

## Ecological site R065XY012NE Sands Low P.Z.14-17

Accessed: 05/19/2024

### 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.

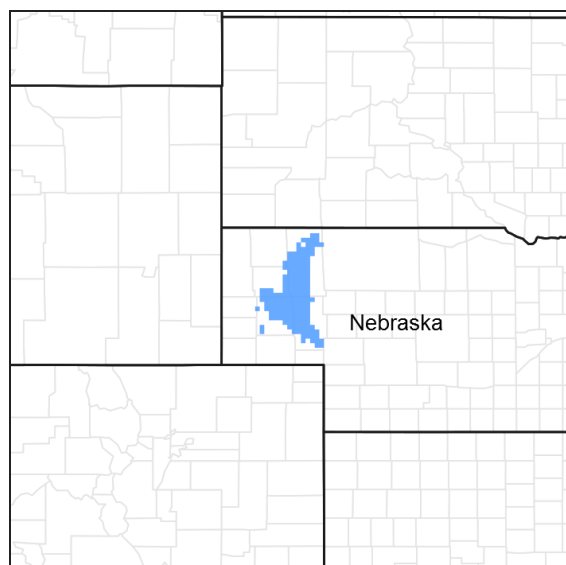


Figure 1. Mapped extent

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: The Sands site is positioned on a dune or hill, with a slope of greater than 3 percent. Edaphic: Soil textures are Loamy Fine Sand or courser, and have a dark colored surface horizon less than 10 inches thick. Catsteps are not evident on this site.

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

R065XY011NE	<b>Sandy Low P.Z. 14-17</b> Sandy 14-17" P.Z.
R065XY013NE	<b>Choppy Sands Low P.Z.14-17</b> Choppy Sands 14-17" P.Z.
R065XY024NE	<b>Subirrigated</b> Subirrigated

## Similar sites

R065XY011NE	<b>Sandy Low P.Z. 14-17</b> Sandy 14-17" P.Z. [slope not as steep; higher production; prairie sandreed dominant.]
R065XY013NE	<b>Choppy Sands Low P.Z.14-17</b> Choppy Sands 14-17" P.Z. [steeper slope; lower production; blowout grass present; shrubs more evident]

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) Dune
Flooding frequency	None
Ponding frequency	None
Elevation	1,067–1,219 m
Slope	3–24%
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 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)	138 days
Freeze-free period (average)	159 days
Precipitation total (average)	406 mm

Influencing water features

None

Soil features

The features common to all soils in this site are the sandy textured surface soils and slopes of 3 to 24 percent. The soils in this site are excessively drained and formed in eolian sand. The surface layer is 2 to 9 inches thick. The texture of the subsurface ranges from loamy fine sand to fine sand. Runoff as evidenced by patterns of rill, gully, or other water flow is low to very low due to the very 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 varoius soil survey reports. Contact the local USDA Service Center for soil survey reports that include more details 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: none.

Table 4. Representative soil features

Surface texture	(1) Fine sand (2) Loamy fine sand (3) Sand
Family particle size	(1) Sandy
Drainage class	Excessively drained
Permeability class	Rapid
Soil depth	203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%

Available water capacity (0-101.6cm)	7.62 cm
Calcium carbonate equivalent (0-101.6cm)	0%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	6.6–7.8
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

