent production by month).

NE6536, NE/SD Sandhills, Native Grass, Non-Use. Warm-season dominant, cool-season subdominant, excessive litter.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	15	20	20	20	10	7	3	0	0

## State 5

### 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, horseweed (maretail), green sagewort, and/or ragweed. Other plants that commonly occur on the plant community include six-weeks fescue, prairie sandreed, witchgrass, little bluestem, switchgrass, and needleandthread. Compared to the Sand 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.

### Community 5.1

#### Go-back Land Plant Community

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## 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>Sand Bluestem</b>			570–760	
	sand bluestem	ANHA	<i>Andropogon hallii</i>	570–760	–
2	<b>Prairie Sandreed</b>			475–665	
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	475–665	–
3	<b>Needleandthread</b>			95–190	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	95–190	–
4	<b>Blue Grama</b>			95–190	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	95–190	–
5	<b>Other Warm-Season</b>			38–190	
	switchgrass	PAVI2	<i>Panicum virgatum</i>	0–190	–
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	0–190	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	0–95	–
	sand lovegrass	ERTR3	<i>Eragrostis trichodes</i>	0–95	–
6	<b>Misc. Grasses/Grass-Likes</b>			38–190	
	sedge	CAREX	<i>Carex</i>	0–95	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–95	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	0–95	–

	threadleaf sedge	CAFI	<i>Carex filifolia</i>	0–38	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–38	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	0–19	–
<b>Forb</b>					
8	<b>Forbs</b>			95–190	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–38	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	0–38	–
	tarragon	ARDR4	<i>Artemisia dracunculus</i>	0–19	–
	thistle	CIRSI	<i>Cirsium</i>	0–19	–
	Texas croton	CRTE4	<i>Croton texensis</i>	0–19	–
	common sunflower	HEAN3	<i>Helianthus annuus</i>	0–19	–
	stiff sunflower	HEPA19	<i>Helianthus pauciflorus</i>	0–19	–
	blazing star	LIATR	<i>Liatris</i>	0–19	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–19	–
	tenpetal blazingstar	MEDE2	<i>Mentzelia decapetala</i>	0–19	–
	beardtongue	PENST	<i>Penstemon</i>	0–19	–
	scurfpea	PSORA2	<i>Psoralegium</i>	0–19	–
	white heath aster	SYER	<i>Symphotrichum ericoides</i>	0–19	–
	spiderwort	TRADE	<i>Tradescantia</i>	0–19	–
	vervain	VERBE	<i>Verbena</i>	0–19	–
	Forb, annual	2FA	<i>Forb, annual</i>	0–19	–
<b>Shrub/Vine</b>					
9	<b>Shrubs</b>			19–190	
	rose	ROSA5	<i>Rosa</i>	0–95	–
	sand sagebrush	ARFI2	<i>Artemisia filifolia</i>	0–95	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	0–95	–
	Subshrub (<.5m)	2SUBS	<i>Subshrub (&lt;.5m)</i>	0–38	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	0–38	–
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	0–38	–
	brittle pricklypear	OPFR	<i>Opuntia fragilis</i>	0–19	–

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>Sand Bluestem</b>			80–240	
	sand bluestem	ANHA	<i>Andropogon hallii</i>	80–240	–
2	<b>Prairie Sandreed</b>			400–560	
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	400–560	–
3	<b>Needleandthread</b>			80–240	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	80–240	–
4	<b>Blue Grama</b>			80–240	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	80–240	–
5	<b>Other Warm-Season</b>			80–240	

	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	0–160	–
	switchgrass	PAVI2	<i>Panicum virgatum</i>	0–80	–
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	0–80	–
	sand lovegrass	ERTR3	<i>Eragrostis trichodes</i>	0–32	–
	sandhill muhly	MUPU2	<i>Muhlenbergia pungens</i>	0–32	–
6	<b>Miscellaneous Grasses/Grass-Likes</b>			32–160	
	sedge	CAREX	<i>Carex</i>	0–80	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	0–80	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–32	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–32	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	0–32	–
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	0–32	–
7	<b>Non-Native Grasses</b>			0–16	
	cheatgrass	BRTE	<i>Bromus tectorum</i>	0–16	–
<b>Forb</b>					
8	<b>Forbs</b>			16–160	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–32	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	0–32	–
	spiderwort	TRADE	<i>Tradescantia</i>	0–32	–
	thistle	CIRSI	<i>Cirsium</i>	0–32	–
	Rocky Mountain beeplant	CLSE	<i>Cleome serrulata</i>	0–16	–
	Texas croton	CRTE4	<i>Croton texensis</i>	0–16	–
	common sunflower	HEAN3	<i>Helianthus annuus</i>	0–16	–
	stiff sunflower	HEPA19	<i>Helianthus pauciflorus</i>	0–16	–
	blazing star	LIATR	<i>Liatris</i>	0–16	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–16	–
	tenpetal blazingstar	MEDE2	<i>Mentzelia decapetala</i>	0–16	–
	beardtongue	PENST	<i>Penstemon</i>	0–16	–
	scurfpea	PSORA2	<i>Psoralidium</i>	0–16	–
	white heath aster	SYER	<i>Symphotrichum ericoides</i>	0–16	–
	vervain	VERBE	<i>Verbena</i>	0–16	–
	tarragon	ARDR4	<i>Artemisia dracunculus</i>	0–16	–
	Forb, annual	2FA	<i>Forb, annual</i>	0–16	–
<b>Shrub/Vine</b>					
9	<b>Shrubs</b>			16–160	
	sand sagebrush	ARFI2	<i>Artemisia filifolia</i>	0–80	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	0–80	–
	Subshrub (<.5m)	2SUBS	<i>Subshrub (&lt;.5m)</i>	0–32	–
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	0–32	–
	rose	ROSA5	<i>Rosa</i>	0–32	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	0–32	–
	brittle pricklypear	OPFR	<i>Opuntia fragilis</i>	0–16	–

