USDA Natural Resources Conservation Service

Ecological site R065XY056NE
Choppy Sands High P.Z. 22-25

Accessed: 05/09/2024

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.

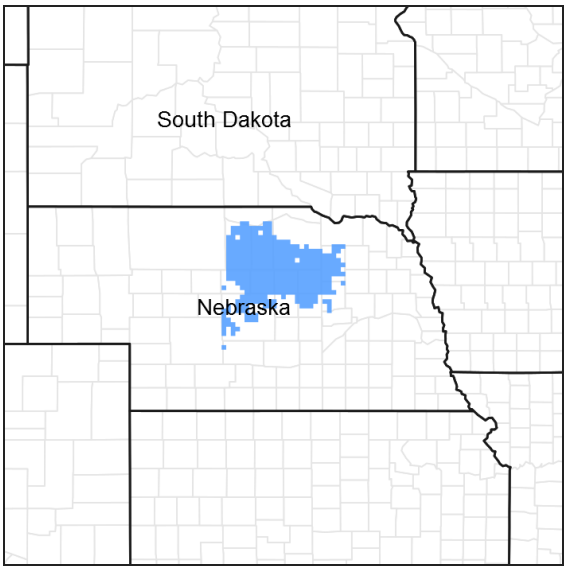


Figure 1. Mapped extent

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)

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 Choppy Sands site is positioned on a dune or hill, with a slope that are typically greater than 24 percent.
Edaphic: The soil textures for this site are Loamy Fine Sand or courser. Sloughing produces evident catsteps 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. 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	**Subirrigated**
R065XY041NE	**Shallow To Gravel**
R065XY054NE	**Sandy High P.Z. 22-25**
R065XY055NE	**Sands High P.Z. 22-25**

Similar sites

R065XY054NE	**Sandy High P.Z. 22-25**
R065XY055NE	**Sands High P.Z. 22-25**

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Andropogon hallii* (2) *Schizachyrium scoparium*

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 are. 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
Elevation	610–1,036 m
Slope	24–60%
Aspect	Aspect is not a significant factor

Climatic features

The mean average annual precipitation varies from 22-25 inches, but has varied from 13 to 29 inches in the driest to wettest seasons. Approximately 65 percent of the annual precipitation occurs during the growing season of mid-April to late September. The average annual snowfall varies from about 30 inches to about 32 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 139 days, but the growing season has varied from 120 to 160 days. The average date of first frost in the fall is September 25, and the last frost in the spring is about May 7. July is the hottest month and January is the coldest. It is not uncommon for the temperature to reach 100 degrees F during the summer. Summer humidity is low and evaporation is high. The winters are characterized with frequent notherly winds, producing severe cold with temperatures dropping to as low as -30 degrees F.

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)	139 days
Freeze-free period (average)	157 days
Precipitation total (average)	610 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 24 to 60 percent. The soils in this site are excessively drained and formed in eolian sand. The surface layer is 2 to 10 inches thick. The texture of the subsurface is fine sand. Runoff as evidenced by patterns of rill, gully or other water flow is typically low, in spite of the very steep slopes, due to the very high intake rate of these soils. Crytobiotic 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: Valentine.

Other soil series that have been correlated to this site include: none.

Table 4. Representative soil features

Surface texture	(1) Fine 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)	5.1–7.3
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

