Ecological site R058DY030SD
Choppy Sands

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.

Classification relationships

Level IV Ecoregions of the Conterminous United States: 43e – Sagebrush Steppe.

Associated sites

R058DY008SD	**Sands**
R058DY009SD	**Sandy**

Similar sites

R058DY008SD	**Sands** Sands [more prairie sandreed; less bare ground]
R058DY009SD	**Sandy** Sandy [more western wheatgrass; more production]

Table 1. Dominant plant species

Tree	Not specified

Shrub	Not specified
Herbaceous	(1) *Andropogon hallii* (2) *Calamovilfa longifolia*

Physiographic features

This site occurs on moderately steep to steep uplands.

Table 2. Representative physiographic features

Landforms	(1) Dune
Flooding frequency	None
Ponding frequency	None
Elevation	701–1,219 m
Slope	20–50%
Water table depth	203 cm
Aspect	Aspect is not a significant factor

Climatic features

The climate in this MLRA is typical of the drier portions of the Northern Great Plains where sagebrush steppes to the west yield to grassland to the east. Annual precipitation ranges from 14 to 16 inches. Most of the rainfall occurs as frontal storms early in the growing season. Some high intensity, convective thunderstorms occur in the summer. Precipitation in winter occurs as snow. Temperatures show a wide range between summer and winter and between daily maximums and minimums, due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Outbreaks of cold air from Canada in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring. The normal average annual temperature is about 44°F. January is the coldest month with average temperatures ranging from about 12°F (Marmarth, North Dakota (ND)), to about 20°F (Baker, Montana (MT)). July is the warmest month with temperatures averaging from about 70°F (Marmarth, ND), to about 76°F (Baker, MT). The range of normal average monthly temperatures between the coldest and warmest months is about 55°F. Hourly winds are estimated to average about 11 miles per hour (mph) annually, ranging from about 13 mph during the spring to about 10 mph during the summer. Daytime winds are generally stronger than nighttime and strong storms may bring brief periods of high winds with gusts to more than 50 mph.

Growth of cool-season plants begins in early to mid-March, slowing or ceasing in late June. Warm-season plants begin growth about mid-May and can continue to early or mid-September. Greenup 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)	123 days
Freeze-free period (average)	140 days
Precipitation total (average)	406 mm

Influencing water features

No significant water features influence this area.

Soil features

The features common to soils in this site are the loamy fine sand textured surface layers and slopes of 20 to 50 percent. The soils in this site are excessively drained and formed in eolian sand or residuum formed in sandstone.

The surface layer is two to five inches thick. The texture of the subsurface layers range from loamy fine sand to fine sand. This site should show slight to no evidence of rills, wind scoured areas, or pedestalled plants. Water flow paths are broken, irregular in appearance, or discontinuous with numerous vegetative barriers. The soil surface is stable and intact.

These soils are susceptible to wind erosion. The hazard of wind erosion increases when vegetation cover is reduced. Loss of 50 percent or more of the surface layer of the soils on this site can result in a shift in species composition and/or production.

Access Web Soil Survey (http://websoilsurvey.nrcs.uda.gov/app/) for specific local soils information.

Table 4. Representative soil features

Surface texture	(1) Loamy fine sand
Family particle size	(1) Sandy
Drainage class	Excessively drained
Permeability class	Moderately rapid to 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)	0–5%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	5.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

This site developed under Northern Great Plains climatic conditions, natural influences of large herbivores, occasional fire, and other biotic and abiotic factors that typically influence soil/site development. Changes will occur in the plant communities due to short-term weather variations, impacts of native and/or exotic plant and animal species, and management actions. While the following plant community descriptions describe more typical transitions between communities that will occur, severe disturbances, such as periods of well below average precipitation, can cause significant shifts in plant communities and/or species composition.