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>Sand Bluestem</b>			0–55	
	sand bluestem	ANHA	<i>Andropogon hallii</i>	0–55	–
2	<b>Prairie Sandreed</b>			55–165	
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	55–165	–
3	<b>Needleandthread</b>			55–165	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	55–165	–
4	<b>Blue Grama</b>			110–220	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	110–220	–
5	<b>Other Warm-Season</b>			55–220	
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	55–165	–
	sandhill muhly	MUPU2	<i>Muhlenbergia pungens</i>	0–55	–
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	0–55	–
	sand lovegrass	ERTR3	<i>Eragrostis trichodes</i>	0–22	–
	switchgrass	PAVI2	<i>Panicum virgatum</i>	0–11	–
6	<b>Misc. Grasses/Grass-Likes</b>			22–165	
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	0–55	–
	sedge	CAREX	<i>Carex</i>	0–55	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–55	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	0–55	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–22	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	0–22	–
7	<b>Non-Native Grasses</b>			0–55	
	cheatgrass	BRTE	<i>Bromus tectorum</i>	0–55	–
<b>Forb</b>					
8	<b>Forbs</b>			55–165	
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	0–110	–
	tarragon	ARDR4	<i>Artemisia dracuncululus</i>	0–55	–
	Forb, annual	2FA	<i>Forb, annual</i>	0–55	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–22	–
	common sunflower	HEAN3	<i>Helianthus annuus</i>	0–22	–
	thistle	CIRSI	<i>Cirsium</i>	0–22	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–22	–
	tenpetal blazingstar	MEDE2	<i>Mentzelia decapetala</i>	0–22	–
	beardtongue	PENST	<i>Penstemon</i>	0–11	–
	scurfpea	PSORA2	<i>Psoralidium</i>	0–11	–
	white heath aster	SYER	<i>Symphotrichum ericoides</i>	0–11	–
	spiderwort	TRADE	<i>Tradescantia</i>	0–11	–
	vervain	VERBE	<i>Verbena</i>	0–11	–
	Rocky Mountain beeplant	CLSE	<i>Cleome serrulata</i>	0–11	–
	Texas croton	CRTE4	<i>Croton texensis</i>	0–11	–
	stiff sunflower	HEPA19	<i>Helianthus pauciflorus</i>	0–11	–

	blazing star	LIATR	<i>Liatris</i>	0-11	-
<b>Shrub/Vine</b>					
9	<b>Shrubs</b>			11-110	
	sand sagebrush	ARFI2	<i>Artemisia filifolia</i>	0-55	-
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	0-55	-
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	0-55	-
	Subshrub (<.5m)	2SUBS	<i>Subshrub (&lt;.5m)</i>	0-22	-
	rose	ROSA5	<i>Rosa</i>	0-11	-
	soapweed yucca	YUGL	<i>Yucca glauca</i>	0-11	-
	brittle pricklypear	OPFR	<i>Opuntia fragilis</i>	0-11	-

Table 12. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Sand Bluestem</b>			240–400	
	sand bluestem	ANHA	<i>Andropogon hallii</i>	240–400	–
2	<b>Prairie Sandreed</b>			240–400	
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	240–400	–
3	<b>Needleandthread</b>			160–320	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	160–320	–
4	<b>Blue Grama</b>			0–80	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	0–80	–
5	<b>Other Warm-Season</b>			0–240	
	sand lovegrass	ERTR3	<i>Eragrostis trichodes</i>	0–80	–
	switchgrass	PAVI2	<i>Panicum virgatum</i>	0–80	–
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	0–80	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	0–80	–
6	<b>Misc. Grasses/Grass-Likes</b>			32–240	
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	16–160	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	0–80	–
	sedge	CAREX	<i>Carex</i>	0–80	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–32	–
7	<b>Non-Native Grasses</b>			0–16	
	cheatgrass	BRTE	<i>Bromus tectorum</i>	0–16	–
<b>Forb</b>					
8	<b>Forbs</b>			16–160	
	Forb, annual	2FA	<i>Forb, annual</i>	0–80	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–32	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	0–32	–
	common sunflower	HEAN3	<i>Helianthus annuus</i>	0–32	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–16	–
	tenpetal blazingstar	MEDE2	<i>Mentzelia decapetala</i>	0–16	–
	scurfpea	PSORA2	<i>Psoraleidium</i>	0–16	–
	tarragon	ARDR4	<i>Artemisia dracunculus</i>	0–16	–
	thistle	CIRSI	<i>Cirsium</i>	0–16	–
	Texas croton	CRTE4	<i>Croton texensis</i>	0–16	–
<b>Shrub/Vine</b>					
9	<b>Shrubs</b>			16–80	
	sand sagebrush	ARFI2	<i>Artemisia filifolia</i>	0–80	–
	rose	ROSA5	<i>Rosa</i>	0–80	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	0–32	–
	Subshrub (<.5m)	2SUBS	<i>Subshrub (&lt;.5m)</i>	0–32	–
	brittle pricklypear	OPFR	<i>Opuntia fragilis</i>	0–16	–
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	0–16	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	0–16	–