## Ecological dynamics

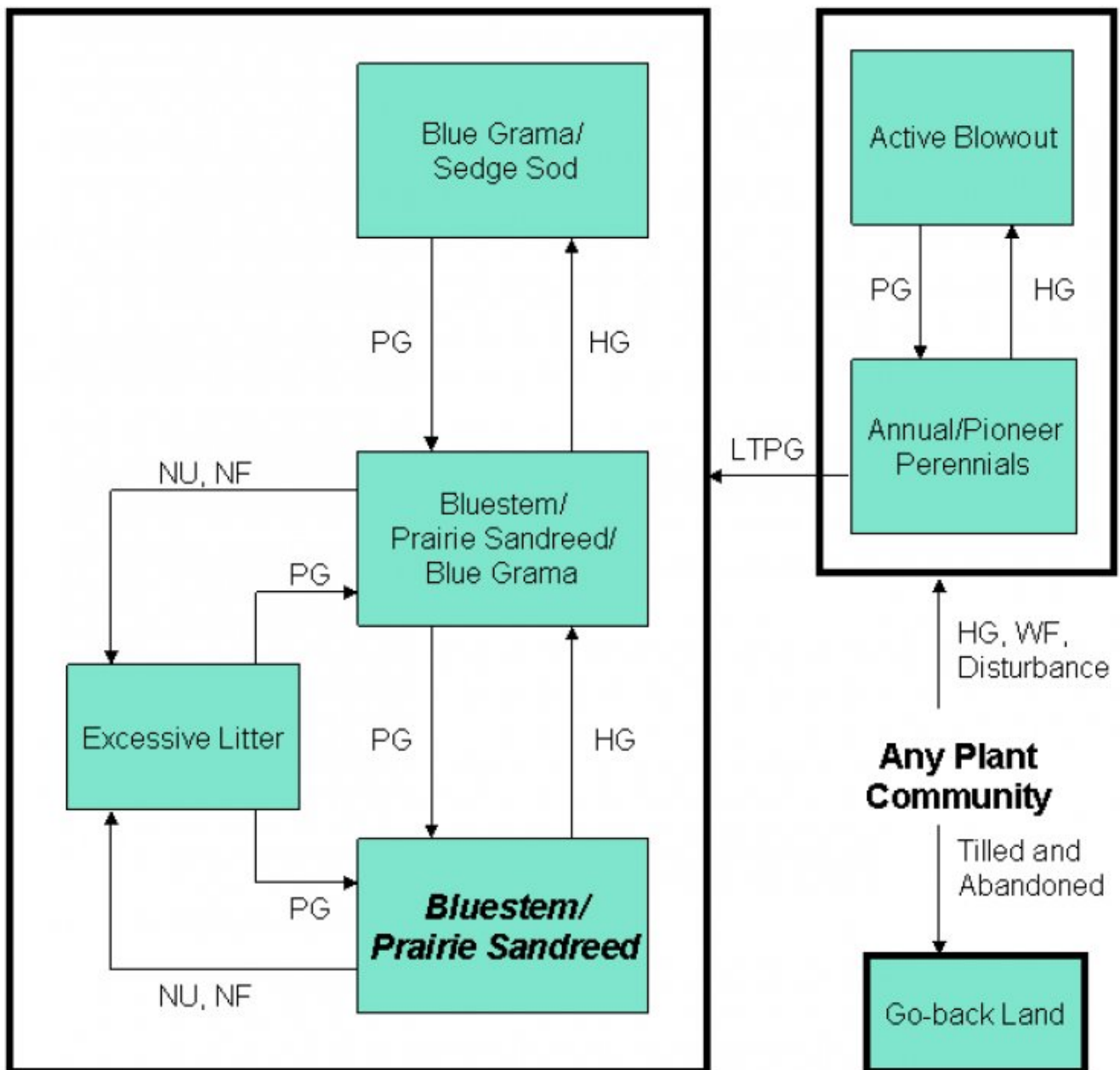
Historically, large areas of blowing sand resulted in the active movement of the sand dunes. Evaporation from the soil surface was extremely high due to the large areas of bare ground, lack of litter, and sparse plant populations. The transpiration rate of these sparse plant populations was also high 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, 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 Bluestem/Prairie Sandreed Plant Community. It has been determined by study of range and 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



**HG** - heavy grazing; **LTPG** - long term prescribed grazing; **NF** - no fire;  
**NU** - non use; **PG** - prescribed grazing; **WF** - wildfire

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). This 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 with grazing and/or prescribed burning, and sometimes on areas receiving occasional short periods of rest. This plant community consists chiefly of tall and mid warm-season grasses. Principle dominants are sand bluestem, prairie sandreed, and little bluestem. Grasses of secondary importance are needleandthread, switchgrass, sand dropseed, and hairy or blue grama. Sedges occur in the understory. Forbs and shrubs such as gayfeather, stiff sunflower, leadplant, rose, and sandcherry are significant. This plant community is about 85 percent grasses, 10 percent forbs, and 5 percent shrubs by weight. This plant community is extremely resilient and well adapted to the Northern Great Plains climatic conditions. 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: Heavy grazing and/or improper rest periods will convert this plant community to the Bluestem/Prairie Sandreed/Blue Grama Plant Community. Continuous heavy grazing tends to accelerate this movement. Non-use and no fire will convert this plant community to the Excessive Litter Plant Community.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1676	1907	2471
Forb	101	160	219
Shrub/Vine	17	64	112
Total	1794	2131	2802

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  
Bluestem/Prairie Sandreed/Blue Grama Plant Community