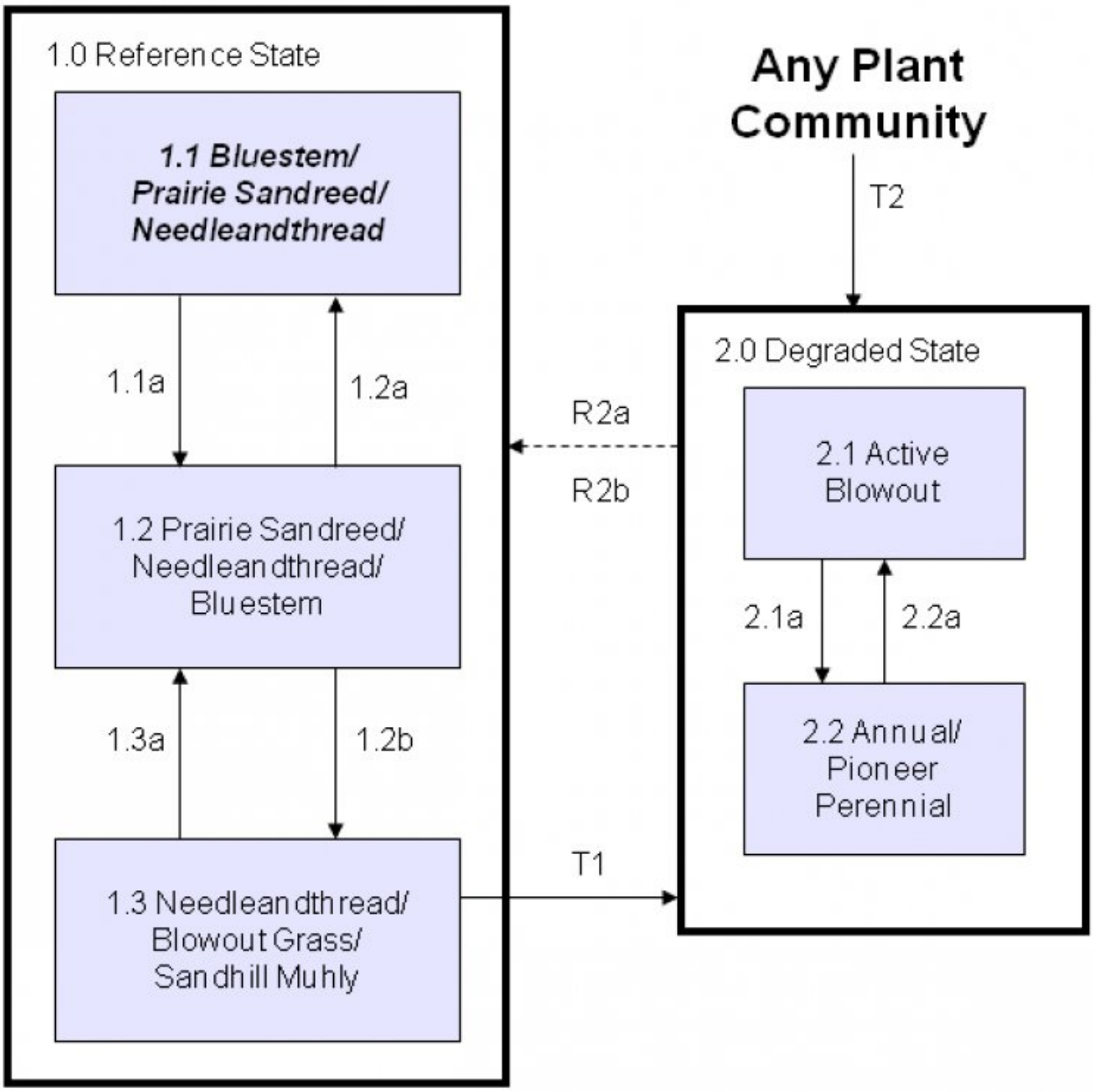
As this site deteriorates, sand dropseed, sandhill muhly, needleandthread, and hairy grama will increase. Species such as sand bluestem, prairie sandreed, and switchgrass will decrease in frequency and production. The site is resilient and well adapted to the Northern Great Plains climatic conditions. The diversity in plant species allows for high drought resistance.

The plant community upon which interpretations are primarily based is the Bluestem/Prairie Sandreed/Needleandthread Plant Community. This plant community has been determined by studying rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily grazed to lightly grazed areas, seasonal use pastures, and historical accounts also have been used. Plant communities, states, transitional pathways, and thresholds have

been determined through similar studies and experience.

The following is a diagram that illustrates the common plant communities that can occur on the site and the transition pathways between communities. The ecological processes are discussed in more detail in the plant community descriptions following the diagram.

State and transition model



State 1
Reference

The State narrative is under development.