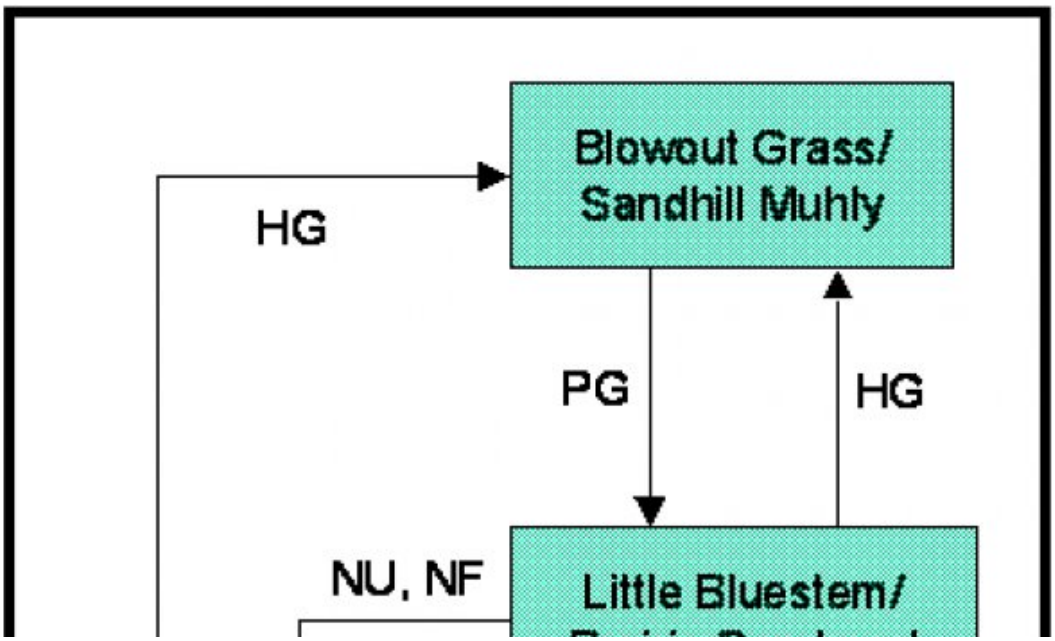
Historically, large areas of blowing sand resulted in the active movement of the sand dunes. Evaporation from the soil surface was extremely high due to the large areas of bare ground, lack of litter and sparse plant populations. The transpiration rate of these sparse plant populations was also high due to the harsh soil environment. Occasional wild fires, severe grazing by transient bison heards 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 become evident on the site. Annual plants such as sandbur, Texas croton, and annual sunflower eventually colonized the areas between the perennials.

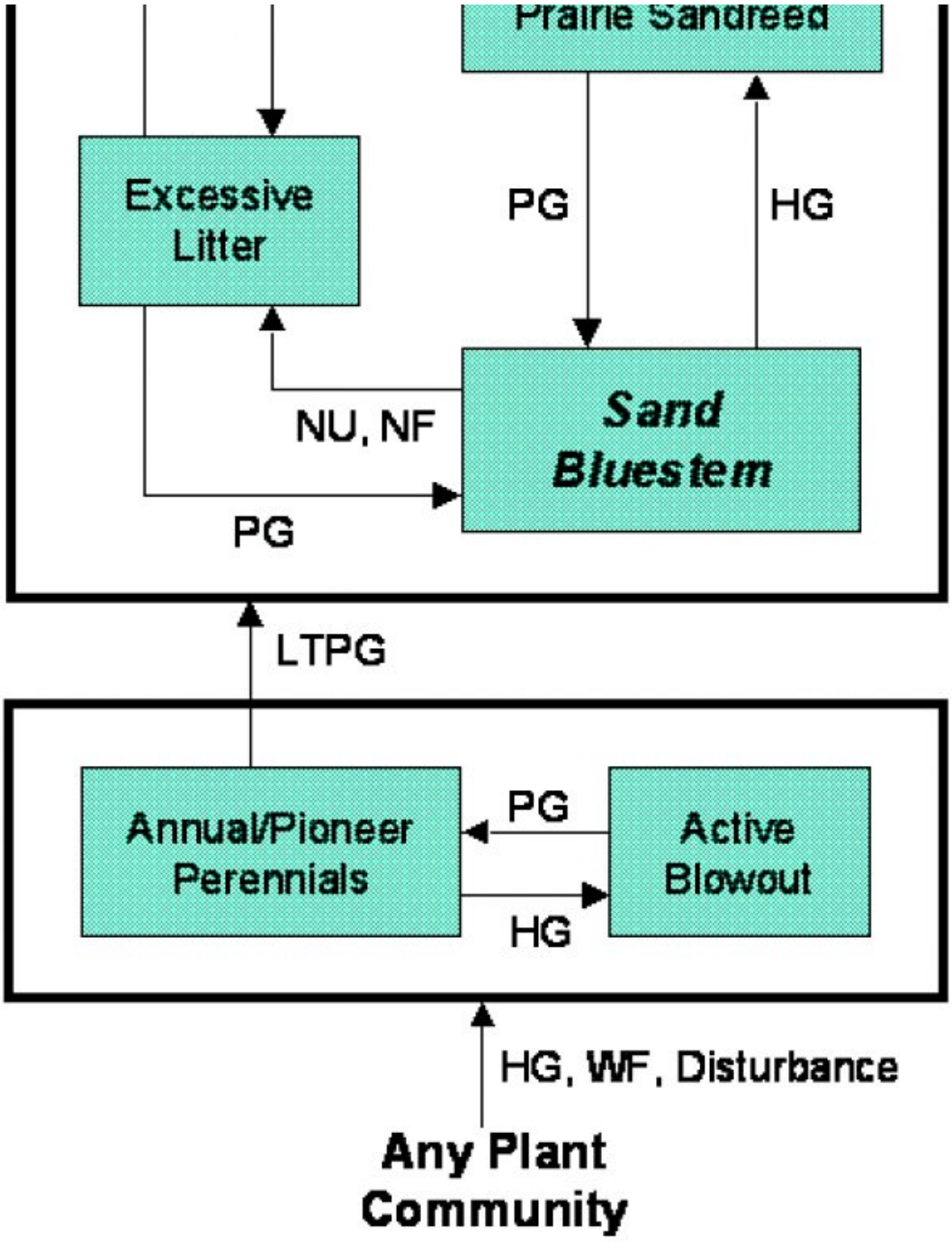
As this site deteriorates, sand dropseed, needleandthread, hairy grama, and prairie sandreed will increase. Species such as sand bluestem and switchgrass will decrease in frequency and production. The site is resilient and well adapted to the Northern Great Plains climatic conditions. The diversity in 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, transistional pathways, and thresholds have been determined through similar studies and experience.