## **Animal community**

### **Livestock - Grazing Interpretations:**

Grazing by domestic livestock is one of the major income-producing industries in the area. Rangeland in this area may provide yearlong forage for cattle, sheep, or horses. During the dormant period, the protein levels of the forage may be lower than the minimum needed to meet livestock (primarily cattle and sheep) requirements.

### **Wildlife Habitat Interpretations:**

When the plant community structure of this tallgrass prairie site is maintained, this site provides excellent nesting areas for quail, pheasant, and prairie chickens, especially when it is associated with adjacent booming grounds. The variety of forbs, grasses, and insects on this site makes it a preferred feeding area for deer and birds. Numerous songbirds utilize this site for nesting and other activities.

Changes to the structure and species composition of the plant community in ways that reduce the availability of the food and cover that attracts these species to this site. However, some animal species favor alternative community phases/states. For additional habitat components beyond the scope of this ESD, refer to species specific habitat appraisal guides.

In the absence of fire and grazing, excess litter buildup can occur on this site hindering the movement of young birds, especially quail and prairie chickens. Additionally, decreased forb abundance/diversity will result in an accompanying decrease in insects, a critical food source for young birds.

Numerous rodents and small animals utilize this site by taking advantage of the taller growing plants to visually shield them from predators.

## **Hydrological functions**

### **Hydrology Functions:**

Water is the principal factor limiting forage production on this site. Shrub invasion, particularly by eastern red cedar, greatly exacerbates this issue. Control of invasive shrubs by Rx fire and mechanical means are important tools in maintaining the site as a grassland.

Soils in this Ecological site are generally in hydrologic group D. Infiltration rate is moderately slow to slow. Runoff potential for this site varies from low to very high depending on soil hydrologic group, slope and ground cover. For the representative 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 percent of the soil surface. Overall this site has the appearance of being stable and productive.

## **Recreational uses**

This site provides hunting for upland game species along with hiking, photography, bird watching, and other opportunities. The wide varieties of plants which bloom from spring until fall have an aesthetic value that appeals to visitors.

Wildflowers are abundant on this site. The most visible wildflowers change from year to year due to the variability among the growing seasons. Because of this variety of wildflowers and grasses, many people tour and collect plant materials from this site for dried floral arrangements.

## **Wood products**

Although several tree species invade this site, they usually do not reach sufficient size to produce wood products except for firewood.

## **Other products**

The deep, productive nature of the soils associated with this site make it attractive for a variety of other land uses. When in large blocks on flatter slopes, they are preferred cropland soils. Introduced pasture plants do well on these soils.

## 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 3 SCS-RANGE-417 records available from Garden, Morrill, and Sheridan counties. The sample period is from 1970 to 1998.

## Other references

Other sources used as references 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- R065XY011NE - 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):** Bare ground less than 10 percent and patches less than 2 inches in diameter.  

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5. **Number of gullies and erosion associated with gullies:** Active gullies should not 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.  

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface structure is typically granular, and mollic (higher organic matter) colors of A-horizon about 5 to 10 inches deep. If conditions are other than this, refer to map unit component descriptions for component on which the site occurs.  

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Healthy, deep rooted native grasses enhance infiltration and reduce runoff.  

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** No compaction layer should be present.  

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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 and mid, warm-season grasses >>

Sub-dominant: Mid, cool-season grasses >

Other: Short, warm-season grasses = forbs = shrubs

Additional: Other grasses occur in other functional groups in minor amounts.

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Very little to no evidence of decadence or mortality. Bunch grasses have strong, healthy centers and shrubs are vigorous.
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14. **Average percent litter cover (%) and depth ( in):** 75 to 85 percent plant litter cover, roughly 0.25 to 0.5 inch depth. Litter cover is in contact with soil surface.
- 

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Ranges from 1,600 to 2,500 pounds/acre. Reference value is 1,900 pounds/acre (air-dry weight basis).
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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:** Refer to State and Local Noxious Weed List.
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17. **Perennial plant reproductive capability:** All species exhibit high vigor relative to climatic conditions. Do not rate based solely on seed production. Perennial grasses typically have vigorous rhizomes or tillers.
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