Community 1.1

Bluestem/Prairie Sandreed/Needleandthread

The interpretive plant community for this site is the Bluestem/Prairie Sandreed/Needleandthread Plant Community. This is also considered to be climax. 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 deferment. The potential vegetation is about 80 to 90 percent grasses or grass-like plants, 5 to 10 percent forbs, and 5 to 10 percent shrubs. Warm-season grasses dominate this plant community. The major grasses include prairie sandreed, sand bluestem, needleandthread, and little bluestem. Other grass or grass-like species occurring on the site include switchgrass, Indian ricegrass, sand lovegrass, sandhill muhly, blue grama, hairy grama, and sedges. Significant forbs include stiff sunflower, bracted spiderwort, purple prairie clover, dotted gayfeather, green sagewort, hairy goldaster, penstemon, and scurfpea. The significant shrubs that occur include western sandcherry, fringed sagewort, leadplant, rose, and yucca. This plant community is well adapted to the Northern Great Plains climatic conditions. Individual species can vary greatly in production depending on growing conditions (timing and amount of precipitation and temperature). The diversity in plant species allows for high drought tolerance. This is a healthy and sustainable plant community. Moderate or high available water capacity provides a favorable soil-water-plant relationship. Overall, the interpretive plant community has the appearance of being stable, diverse, and productive. Plant litter is properly distributed with very little movement offsite and natural plant mortality is very low.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1177	1524	1838
Shrub/Vine	84	135	202
Forb	84	135	202
Total	**1345**	**1794**	**2242**

Figure 5. Plant community growth curve (percent production by month). SD5804, Northern Rolling High Plains, warm-season dominant, cool-season sub-dominant.. Warm-season dominant, cool-season sub-dominant, uplands..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	7	18	24	25	15	7	1	0	0

Community 1.2
Prairie Sandreed/Needleandthread/Bluestem

This plant community develops under continuous season-long grazing or from over utilization during extended drought periods. The potential vegetation is made up of approximately 85 to 95 percent grasses and grass-like species, 5 to 10 percent forbs, and 2 to 8 percent shrubs. The dominant grasses include prairie sandreed, needleandthread, and little bluestem. Other grasses or grass-like species may include sandhill muhly, blowout grass, hairy grama, blue grama, and sedge. Significant forbs include green sagewort, scurfpea, western ragweed, and annual eriogonum. The dominant shrubs that occur include cactus, yucca, and fringed sagewort. Compared to the Bluestem/Prairie Sandreed/Needleandthread Plant Community, the somewhat less desirable species such as prairie sandreed, needleandthread, little bluestem, hairy grama, blue grama, and threadleaf sedge have increased. The less grazing tolerant species such as sand bluestem, sand lovegrass, Indian ricegrass, and switchgrass have decreased in composition. Annual bromes, bluegrass, sweetclover, and other annual grasses and forbs can invade the site. This plant community can occur in a mosaic with patchy, slightly used areas occurring adjacent to and intermingled with this plant community. This plant community is not resistant to change. Changes in grazing management can result in a shift to another plant community. This community is fairly resilient following 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 due to the litter cover on the soil surface. Infiltration is high because of the soil texture and surface litter.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	706	1079	1446
Forb	56	92	135
Shrub/Vine	22	62	101
Total	**784**	**1233**	**1682**

Figure 7. Plant community growth curve (percent production by month). SD5804, Northern Rolling High Plains, warm-season dominant, cool-season sub-dominant.. Warm-season dominant, cool-season sub-dominant, uplands..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	7	18	24	25	15	7	1	0	0

Community 1.3
Needleandthread/Blowout Grass/Sandhill Muhly

This plant community typically develops over a period of several years with continuous season-long grazing or continuous seasonal grazing (grazing at the same time of year every year for extended periods during the growing season). It is made up of approximately 80 to 90 percent grasses and grass-like species, 5 to 10 percent forbs, and 2 to 8 percent shrubs. The dominant grasses are needleandthread, blowout grass, sandhill muhly, blue grama, hairy grama, sand dropseed, and sedge. Significant forbs include western ragweed, green sagewort, scurfpea, goldenrod, and annual eriogonum. Dominant shrubs in this community include fringed sagewort, yucca, and cactus. Compared to the Bluestem/Prairie Sandreed/Needleandthread Plant Community, blowout grass, sandhill muhly, sand dropseed, hairy grama, blue grama, and sedge have increased. Prairie sandreed is greatly diminished. Sand bluestem and little bluestem are essentially absent. Desirable plant species have decreased. This plant community is not resistant to change due to the higher percentage of bare ground. The water cycle is impaired due to a reduction in litter and the potential for higher runoff and decreased infiltration. The risk for soil erosion increases.