The following 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
Sand Bluestem Plant Community

Community 1.1
Sand Bluestem Plant Community

Interpretations are primarily based on the Sand Bluestem 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 can be found on areas that are properly managed with grazing and/or prescribed burning, and sometimes on areas receiving occasional short periods of rest. 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 blazing star (gayfeather), stiff sunflower, leadplant, rose and western

sandcherry are significant. This plant community is about 80% grasses, 10% forbs, and 10% shrubs by weight. This plant community is 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). 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 commuity to the Little Bluestem/Prairie Sandreed 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	1866	2340	2802
Shrub/Vine	22	148	280
Forb	129	202	280
Total	**2017**	**2690**	**3362**

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
Little Bluestem/Prairie Sandreed Plant Community

Community 2.1
Little Bluestem/Prairie Sandreed Plant Community

This plant community develops under traditional grazing systems (such as continuous summer grazing). The potential vegetation is about 80% grasses or grass-like plants, 10% forbs and 10% shrubs. It is made up of primarily warm season grasses with prairie sandreed and little bluestem being dominant. Other grasses include sand bluestem, hairy grama, needleandthread, and sand lovegrass. The dominant/significant forbs include green sagewort, dotted blazing star(gayfeather), scurfpea, stiff sunflower, beardtongue (penstemon), hairy goldaster, gilia, and Cuman (western) ragweed. Shrubs present include rose, small soapweed, poison ivy and fragile cactus. Compared to the Sand Bluestem Plant Community, sand bluestem decreases, and little bluestem and grama increase. Leadplant, western sandcherry and chokecherry decrease. Bare ground increases as tall, warm-season grasses decrease. This plant community is resistant to change. Any short-term disturbance will not result in a shift to another plant commuity due to the species diversity. Soil erosion is low unless plant cover is reduced through fire, hail or heavy grazing. The water cycle is functioning. Runoff can occur during high rainfall events, resulting in soil erosion in concentrated flow areas. Transitional pathways and/or community pathways leading to other plant commuities are as follows: Under repeated heavy summer grazing, this plant community will move towards the Blowout Grass/Sandhill Muhly Plant Community. The risks involved may include a decrease in forage production, plant diversity, ground cover, and an increase in annual grasses and forbs. Non-use and no fire will move this plant community toward the Excessive Litter Plant Community. Ground cover increases as a result of higher amounts of litter, but plant cover decreases as wolf plants become prevalent. Increased ground cover reduces soil erosion and runoff, but the site is at risk to wildfire due to large amounts of fuel and low plant cover. With prescribed grazing, this plant community will move rapidly toward the Sand Bluestem Plant Community with a notable increase in warm season grasses, perennial forbs and palatable shrubs. Continuous winter use will also move this plant community towards the Sand Bluestem Plant Community, and small soapweed will be reduced. Risks involved with winter use are trailing along slopes, soil erosion of south facing slopes when livestock seek protection from prevailing Northwesternly winds, and poor distribution resulting in heavy use on associated bottom lands.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1866	2340	2802
Shrub/Vine	22	148	280
Forb	129	202	280
Total	**2017**	**2690**	**3362**