Community 2.1  
Bluestem/Prairie Sandreed/Blue Grama Plant Community

This plant community developed under short term continuous grazing. It is made up of a mixture of warm and cool season grasses. The potential vegetation is about 85% grasses or grass-like plants, 10% forbs, and 5% shrubs. The dominant grasses include sand bluestem and prairie sandreed. Other grasses may include blue grama, needleandthread, sand dropseed, and sedges. The dominant forbs include Cumin (western) ragweed, annual wild-buckwheat (eriogonum), and spiderwort. Dominant shrubs in this community include rose, cactus, yucca, and sand sagebrush. Compared to the Blustem/Prairie Sandreed Plant Community, blue grama, sand dropseed, and annual forbs increased. Sand bluestem, sand lovegrass, and little bluestem have decreased. Annual forbs invade the plant community. Plant diversity is high. This plant community is not resistant to change. Changes in climate, fire patterns, and/or grazing management can result in a shift to another plant community. This community is fairly

resilient upon removal of normal disturbances because of the high diversity of plant species and the high amount of litter. Soil erosion is low. The water cycle is functioning because of the plant and litter cover and the soil surface. Infiltration is high because of soil texture and surface litter. 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: Prescribed grazing, or prescribed grazing with periodic fire will convert the plant community to the Bluestem/Prairie Sandreed Plant Community. The probability of this occurring is high. Heavy grazing or improper rest periods will convert this plant community to the Blue Grama/Sedge Sod Plant Community. Continuous heavy grazing tends to accelerate this movement to the Blue Grama/Sedge Sod 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 (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1552	1753	2281
Forb	—	95	196
Shrub/Vine	17	57	101
<b>Total</b>	<b>1569</b>	<b>1905</b>	<b>2578</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/Sedge Sod Plant Community

#### Community 3.1

#### Blue Grama/Sedge Sod Plant Community

This plant community developed under long-term season long grazing with inadequate rest during the growing season. It is made up of warm-season short grasses, cool-season grasses, grass-like, and grazing tolerant shrubs. The potential vegetation is about 85% grasses or grass-like plants, 10% forbs, and 5% shrubs. The dominant grass is blue grama. Other grasses or grass-like include needleandthread, sedges, sand dropseed, and prairie sandreed. The dominant forbs include Cumin (western) ragweed and common sunflower. The dominant shrubs include sand sage and yucca. Compared to the Blustem/Prairie Sandreed Plant Community, sandhill muhly, hairy grama, sedges, ragweed, and rose have increased, while prairie sandreed, sand bluestem, and switchgrass have decreased. The plant diversity has decreased from that of the Bluestem/Prairie Sandreed Plant Community. This plant community is not resistant to change due to a higher percentage of bare ground. Under disturbance, this plant community is not resilient. The soil erosion is moderate. The water cycle is impaired due to a reduction in litter and the potential for higher runoff and decreased infiltration. 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: With prescribed grazing, including adequate recovery periods, this plant community will be converted to the Bluestem/Prairie Sandreed/Blue Grama Plant Community.

**Table 7. Annual production by plant type**

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1121	1348	1564
Forb	—	73	151
Shrub/Vine	—	37	78
<b>Total</b>	<b>1121</b>	<b>1458</b>	<b>1793</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

### Community 4.1 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 forbs and grasses. Typically bunchgrasses develop dead centers and rhizomatous grasses form small colonies because of a lack of tiller stimulation. The potential vegetation is about 80% grasses or grass-like plants, 15% forbs, and 5% shrubs. Dominant grasses include prairie sandreed, little bluestem, and needleandthread. Other grasses include sand bluestem, sand dropseed, and prairie junegrass. Dominant forbs include common sunflower and ten-petal blazingstar (mentzelia). Dominant shrubs include yucca, cactus, and sand sagebrush. Compared to the 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 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 Bluestem/Prairie Sandreed Plant Community or the Bluestem/Prairie Sandreed/Blue Grama Plant Community.

Table 8. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1149	1365	1468
Forb	73	157	241
Shrub/Vine	11	47	84
<b>Total</b>	<b>1233</b>	<b>1569</b>	<b>1793</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

### Annual/Pioneer Perennial Plant Community

#### Community 5.1

##### Annual/Pioneer Perennial Plant Community

As succession progresses, sandhill muhly, blowout grass, and sand bluestem begin to colonize. Sandbur, lemon scurfpea, Texas croton, and common sunflower begin to come in with prairie sandreed, hairy grama, and rose slowly becoming evident on 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: NE6537 Growth curve name: Nebraska/South Dakota Sandhills, Annual/Pioneer Perennial Growth curve description: Short cool season grasses, and cool season annual forbs. Transitional pathways and/or community pathways leading to other plant communities are as follows: With continued disturbance (such as heavy grazing) and/or wildfire, this plant community will move towards the Active Blowout Plant Community. Under long-term prescribed grazing (10+ years), including adequate rest periods, succession will progress leading to the Bluestem/Prairie Sandreed Plant Community. The slope, aspect, size, and relative abundance of perennial plants will influence the rate that change will occur.