Table 7. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	404	686	1082
Forb	34	59	84
Shrub/Vine	11	39	67
Total	**449**	**784**	**1233**

Figure 9. Plant community growth curve (percent production by month). SD5803, Northern Rolling High Plains, cool-season/warm-season co-dominant.. Cool-season, warm-season co-dominant, uplands..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	10	20	28	21	10	5	3	0	0

Pathway 1.1a
Community 1.1 to 1.2

Continuous season-long grazing or grazing for extended periods during the actively growing period of the dominant grasses without adequate recovery periods will lead to the Prairie Sandreed/Needleandthread/Bluestem Plant Community. This occurs with exposure to herbivory during the entire or a major portion of the growing season at moderate stocking rates.

Pathway 1.2a

Community 1.2 to 1.1

Prescribed grazing, which allows for adequate plant recovery periods will move this plant community to the Bluestem/Prairie Sandreed/Needleandthread Plant Community.

Conservation practices

Prescribed Grazing

Pathway 1.2b
Community 1.2 to 1.3

With continuous seasonal grazing or continuous season-long grazing, this plant community will move towards the Needleandthread/Blowout Grass/Sandhill Muhly Plant Community.

Pathway 1.3a
Community 1.3 to 1.2

With prescribed grazing and favorable climatic conditions, which allow for adequate plant recovery periods, this plant community can shift to the Prairie Sandreed/Needleand-thread/Bluestem Plant Community.

Conservation practices

Prescribed Grazing

State 2
Degraded

The State narrative is under development.

Community 2.1
Active Blowout

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. The plant community is in a low successional stage due to steep slopes and poor soil development. As succession progresses, sandhill muhly, blowout grass and sand bluestem begin to colonize. Lemon scurfpea, sandbur, and annual sunflower begin to come in with prairie sandreed, hairy grama, and rose slowly becoming evident on this plant community.

Community 2.2
Annual/Pioneer Perennial Plant Community

This plant community develops under frequent and severe defoliation and/or excessive disturbance. This can result from heavy livestock or wildlife concentration (i.e., water locations, bedding or loafing grounds, feeding areas, etc.,) or cropping abandonment (Go-back land). The dominant vegetation includes pioneer annual grasses and forbs and early successional biennial and perennial species. Grasses may include blue grama, sand dropseed, sedge, sixweeks fescue, and cheatgrass. The dominant forbs may include green sagewort, western ragweed, annual sunflower, and annual eriogonum. Shrubs that may be present include cactus and small soapweed. This plant community is resistant to change, as long as soil disturbance or severe vegetation defoliation persists, thus holding back secondary plant succession. Soil erosion is potentially high in this plant community. The community also is susceptible to invasion of nonnative annual and perennial forbs due to severe soil disturbances and relatively high percent of bare ground. Reduced surface cover, low plant density, low plant vigor, and loss of root biomass, all contribute to decreased water infiltration, increased runoff, and accelerated erosion rates. If left without management, blowouts may occur.

Pathway 2.1a

Community 2.1 to 2.2

With a removal of disturbance 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.

Pathway 2.2a
Community 2.2 to 2.1

With continued disturbance (such as heavy grazing and/or wildfire), this plant community will move towards the Active Blowout Plant Community.

Transition T1
State 1 to 2

Heavy continuous season-long grazing will greatly reduce vegetation cover and lead this site across a threshold to a plant community with much greater bare ground and pioneer species. The result may be an active blowout.

Transition T2
State 1 to 2

Severe disturbance, or long-term non-use will shift this plant community to the Degraded State.

Transition T2
State 1 to 2

Severe disturbance, or long-term non-use will shift this plant community to the Degraded State.

Transition T2
State 1 to 2

Severe disturbance, or long-term non-use will shift this plant community to the Degraded State.

Restoration pathway R2
State 2 to 1

Removing disturbances that led to this plant community and critical area treatment (i.e., use of mulch and seeding) this plant community may eventually progress through succession back to a plant community resembling the Bluestem/Prairie Sandreed/Needleandthread Plant Community.

Restoration pathway R2b
State 2 to 1

Under long-term prescribed grazing (10+ years), including adequate rest periods, succession will progress potentially leading to the Bluestem/Prairie Sandreed/Needleandthread Plant Community. The slope, aspect, size and relative abundance of perennial plants will influence the rate that change will occur.