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
Blowout Grass/Sandhill Muhly Plant Community

Community 3.1
Blowout Grass/Sandhill Muhly Plant Community

This plant community develops under continuous heavy grazing. Large amounts of bare ground are evident. Plants are sparse with primary species being blowout grass and sandhill muhly. The potential vegetation is about 55% grasses or grass-like plants, 10% forbs and 35% shrubs. Sand bluestem may be present on deposition sites adjacent to active blowouts. The dominant forbs include lemon scurfpea, common sunflower, Cuman(western)ragweed, and green sagewort. Small soapweed is the only shrub that routinely occurs on this plant community. This plant community is not resistant to change. Any short-term disturbance could result in a shift to an active blowout. Transitional pathways and/or community pathways leading to other plant communities are as follows: Under continuous heavy grazing, this area will become an active blowout. In years of high rainfall, annual forbs may provide enough cover to minimize soil erosion. With prescribed grazing, this plant community will move toward the Little Bluestem/Prairie Sandreed Plant Community. Initially, small increases in sand dropseed and prairie sandreed will be evident. Careful management is required to protect this plant community from excessive soil erosion until the vigor of individual plants improve and plant density increases.

Table 7. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	375	400	460
Shrub/Vine	129	235	364
Forb	–	37	73
Total	**504**	**672**	**897**

Figure 11. Plant community growth curve (percent production by month). NE6539, NE/SD Sandhills, Native Grass, Disturbed. Warm-season and cool-season co-dominant, short-, mid-, and tallgrasses.

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

State 4
Excessive Litter Plant Community

Community 4.1
Excessive Litter Plant Community

This plant community developed under exclusion from grazing and wildfire. Plant litter accumulated when this community first develops. Eventually litter levels become high enough that plants are crowded out and bare ground areas develop. Annual forbs and grasses commonly fill these bare ground areas. 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, 10% forbs and 10% shrubs. The plant community consists of primarily warm-season grasses with sand bluestem, sand lovegrass, and little bluestem being dominant. Other warm-season grasses include prairie sandreed, hairy grama, and blowout grass. The dominant forbs include green sagewort, dotted blazing star (gayfeather), stiff sunflower, beardtongue (penstemon), gilia, and Cuman (western) ragweed. Shrubs present include rose, western sandcherry, and western poison ivy. With the exception of needleandthread, cool season grasses and sedges are slightly reduced in number when compared to the Sand Bluestem Plant Commuity. With continued exclusion of grazing and wildfire, this plant community will contine to lose plant diversity. This plant community is at risk to wildfire due to large amounts of fuel and low plant density. This plant community is not resistant to change. And short-term disturbance could result in a shift to another plant community due to a decrease in species diversity and plant cover. Soil erosion is low unless ground cover is reduced through fire. The water cycle is functioning. Transitional pathways and/or community pathways leading to other plant communities are as follows: Under continuous heavy grazing, this plant community will move towards the Blowout Grass/Sandhill Muhly Plant Community. Hoof action and grazing will reduce the amount of litter, reducing ground cover. Resulting areas of bare ground are subject to wind and water erosion. The risks involved are excessive soil erosion, an increase in annual grasses and forbs, and a decrease in species diversity. With prescribed grazing, this plant community will move toward the Sand Bluestem Plant Community with a notable increase in warm season grasses, perennial forbs and desirable shrubs. Careful managment is required to protect this plant community from excessive soil erosion until the vigor of individual grasses improves and plant density increases.