Figure 14. Plant community growth curve (percent production by month). NE6537, NE/SD Sandhills, Annual/Pioneer Perennial. Short cool season grasses, and cool season annual forbs..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	10	20	30	20	5	5	5	0	0

## State 6

### Active Blowout Plant Community

#### Community 6.1

##### Active Blowout Plant Community

This condition can be reached from any other plant community with significant disturbances such as heavy grazing, and repeated wildfire. Large areas of blowing sand result in movement and possible enlargement of the blowout. Evaporation and transpiration of the few existing plants are extremely high due to bare ground, lack of litter, fire, and few plants. The plant community is in a low successional stage from poor soil development, fire occurrence, and sporadic herbivore use. Sandhill muhly and blowout grass are present due to their drought tolerance. 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: NE6538 Growth curve name: Nebraska/South Dakota Sandhills, Active Blowout Growth curve description: Areas of open, blowing sand and pioneer species. Transitional pathways and/or community pathways leading to other plant communities are as follows: With prescribed grazing and concentrated short-term animal impact (such as feeding hay on the blowout), this plant community will move to the Annual/Pioneer Perennial Plant Community. Establishment of vegetation may be accelerated by broadcast seeding of a temporary cover crop prior to removal of animal impact.

Figure 15. Plant community growth curve (percent production by month). NE6538, NE/SD Sandhills, Active Blowout. Areas of open, blowing sand and pioneer species.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	0	10	35	30	20	5	0	0	0

## State 7

### Go-back Land Plant Community

## Community 7.1

### 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 little bluestem, three-awn, sand dropseed, prairie sandreed, marehail, annual sunflower, green sagewort, and/or ragweed. Other plants that occur on the plant community include rose, yucca, sand blustem, switchgrass, and needleandthread. Compared to the Bluestem/Prairie Sandreed Plant Community, warm-season natives have decreased. Annual forbs and grasses 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. Soil erosion is typically evident in low successional stages. The water cycle is not greatly affected. Many of the areas seeded prior to the 1960's are now dominated by little bluestem.

### Additional community tables

Table 9. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Sand Bluestem</b>			426–852	
	sand bluestem	ANHA	<i>Andropogon hallii</i>	426–852	–
2	<b>Prairie Sandreed</b>			426–852	
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	426–852	–
3	<b>Needleandthread</b>			106–213	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	106–213	–
4	<b>Grama</b>			21–213	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	21–213	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	21–106	–
5	<b>Warm-Season Grasses</b>			0–213	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	0–213	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	0–106	–
	switchgrass	PAVI2	<i>Panicum virgatum</i>	0–106	–
	sand lovegrass	ERTR3	<i>Eragrostis trichodes</i>	0–106	–
	sandhill muhly	MUPU2	<i>Muhlenbergia pungens</i>	0–106	–
	thin paspalum	PASE5	<i>Paspalum setaceum</i>	0–43	–
6	<b>Native Grass/Grass-Likes</b>			43–170	
	sedge	CAREX	<i>Carex</i>	21–106	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	21–106	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–43	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	0–43	–
<b>Forb</b>					
8	<b>Forbs</b>			106–213	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–43	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	0–21	–
	tarragon	ARDR4	<i>Artemisia dracunculus</i>	0–21	–
	thistle	CIRSI	<i>Cirsium</i>	0–21	–
	common sunflower	HEAN3	<i>Helianthus annuus</i>	0–21	–
	blazing star	LIATR	<i>Liatris</i>	0–21	–
	rush skeletonplant	LY III	<i>Lyodasemia juncea</i>	0–21	–