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Tall Warm-Season Grasses**			359–717	
	sand bluestem	ANHA	*Andropogon hallii*	179–448	–
	prairie sandreed	CALO	*Calamovilfa longifolia*	179–448	–

	switchgrass	PAVI2	*Panicum virgatum*	0–90	–
2	**Mid-Cool Season Bunchgrasses**			179–359	
	needle and thread	HECOC8	*Hesperostipa comata ssp. comata*	179–359	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	0–90	–
3	**Mid Warm-Season Bunchgrasses**			90–269	
	little bluestem	SCSC	*Schizachyrium scoparium*	36–179	–
	sand lovegrass	ERTR3	*Eragrostis trichodes*	18–90	–
	sandhill muhly	MUPU2	*Muhlenbergia pungens*	0–90	–
	blowout grass	REFL	*Redfieldia flexuosa*	0–90	–
4	**Short-Warm Season Grasses**			90–179	
	blue grama	BOGR2	*Bouteloua gracilis*	18–90	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	18–90	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	18–36	–
	thin paspalum	PASE5	*Paspalum setaceum*	0–18	–
5	**Other Native Grasses**			36–143	
	Graminoid (grass or grass-like)	2GRAM	*Graminoid (grass or grass-like)*	0–90	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	18–54	–
	Scribner's rosette grass	DIOLS	*Dichanthelium oligosanthes var. scribnerianum*	18–36	–
	fall rosette grass	DIWI5	*Dichanthelium wilcoxianum*	0–36	–
	sixweeks fescue	VUOC	*Vulpia octoflora*	0–18	–
6	**Grass-Likes**			36–126	
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	18–90	–
	threadleaf sedge	CAFI	*Carex filifolia*	18–90	–
Forb					
8	**Forbs**			90–179	
	Forb, native	2FN	*Forb, native*	18–90	–
	stiff sunflower	HEPA19	*Helianthus pauciflorus*	18–54	–
	hairy false goldenaster	HEVI4	*Heterotheca villosa*	18–36	–
	bush morning-glory	IPLE	*Ipomoea leptophylla*	18–36	–
	dotted blazing star	LIPU	*Liatris punctata*	18–36	–
	scurfpea	PSORA2	*Psoralidium*	18–36	–
	goldenrod	SOLID	*Solidago*	18–36	–
	longbract spiderwort	TRBR	*Tradescantia bracteata*	18–36	–
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	18–36	–
	field sagewort	ARCA12	*Artemisia campestris*	18–36	–
	wavyleaf thistle	CIUN	*Cirsium undulatum*	18–36	–
	purple prairie clover	DAPU5	*Dalea purpurea*	18–36	–
	blacksamson echinacea	ECAN2	*Echinacea angustifolia*	0–36	–
	annual buckwheat	ERAN4	*Eriogonum annuum*	0–18	–
	yellow sundrops	CASE12	*Calylophus serrulatus*	0–18	–
	western yarrow	ACMIO	*Achillea millefolium var. occidentalis*	0–18	–
	beardtongue	PENST	*Penstemon*	0–18	–

	rush skeletonplant	LYJU	*Lygodesmia juncea*	0–18	–
Shrub/Vine					
9	**Shrubs**			90–179	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–72	–
	leadplant	AMCA6	*Amorpha canescens*	18–54	–
	prairie sagewort	ARFR4	*Artemisia frigida*	0–36	–
	plains pricklypear	OPPO	*Opuntia polyacantha*	18–36	–
	western sandcherry	PRPUB	*Prunus pumila var. besseyi*	18–36	–
	rose	ROSA5	*Rosa*	18–36	–
	western poison ivy	TORY	*Toxicodendron rydbergii*	0–36	–
	soapweed yucca	YUGL	*Yucca glauca*	18–36	–

Table 9. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Tall Warm-Season Grasses**			185–370	
	prairie sandreed	CALO	*Calamovilfa longifolia*	185–370	–
	sand bluestem	ANHA	*Andropogon hallii*	0–62	–
2	**Mid-Cool Season Bunchgrasses**			123–308	
	needle and thread	HECOC8	*Hesperostipa comata ssp. comata*	123–308	–
3	**Mid Warm-Season Bunchgrasses**			123–308	
	little bluestem	SCSC	*Schizachyrium scoparium*	62–185	–
	sandhill muhly	MUPU2	*Muhlenbergia pungens*	12–123	–
	blowout grass	REFL	*Redfieldia flexuosa*	0–123	–
4	**Short-Warm Season Grasses**			62–185	
	blue grama	BOGR2	*Bouteloua gracilis*	25–123	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	25–123	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	12–62	–
5	**Other Native Grasses**			25–62	
	Graminoid (grass or grass-like)	2GRAM	*Graminoid (grass or grass-like)*	0–49	–
	Scribner's rosette grass	DIOLS	*Dichanthelium oligosanthes var. scribnerianum*	12–37	–
	fall rosette grass	DIWI5	*Dichanthelium wilcoxianum*	0–37	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	12–25	–
	sixweeks fescue	VUOC	*Vulpia octoflora*	0–25	–
6	**Other Native Grasses**			37–123	
	threadleaf sedge	CAFI	*Carex filifolia*	25–123	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	12–99	–
7	**Non-Native Grasses**			12–62	
	cheatgrass	BRTE	*Bromus tectorum*	12–62	–
	bluegrass	POA	*Poa*	0–62	–
Forb					
8	**Forbs**			62–123	