Table 8. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1569	1755	2163
Shrub/Vine	17	111	207
Forb	95	151	207
Total	**1681**	**2017**	**2577**

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 Plant Community

Community 5.1
Annual/Pioneer 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. 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 Sand Bluestem 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. Large areas of blowing sand result in movement and possible enlargement of the blowout. Evaporation is extremely high, and transpiration of the few existing plants is also high due to bare ground, lack of litter, and low plant density. This plant community is in a low successional stage due to steep slopes and poor soil development. Sandhill muhly and blowout grass are present due to their drought tolerance. Transistional pathways and/or community pathways leading to other plant communities are as folows: 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

Additional community tables

Table 9. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Sand Bluestem**			538–1076	
	sand bluestem	ANHA	*Andropogon hallii*	538–1076	–
2	**Prairie Sandreed**			404–673	
	prairie sandreed	CALO	*Calamovilfa longifolia*	404–673	–
3	**Little Bluestem**			404–673	
	little bluestem	SCSC	*Schizachyrium scoparium*	404–673	–
4	**Needlegrass**			0–269	
	needle and thread	HECOC8	*Hesperostipa comata ssp. comata*	135–269	–
	porcupinegrass	HESP11	*Hesperostipa spartea*	0–269	–
5	**Grama**			27–135	
	blue grama	BOGR2	*Bouteloua gracilis*	0–135	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	27–135	–
6	**Other Warm-Season**			404–807	
	sand lovegrass	ERTR3	*Eragrostis trichodes*	135–538	–
	switchgrass	PAVI2	*Panicum virgatum*	269–538	–
	Indiangrass	SONU2	*Sorghastrum nutans*	135–269	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	0–135	–
	blowout grass	REFL	*Redfieldia flexuosa*	0–135	–
	sandhill muhly	MUPU2	*Muhlenbergia pungens*	0–135	–

	thin paspalum	PASE5	*Paspalum setaceum*	0–81	–
7	**Native Grass/Grasslikes**			54–215	
	sedge	CAREX	*Carex*	0–135	–
	Scribner's rosette grass	DIOLS	*Dichanthelium oligosanthes var. scribnerianum*	0–135	–
	fall rosette grass	DIWI5	*Dichanthelium wilcoxianum*	0–135	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	0–135	–
	Grass, perennial	2GP	*Grass, perennial*	0–54	–
Forb					
8	**Forbs**			135–269	
	Forb, annual	2FA	*Forb, annual*	0–54	–
	Forb, perennial	2FP	*Forb, perennial*	0–54	–
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	0–54	–
	common sunflower	HEAN3	*Helianthus annuus*	0–54	–
	stiff sunflower	HEPA19	*Helianthus pauciflorus*	0–54	–
	hairy false goldenaster	HEVI4	*Heterotheca villosa*	0–27	–
	blazing star	LIATR	*Liatris*	0–27	–
	beardtongue	PENST	*Penstemon*	0–27	–
	scurfpea	PSORA2	*Psoralidium*	0–27	–
	tarragon	ARDR4	*Artemisia dracunculus*	0–27	–
Shrub/Vine					
9	**Shrubs**			27–269	
	leadplant	AMCA6	*Amorpha canescens*	0–135	–
	American plum	PRAM	*Prunus americana*	0–135	–
	western sandcherry	PRPUB	*Prunus pumila var. besseyi*	0–135	–
	rose	ROSA5	*Rosa*	0–135	–
	western poison ivy	TORY	*Toxicodendron rydbergii*	0–135	–
	soapweed yucca	YUGL	*Yucca glauca*	0–135	–
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–81	–

