

Ecological site R058DY026SD

Thin Sandy

Accessed: 05/21/2024

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.

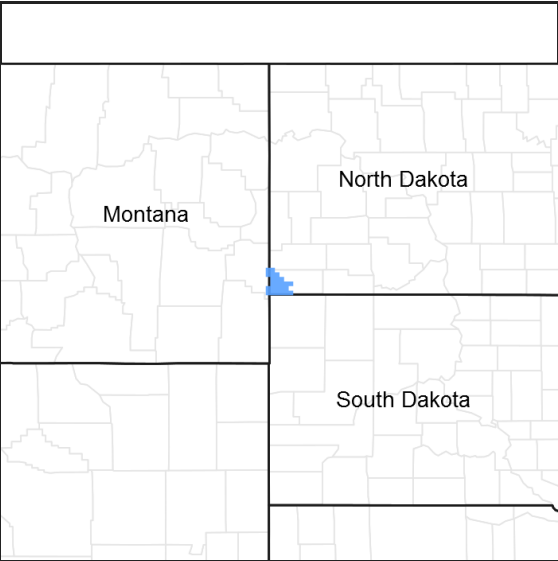


Figure 1. Mapped extent

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

R058DY009SD	Sandy
R058DY010SD	Loamy
R058DY028SD	Shallow Sandy

Similar sites

R058DY010SD	<b>Loamy</b> Loamy [more western wheatgrass; less needleandthread; more production]
R058DY009SD	<b>Sandy</b> Sandy [more western wheatgrass; more production]

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Hesperostipa comata</i> (2) <i>Schizachyrium scoparium</i>

## Physiographic features

This site occurs on moderately steep to steep uplands.

**Table 2. Representative physiographic features**

Landforms	(1) Hill
Flooding frequency	None
Ponding frequency	None
Elevation	701–1,219 m
Slope	9–25%
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 or fine sandy loam textured surface layers and

slopes of 9 to 25 percent. The soils in this site are well to excessively drained and formed in residuum derived from sandstone. The surface layer is two to four 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 or wind scoured areas. Bunch grasses are occasionally pedestalled but no exposed roots will be present. Water flow paths are broken, irregular in appearance, or discontinuous with numerous vegetative barriers. The soil surface is stable and intact.

These soils are somewhat susceptible to water erosion. The hazard of water erosion increases on slopes greater than about 15 percent. 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.usda.gov/app/HomePage.htm>) for specific local soils information.

**Table 4. Representative soil features**

Surface texture	(1) Loamy fine sand (2) Fine sandy loam
Family particle size	(1) Sandy
Drainage class	Well drained to excessively drained
Permeability class	Moderately rapid
Soil depth	51–203 cm
Surface fragment cover ≤3"	0–5%
Surface fragment cover >3"	0%
Available water capacity (0–101.6cm)	7.62–10.16 cm
Calcium carbonate equivalent (0–101.6cm)	0–25%
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)	0–10%
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.