8	**Forbs**			62–123	
	Forb, native	2FN	*Forb, native*	12–62	–
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	12–62	–
	Forb, introduced	2FI	*Forb, introduced*	0–49	–
	field sagewort	ARCA12	*Artemisia campestris*	12–37	–
	scurfpea	PSORA2	*Psoralidium*	12–37	–
	annual buckwheat	ERAN4	*Eriogonum annuum*	0–25	–
	stiff sunflower	HEPA19	*Helianthus pauciflorus*	0–12	–
	hairy false goldenaster	HEVI4	*Heterotheca villosa*	0–12	–
	bush morning-glory	IPLE	*Ipomoea leptophylla*	0–12	–
	dotted blazing star	LIPU	*Liatris punctata*	0–12	–
	rush skeletonplant	LYJU	*Lygodesmia juncea*	0–12	–
	wavyleaf thistle	CIUN	*Cirsium undulatum*	0–12	–
	purple prairie clover	DAPU5	*Dalea purpurea*	0–12	–
	goldenrod	SOLID	*Solidago*	0–12	–
	longbract spiderwort	TRBR	*Tradescantia bracteata*	0–12	–
	western yarrow	ACMIO	*Achillea millefolium var. occidentalis*	0–12	–
Shrub/Vine					
9	**Shrubs**			25–99	
	soapweed yucca	YUGL	*Yucca glauca*	12–49	–
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–37	–
	prairie sagewort	ARFR4	*Artemisia frigida*	12–37	–
	plains pricklypear	OPPO	*Opuntia polyacantha*	12–25	–
	western sandcherry	PRPUB	*Prunus pumila var. besseyi*	0–12	–
	rose	ROSA5	*Rosa*	0–12	–
	western poison ivy	TORY	*Toxicodendron rydbergii*	0–12	–
	leadplant	AMCA6	*Amorpha canescens*	0–12	–

Table 10. Community 1.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Tall Warm-Season Grasses**			0–39	
	prairie sandreed	CALO	*Calamovilfa longifolia*	0–39	–
	sand bluestem	ANHA	*Andropogon hallii*	0–16	–
2	**Mid-Cool Season Bunchgrasses**			118–235	
	needle and thread	HECOC8	*Hesperostipa comata ssp. comata*	118–235	–
3	**Mid Warm-Season Bunchgrasses**			39–196	
	sandhill muhly	MUPU2	*Muhlenbergia pungens*	16–118	–
	blowout grass	REFL	*Redfieldia flexuosa*	16–118	–
	little bluestem	SCSC	*Schizachyrium scoparium*	0–39	–
4	**Short-Warm Season Grasses**			78–157	
	blue grama	BOGR2	*Bouteloua gracilis*	16–118	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	16–118	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	16–78	–

5	**Other Native Grasses**			24–55	
	Graminoid (grass or grass-like)	2GRAM	*Graminoid (grass or grass-like)*	0–24	–
	Scribner's rosette grass	DIOLS	*Dichanthelium oligosanthes var. scribnerianum*	8–24	–
	fall rosette grass	DIWI5	*Dichanthelium wilcoxianum*	0–24	–
	sixweeks fescue	VUOC	*Vulpia octoflora*	8–24	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	8–16	–
6	**Other Native Grasses**			39–118	
	threadleaf sedge	CAFI	*Carex filifolia*	39–118	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	8–63	–
7	**Non-Native Grasses**			8–39	
	cheatgrass	BRTE	*Bromus tectorum*	8–39	–
Forb					
8	**Forbs**			39–78	
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	16–63	–
	Forb, native	2FN	*Forb, native*	8–39	–
	field sagewort	ARCA12	*Artemisia campestris*	8–31	–
	annual buckwheat	ERAN4	*Eriogonum annuum*	0–24	–
	Forb, introduced	2FI	*Forb, introduced*	0–24	–
	scurfpea	PSORA2	*Psoralidium*	8–24	–
	western yarrow	ACMIO	*Achillea millefolium var. occidentalis*	0–8	–
	rush skeletonplant	LYJU	*Lygodesmia juncea*	0–8	–
Shrub/Vine					
9	**Shrubs**			16–63	
	soapweed yucca	YUGL	*Yucca glauca*	8–47	–
	prairie sagewort	ARFR4	*Artemisia frigida*	8–24	–
	plains pricklypear	OPPO	*Opuntia polyacantha*	8–16	–
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–16	–