Table 10. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Sand Bluestem**			90–269	
	sand bluestem	ANHA	*Andropogon hallii*	90–269	–
2	**Prairie Sandreed**			359–628	
	prairie sandreed	CALO	*Calamovilfa longifolia*	359–628	–
3	**Little Bluestem**			359–628	
	little bluestem	SCSC	*Schizachyrium scoparium*	359–628	–
4	**Needlegrass**			18–179	
	needle and thread	HECOC8	*Hesperostipa comata ssp. comata*	18–179	–
	porcupinegrass	HESP11	*Hesperostipa spartea*	0–36	–
5	**Grama**			0–90	

	hairy grama	BOHI2	*Bouteloua hirsuta*	18–179	–
	blue grama	BOGR2	*Bouteloua gracilis*	0–90	–
6	**Other Warm-Season**			0–90	
	switchgrass	PAVI2	*Panicum virgatum*	0–179	–
	blowout grass	REFL	*Redfieldia flexuosa*	0–90	–
	Indiangrass	SONU2	*Sorghastrum nutans*	0–90	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	0–90	–
	sand lovegrass	ERTR3	*Eragrostis trichodes*	0–90	–
	sandhill muhly	MUPU2	*Muhlenbergia pungens*	0–90	–
	thin paspalum	PASE5	*Paspalum setaceum*	0–36	–
7	**Native Grass/Grasslikes**			0–36	
	prairie Junegrass	KOMA	*Koeleria macrantha*	0–90	–
	sedge	CAREX	*Carex*	0–90	–
	fall rosette grass	DIWI5	*Dichanthelium wilcoxianum*	0–54	–
	Scribner's rosette grass	DIOLS	*Dichanthelium oligosanthes var. scribnerianum*	0–36	–
	Grass, perennial	2GP	*Grass, perennial*	0–36	–
Forb					
8	**Forbs**			0–54	
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	0–54	–
	tarragon	ARDR4	*Artemisia dracunculus*	0–36	–
	Forb, annual	2FA	*Forb, annual*	0–36	–
	Forb, perennial	2FP	*Forb, perennial*	0–18	–
	stiff sunflower	HEPA19	*Helianthus pauciflorus*	0–18	–
	hairy false goldenaster	HEVI4	*Heterotheca villosa*	0–18	–
	dotted blazing star	LIPU	*Liatris punctata*	0–18	–
	beardtongue	PENST	*Penstemon*	0–18	–
	scurfpea	PSORA2	*Psoralidium*	0–18	–
	common sunflower	HEAN3	*Helianthus annuus*	–	–
Shrub/Vine					
9	**Shrubs**			18–179	
	rose	ROSA5	*Rosa*	0–90	–
	soapweed yucca	YUGL	*Yucca glauca*	0–90	–
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–54	–
	leadplant	AMCA6	*Amorpha canescens*	0–36	–
	western sandcherry	PRPUB	*Prunus pumila var. besseyi*	0–36	–
	American plum	PRAM	*Prunus americana*	0–18	–

Table 11. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Sand Bluestem**			0–67	
	sand bluestem	ANHA	*Andropogon hallii*	0–67	–
2	**Prairie Sandreed**			0–67	
	prairie sandreed	CALO	*Calamovilfa longifolia*	0–67	–
3	**Little Bluestem**			0–34	
	little bluestem	SCSC	*Schizachyrium scoparium*	0–34	–
5	**Grama**			0–13	
	hairy grama	BOHI2	*Bouteloua hirsuta*	0–13	–
6	**Other Warm-Season**			202–538	
	blowout grass	REFL	*Redfieldia flexuosa*	202–471	–
	sandhill muhly	MUPU2	*Muhlenbergia pungens*	34–269	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	0–34	–
Forb					
8	**Forbs**			0–34	
	Forb, annual	2FA	*Forb, annual*	0–34	–
	common sunflower	HEAN3	*Helianthus annuus*	0–34	–
	Forb, perennial	2FP	*Forb, perennial*	0–20	–
	tarragon	ARDR4	*Artemisia dracunculus*	0–20	–
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	0–13	–
	scurfpea	PSORA2	*Psoralidium*	0–13	–
Shrub/Vine					
9	**Shrubs**			0–34	
	soapweed yucca	YUGL	*Yucca glauca*	135–336	–
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–34	–
	rose	ROSA5	*Rosa*	0–7	–