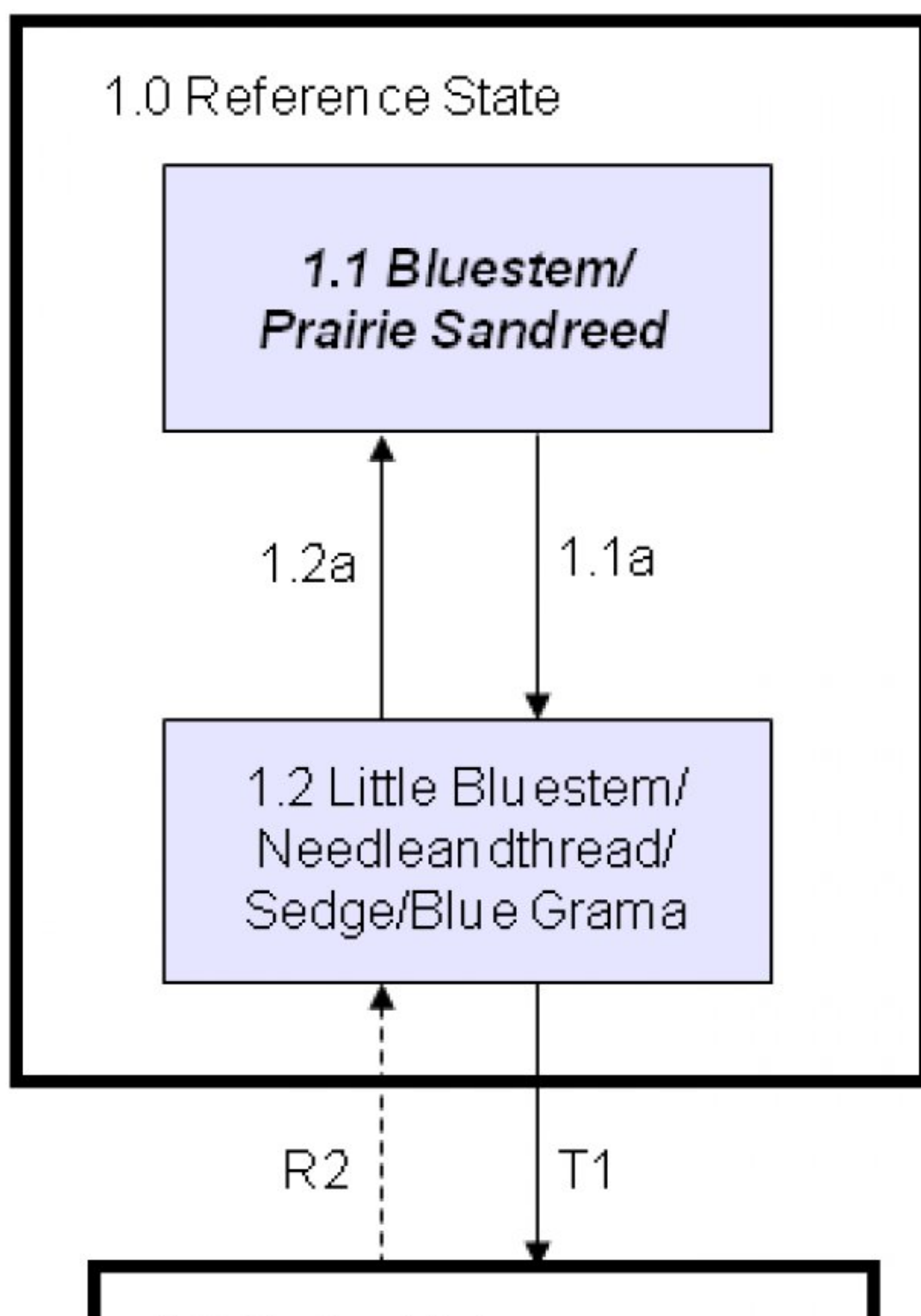
Several years of continuous grazing without adequate recovery periods, following each grazing occurrence will likely cause this site to depart from the Bluestem/Prairie Sandreed Plant Community. Species such as needleandthread and little bluestem will initially increase. Sand bluestem, prairie sandreed, big bluestem, and plains muhly will decrease in frequency and production. Heavy continuous grazing causes sedge and blue grama to increase and eventually dominate and pioneer perennials, and annuals to increase.

The plant community upon which interpretations are primarily based is the Bluestem/Prairie Sandreed 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

### Community 1.1 Bluestem/Prairie Sandreed

The interpretive plant community for this site is the Bluestem/Prairie Sandreed 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, little bluestem, needleandthread, and western wheatgrass. Other grasses or grass-like species occurring on the site include big bluestem, sand bluestem, sedge, blue grama, prairie Junegrass, plains muhly, and sideoats grama. Significant forbs include dotted gayfeather, green sagewort, goldenrod, hairy goldaster, purple coneflower, and purple prairie clover. The significant shrubs that occur include western sandcherry, fringed sagewort, rose, dwarf false indigo, 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	1154	1715	2242
Shrub/Vine	95	151	224
Forb	95	151	224
<b>Total</b>	<b>1344</b>	<b>2017</b>	<b>2690</b>