Animal community

Animal Community – Wildlife Interpretations
Major Land Resource Area (MLRA) 58D lies within the drier portion of Northern mixed-grass prairie ecosystem where sagebrush steppes to the west yield to grassland steppes to the east. Prior to European settlement, this area consisted of diverse grass/shrub land habitats interspersed with varying densities of depressional, instream wetlands, and woody riparian corridors. These habitats provided critical life cycle components for many of its users. Many species of grassland birds, small mammals, reptiles, amphibians, and herds of roaming bison, elk, and pronghorn were among the inhabitants adapted to this semi-arid region. Roaming herbivores, as well as, several small mammal and insect species, were the primary consumers linking the grassland resources to predators such as the wolf, mountain lion, and grizzly bear, as well as, smaller carnivores such as the coyote, bobcat, fox, and raptors. The black-tailed prairie dog was once abundant; however, the species remains a keystone species within its range. The black-footed ferret, burrowing owl, ferruginous hawk, mountain plover, and swift fox were associated with prairie dog complexes.

Historically, the Northern mixed-grass prairie was a disturbance-driven ecosystem with fire, herbivory, and climate functioning as the primary disturbance factors either singly or in combination. Following European settlement, livestock grazing, cropland conversion, elimination of fire, energy development, and other anthropogenic factors

influenced species composition and abundance. Introduced and invasive species further impacted plant and animal communities. Bison were historically a keystone species but have been extirpated as a free-ranging herbivore. The loss of the bison, reduction of prairie dog colonies, and loss of fire as ecological drivers greatly influenced the character of the remaining native plant communities and altered wildlife habitats. Human development has reduced habitat quality for area-sensitive species.

Within MLRA 58D, the Choppy Sands Ecological Site (ES) provides upland grassland cover with an associated forb and shrub component. It was typically part of an expansive grassland landscape that included combinations of Loamy, Shallow Loamy, Shallow Clayey, Thin Loamy, Claypan, Sands, Sandy, Sandy Claypan, Clayey, and Thin Claypan ESs. This site provided habitat for species requiring unfragmented grassland. Important habitat features include upland nesting habitat for grassland birds, forbs, and insects for brood habitat, and a forage source for small and large herbivores. Many grassland and shrub steppe nesting bird populations are declining. Extirpated species include free-ranging bison, grizzly bear, gray wolf, black-footed ferret, mountain plover, Rocky Mountain locust, and swift fox.

The majority of Choppy Sands ES remains intact and provides increasingly important habitat for grassland nesting birds, small rodents, coyotes, and a variety of reptiles, amphibians, and insects. Invasive species such as annual bromegrasses and crested wheat have impacted the biological integrity of the site for some grassland birds.

Bluestem/Prairie Sandreed/Needleandthread and Prairie Sandreed/Needleandthread/Bluestem: The predominance of grasses plus high diversity of forbs and shrubs in this community favors grazers and mixed-feeders, such as deer and pronghorn. Insects, such as pollinators, play a large role in maintaining the forb community and provide a forage base for grassland birds and other species. The complex plant structural diversity provides habitat for a wide array of migratory and resident birds. Grasshopper sparrow, lark bunting, western meadowlark, and sharp-tailed grouse are common and benefit from the structure and composition this plant community provides. Diverse prey populations are available for grassland raptors such as ferruginous hawk, Swainson’s hawk, golden eagle, and prairie falcon.

The diversity of grasses, forbs, and shrubs provide high nutrition levels for small and large herbivores including voles, mice, thirteen-lined ground squirrel, white-tailed jackrabbit, and deer. The higher stature of this plant community provides thermal, protective, and escape cover for herbivores and grassland birds. Predators utilizing this plant community include coyote, American badger, red fox, and long-tailed weasel. This plant community provides habitat for herptiles such as the spade foot toad, bull snake, and western rattlesnake.