Table 12. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Sand Bluestem**			303–706	
	sand bluestem	ANHA	*Andropogon hallii*	303–706	–
2	**Prairie Sandreed**			303–504	
	prairie sandreed	CALO	*Calamovilfa longifolia*	303–504	–
3	**Little Bluestem**			202–504	
	little bluestem	SCSC	*Schizachyrium scoparium*	202–504	–
4	**Needlegrass**			101–303	
	needle and thread	HECOC8	*Hesperostipa comata ssp. comata*	101–303	–
	porcupinegrass	HESP11	*Hesperostipa spartea*	0–101	–
5	**Grama**			0–101	
	blue grama	BOGR2	*Bouteloua gracilis*	0–101	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	0–101	–

6	**Other Warm-Season**			40–303	
	sand lovegrass	ERTR3	*Eragrostis trichodes*	40–303	–
	switchgrass	PAVI2	*Panicum virgatum*	101–303	–
	blowout grass	REFL	*Redfieldia flexuosa*	0–101	–
	Indiangrass	SONU2	*Sorghastrum nutans*	0–101	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	0–101	–
	sandhill muhly	MUPU2	*Muhlenbergia pungens*	0–101	–
	thin paspalum	PASE5	*Paspalum setaceum*	0–40	–
7	**Native Grass/Grasslikes**			40–161	
	prairie Junegrass	KOMA	*Koeleria macrantha*	0–101	–
	sedge	CAREX	*Carex*	0–101	–
	Scribner's rosette grass	DIOLS	*Dichanthelium oligosanthes var. scribnerianum*	0–40	–
	fall rosette grass	DIWI5	*Dichanthelium wilcoxianum*	0–40	–
	Grass, perennial	2GP	*Grass, perennial*	0–40	–
Forb					
8	**Forbs**			0–40	
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	0–40	–
	Forb, annual	2FA	*Forb, annual*	0–40	–
	Forb, perennial	2FP	*Forb, perennial*	0–20	–
	tarragon	ARDR4	*Artemisia dracunculus*	0–20	–
	stiff sunflower	HEPA19	*Helianthus pauciflorus*	0–20	–
	hairy false goldenaster	HEVI4	*Heterotheca villosa*	0–20	–
	dotted blazing star	LIPU	*Liatris punctata*	0–20	–
	scurfpea	PSORA2	*Psoralidium*	0–20	–
Shrub/Vine					
9	**Shrubs**			20–202	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–101	–
	leadplant	AMCA6	*Amorpha canescens*	0–101	–
	American plum	PRAM	*Prunus americana*	0–101	–
	western sandcherry	PRPUB	*Prunus pumila var. besseyi*	0–101	–
	rose	ROSA5	*Rosa*	0–101	–
	western poison ivy	TORY	*Toxicodendron rydbergii*	0–101	–
	soapweed yucca	YUGL	*Yucca glauca*	0–101	–

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 utilitze 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. Valentine 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 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 distinquishable 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. Crytogamic 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 aesthetic value that appeals to visitors.

Wood products

No appreciable wood products are present on the site.

Other products

Hand seed harvest of native plant species can provide addional 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 Managment Specialist, NRCS.

Other references

Other sources used as references include: USDA NRCS Water & Climate Center, USDA NRCS National Range and Pasture Handbook, USDA NRCS Soil Survyes 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- R065XY056NE - 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 20 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.

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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):** 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.

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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.

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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.

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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, warm-season grasses >>

    Sub-dominant: Mid, warm-season grasses >

    Other: Mid, cool-season bunchgrasses = forbs = shrubs > short, warm-season grasses = grass-like species

    Additional: Other native 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.

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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.

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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).

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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.