	rust skeletonplant	ETOC	<i>Elyoglossina juncea</i>	0-21	—
	beardtongue	PENST	<i>Penstemon</i>	0-21	—
	scurfpea	PSORA2	<i>Psoralidium</i>	0-21	—
	white heath aster	SYER	<i>Symphotrichum ericoides</i>	0-21	—
	spiderwort	TRADE	<i>Tradescantia</i>	0-21	—
<b>Shrub/Vine</b>					
9	<b>Shrubs</b>			21-106	
	Subshrub (<.5m)	2SUBS	<i>Subshrub (&lt;.5m)</i>	21-64	—
	sand sagebrush	ARFI2	<i>Artemisia filifolia</i>	21-64	—
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	21-64	—
	rose	ROSA5	<i>Rosa</i>	21-64	—
	soapweed yucca	YUGL	<i>Yucca glauca</i>	21-64	—
	western sandcherry	PRPUB	<i>Prunus pumila var. besseyi</i>	21-43	—
	brittle pricklypear	OPFR	<i>Opuntia fragilis</i>	0-21	—

Table 10. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Sand Bluestem</b>			476–667	
	sand bluestem	ANHA	<i>Andropogon hallii</i>	476–667	–
2	<b>Prairie Sandreed</b>			381–572	
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	381–572	–
3	<b>Needleandthread</b>			0–95	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	0–95	–
4	<b>Grama</b>			0–191	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	95–191	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	0–95	–
5	<b>Warm-Season Grasses</b>			38–191	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	0–95	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	0–95	–
	sandhill muhly	MUPU2	<i>Muhlenbergia pungens</i>	0–95	–
	thin paspalum	PASE5	<i>Paspalum setaceum</i>	0–38	–
	sand lovegrass	ERTR3	<i>Eragrostis trichodes</i>	0–19	–
6	<b>Native Grass/Grass-Likes</b>			19–95	
	sedge	CAREX	<i>Carex</i>	19–95	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–95	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–38	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	0–38	–
7	<b>Non-Native Grasses</b>			0–38	
	cheatgrass	BRTE	<i>Bromus tectorum</i>	0–38	–
<b>Forb</b>					
8	<b>Forbs</b>			0–191	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–38	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	0–19	–
	thistle	CIRSI	<i>Cirsium</i>	0–19	–
	common sunflower	HEAN3	<i>Helianthus annuus</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	–
	spiderwort	TRADE	<i>Tradescantia</i>	0–19	–
<b>Shrub/Vine</b>					
9	<b>Shrubs</b>			19–95	
	sand sagebrush	ARFI2	<i>Artemisia filifolia</i>	19–57	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	0–57	–
	rose	ROSA5	<i>Rosa</i>	0–57	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	19–57	–
	brittle pricklypear	OPFR	<i>Opuntia fragilis</i>	0–19	–

Table 11. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
2	<b>Prairie Sandreed</b>			0–146	
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	0–146	–
3	<b>Needleandthread</b>			146–291	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	146–291	–
4	<b>Grama</b>			364–510	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	364–510	–
5	<b>Warm-Season Grasses</b>			0–73	
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	0–73	–
6	<b>Native Grass/Grass-Likes</b>			73–219	
	sedge	CAREX	<i>Carex</i>	73–146	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–73	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–29	–
7	<b>Non-Native Grasses</b>			0–29	
	cheatgrass	BRTE	<i>Bromus tectorum</i>	0–29	–
<b>Forb</b>					
8	<b>Forbs</b>			0–146	
	Forb, annual	2FA	<i>Forb, annual</i>	0–29	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–29	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	0–15	–
	tarragon	ARDR4	<i>Artemisia dracunculus</i>	0–15	–
	thistle	CIRSI	<i>Cirsium</i>	0–15	–
	common sunflower	HEAN3	<i>Helianthus annuus</i>	0–15	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–15	–
	tenpetal blazingstar	MEDE2	<i>Mentzelia decapetala</i>	0–15	–
	spiderwort	TRADE	<i>Tradescantia</i>	0–15	–
<b>Shrub/Vine</b>					
9	<b>Shrubs</b>			0–73	
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	0–73	–
	brittle pricklypear	OPFR	<i>Opuntia fragilis</i>	0–15	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	0–15	–
	sand sagebrush	ARFI2	<i>Artemisia filifolia</i>	0–15	–

Table 12. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Sand Bluestem</b>			78–157	
	sand bluestem	ANHA	<i>Andropogon hallii</i>	78–157	–
2	<b>Prairie Sandreed</b>			157–235	
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	157–235	–
3	<b>Needleandthread</b>			314–471	