Resulting from continuous season-long grazing the shift to a prairie sandreed/needleandthread/bluestem community occurs. The forb and shrub diversity has not substantially decreased. The shift from the HCPC to the prairie sandreed/needleandthread/bluestem community does not result in a significant change to the wildlife community.

Needleandthread/Blowout Grass/Sandhill Muhly: The predominance of grasses and the loss of forbs and shrubs in this community cause a reduction in the insect populations, such as pollinators, and reduce the value to most herbivores. Grasshopper sparrow, horned lark, lark bunting, and sharp-tailed grouse are common and benefit from the structure and composition this plant community provides. Diverse prey populations are available for grassland raptors such as ferruginous hawk, Swainson’s hawk, golden eagle, and prairie falcon.

The diversity of grasses provide adequate nutrition levels for small and large herbivores including voles, mice, thirteen-lined ground squirrel, white-tailed jackrabbit, and deer. Predators utilizing this plant community include coyote, American badger, red fox, and long-tailed weasel. This plant community provides habitat for herptiles such as the spade foot toad, bull snake, and western rattlesnake.

Annual/Pioneer Plant Community: This plant community develops under severe disturbance and/or excessive defoliation. The dominant vegetation includes pioneer annual grasses, forbs, invaders, and early successional biennial and perennial species. Plant species from adjacent ecological sites may become minor components of this plant community. The community is susceptible to invasion of annual bromegrasses, crested wheatgrass, and other nonnative species due to severe soil disturbances and relatively high percent of bare ground.

Soil erosion is potentially high, impacting offsite aquatic habitats through increased runoff, nutrient, and sediment loads. Reduced surface cover, low plant density, low plant vigor, loss of root biomass, and soil compaction, all

contribute to decreased wildlife abundance and diversity.

Since secondary succession is highly variable plant and wildlife species will vary. This plant community provides habitat for generalist or early successional species.

Animal Community – Grazing Interpretations
As this site improves in condition through proper management (from the more shortgrass dominated plant communities to the interpretive plant community), the advantage for livestock production includes: higher forage production from cool-season grasses, improved early spring forage production, and higher water infiltration. The disadvantage for livestock include: reduction in cool-/warm-season grass mix which would provides better management flexibility, less plant diversity, and a potential increase in soil erosion. The Annual, Pioneer Perennial Plant Community is of limited value for livestock production.

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. This site is dominated by soils in hydrologic group A. Infiltration and runoff potential for this site varies from moderate to high depending on soil hydrologic group, slope, and ground cover. In many cases, areas with greater than 75 percent ground cover have the greatest potential for high infiltration and lower runoff. An exception would be where shortgrasses form a strong sod and dominate the site. Normally, areas where ground cover is less than 50 percent have the greatest potential to have reduced infiltration and higher runoff (refer to Section 4, NRCS National Engineering Handbook for runoff quantities and hydrologic curves).

Recreational uses

This site provides hunting opportunities for upland game species. The wide varieties of plants which bloom from spring until fall have an esthetic value that appeals to visitors.

Wood products

No appreciable wood products are typically present on this site.

Other products

Seed harvest of native plant species can provide additional income on this site.

Inventory data references

Information presented here has been derived from NRCS clipping data and other inventory data. Field observations and experience were also used. Those involved in developing this site description include: Ryan Beer, Range Management Specialist (RMS), NRCS; Stan Boltz, RMS, NRCS; Dave Dewald, Wildlife BIO, NRCS; Jody Forman, RMS, NRCS; Dennis Froemke, RMS, NRCS; Cheryl Nielsen, RMS, NRCS; Jeff Printz, RMS, NRCS; Mike Stirling, RMS, NRCS.

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Contributors

SCB
Travis Patient

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.

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Date	05/06/2010
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. “Cat-steps” on steeper slopes may be present on a limited basis, but these are not considered terracettes.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 5 to 25 percent is typical.

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

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6. **Extent of wind scoured, blowouts and/or depositional areas:** 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 1 to 3 inches thick. Some soils (e.g., Zeona) 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):** None.

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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 rhizomatous grasses >>

    Sub-dominant: Cool-season bunchgrass > Mid warm-season bunchgrass > forbs >

    Other: Short warm-season grasses = shrubs > Grass-likes

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Very little evidence of decadence or mortality. Bunch grasses have strong, healthy centers and shrubs are vigorous.

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14. **Average percent litter cover (%) and depth (in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Production ranges from 1,200-2,000 lbs./acre (air-dry weight). Reference value production is 1,600 lbs./acre (air-dry weight).

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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:** State and local noxious weeds

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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.