	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	314–471	–
4	<b>Gramma</b>			16–78	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	16–78	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	16–78	–
5	<b>Warm-Season Grasses</b>			31–235	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	0–157	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	0–78	–
	switchgrass	PAVI2	<i>Panicum virgatum</i>	0–78	–
	sand lovegrass	ERTR3	<i>Eragrostis trichodes</i>	0–78	–
	sandhill muhly	MUPU2	<i>Muhlenbergia pungens</i>	0–78	–
	thin paspalum	PASE5	<i>Paspalum setaceum</i>	0–31	–
6	<b>Native Grass/Grass-Likes</b>			16–157	
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	16–78	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–31	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	0–31	–
	sedge	CAREX	<i>Carex</i>	0–31	–
	Scribner's rosette grass	DIOLS	<i>Dichanthelium oligosanthes</i> var. <i>scribnerianum</i>	0–31	–
7	<b>Non-Native Grasses</b>			0–31	
	cheatgrass	BRTE	<i>Bromus tectorum</i>	0–31	–
<b>Forb</b>					
8	<b>Forbs</b>			78–235	
	common sunflower	HEAN3	<i>Helianthus annuus</i>	0–157	–
	Forb, annual	2FA	<i>Forb, annual</i>	0–31	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–31	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	0–16	–
	tarragon	ARDR4	<i>Artemisia dracunculus</i>	0–16	–
	thistle	CIRSI	<i>Cirsium</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>Psoraleidium</i>	0–16	–
	Missouri goldenrod	SOMI2	<i>Solidago missouriensis</i>	0–16	–
	white heath aster	SYER	<i>Symphyotrichum ericoides</i>	0–16	–
	spiderwort	TRADE	<i>Tradescantia</i>	0–16	–
<b>Shrub/Vine</b>					
9	<b>Shrubs</b>			16–78	
	sand sagebrush	ARFI2	<i>Artemisia filifolia</i>	16–47	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	16–47	–
	rose	ROSA5	<i>Rosa</i>	16–47	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	16–47	–
	brittle pricklypear	OPFR	<i>Opuntia fragilis</i>	0–16	–
	western sandcherry	PRPUB	<i>Prunus pumila</i> var. <i>besseyi</i>	0–16	–

## **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 this site. Normal rainfall is limited to 14-17 inches per year. Valent soils on this site are in Hydrologic Soil Group A (low runoff and high infiltration even when thoroughly wetted). Water transmission through Group A soils is normally greater than 0.30 inches per hour. Runoff is expected to occur only during the most 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 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 aesthetic 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 3 SCS-RANGE-417 records available from Morrill and Sheridan counties. The sample period is from 1983 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-R065XY012NE - 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.

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3. **Number and height of erosional pedestals or terracettes:** Bunchgrasses may be pedestalled, but 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 typically less than 15 percent. Occasional small blowouts may occur immediately adjacent to areas receiving repeated disturbance, but areas should be few and typically not greater than a few feet 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:** Occasional areas associated with increased animal activity (e.g., rodent burrows, animal trailing) may exhibit small wind scoured areas, typically less than 10 feet in diameter.
- 
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.
- 
8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Some series on this site typically have little organic matter in the surface horizon, and the structure is single grain sand. Soil aggregate stability will be difficult to measure on these soils. Surface organic matter should still adhere to the soil surface. Surface erosion by water rarely occurs due to rapid infiltration, but surface is susceptible to wind erosion if vegetative cover is reduced due to drought or heavy grazing. Biological crusts are often present (up to 10% of the surface) and serve to provide resistance to erosion. The dominant rhizomatous warm-season species are adapted to these coarse soils and when vigorous are vital in preventing erosion by wind.
- 
9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** A-horizon should be 2 to 4 inches thick. Some soils have little organic matter in the A-horizon and dark grayish brown colors when moist, but possibly not mollic. Structure can be single grain to fine granular parting to single grain in the 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. Infiltration is typically high due to the coarse nature of these soils.
- 
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.
- 
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 grasses >>
- Sub-dominant: Mid, warm-season grasses > needlegrasses (mid, cool-season bunch) >
- Other: Short, warm-season grasses = forbs = grass-like species > shrubs
- Additional: Other native grasses occur in other functional groups in minor amounts.
- 
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.

- 
14. **Average percent litter cover (%) and depth ( in):** 40-60 percent plant litter cover, roughly 0.25 to 0.5 inches in depth. Litter cover is in contact with the soil surface.
- 
15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Total annual production ranges from 1,600 to 2,500 pounds/acre, with the reference value being 1,900 pounds/acre (air-dry 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 should have vigorous rhizomes or tillers.
-