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

### Little Bluestem/Needleandthread/Sage/Blue Grama

This plant community develops under heavy continuous grazing or continuous seasonal grazing (grazing at the same time of year every year with inadequate recovery periods). The potential vegetation is made up of approximately 80 to 90 percent grasses and grass-like species, 5 to 10 percent forbs, and 5 to 10 percent shrubs. The dominant grass or grass-like species include little bluestem, needleandthread, sedge, and blue grama. Other grasses or grass-like species may include prairie sandreed, western wheatgrass, hairy grama, and sand dropseed. Significant forbs include white prairie aster, scurfpea, green sagewort, and goldenrod. The dominant shrubs that occur include yucca, creeping juniper, and fringed sagewort. Compared to the Bluestem/Prairie Sandreed Plant Community, the shortgrass species including blue grama and threadleaf sedge have increased. The warm-season species including prairie sandreed, big bluestem, sand bluestem, plains muhly, and sideoats grama 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	874	1239	1805
Shrub/Vine	67	110	163
Forb	67	109	163
<b>Total</b>	<b>1008</b>	<b>1458</b>	<b>2131</b>

Figure 7. 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

Heavy continuous grazing or continuous seasonal grazing (grazing at the same time of year every year) will lead to the Little Bluestem/Needleandthread/Sedge/Blue Grama Plant Community. This occurs with exposure to herbivory during a major portion of the growing season and inadequate recovery periods after grazing occurrences.

## 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 Plant Community.

### Conservation practices

Prescribed Grazing
--------------------

## State 2

### Sedge

## Community 2.1

Sedge/Blue Grama/Creeping Juniper

This plant community typically develops over a period of several years with heavy continuous 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 75 to 85 percent grasses and grass-like species, 5 to 10 percent forbs, and 5 to 15 percent shrubs. The dominant grasses are sedge and blue grama. Significant forbs include green sagewort, scurfpea, goldenrod, and white prairie aster. Dominant shrubs in this community include creeping juniper, fringed sagewort, and yucca. Compared to the Bluestem/Prairie Sandreed Plant Community, sedge and blue grama have greatly increased. Prairie sandreed is greatly diminished. Sand bluestem, big bluestem, and little bluestem are essentially absent. Desirable plant species have decreased. This plant community is resistant to change due to the sod forming habit of the sedges and blue grama. 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	471	832	1295
Shrub/Vine	45	101	168
Forb	45	76	106
Total	561	1009	1569

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

Transition T1  
State 1 to 2

With continuous seasonal grazing or heavy continuous grazing, this plant community will move towards the Sedge/Blue Grama/Creeping Juniper Plant Community.

Restoration pathway R2  
State 2 to 1

With long-term prescribed grazing and favorable climatic conditions, which allow for adequate plant recovery periods, this plant community may eventually shift to the Little Bluestem/Needleandthread/Sedge/Blue Grama Plant Community.

Conservation practices

Prescribed Grazing
--------------------

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			303–706	
	prairie sandreed	CALO	Calamovilfa longifolia	202–504	–
	big bluestem	ANGE	Andropogon gerardii	101–202	–
	sand bluestem	ANHA	Andropogon hallii	101–202	–

2	<b>Warm-Season Grasses</b>			202–605	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	202–504	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–101	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	0–101	–
	plains muhly	MUCU3	<i>Muhlenbergia cuspidata</i>	20–101	–
3	<b>Cool-Season Grasses</b>			101–303	
	needle and thread	HECOC8	<i>Hesperostipa comata</i> ssp. <i>comata</i>	40–303	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	40–303	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	20–101	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–101	–
	Scribner's rosette grass	DIOLS	<i>Dichanthelium oligosanthes</i> var. <i>scribnerianum</i>	20–61	–
	sixweeks fescue	VUOC	<i>Vulpia octoflora</i>	0–20	–
4	<b>Short-Warm Season Grasses</b>			40–202	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	40–161	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	20–101	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	0–61	–
	Fendler threeawn	ARPUL	<i>Aristida purpurea</i> var. <i>longiseta</i>	0–61	–
5	<b>Grass-Likes</b>			101–202	
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	101–202	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–101	–
	sun sedge	CAINH2	<i>Carex inops</i> ssp. <i>heliophila</i>	0–61	–
<b>Forb</b>					
7	<b>Forbs</b>			101–202	
	Forb, native	2FN	<i>Forb, native</i>	20–40	–
	scurfpea	PSORA2	<i>Psoraleidium</i>	20–40	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	20–40	–
	goldenrod	SOLID	<i>Solidago</i>	20–40	–
	white prairie aster	SYFA	<i>Symphyotrichum falcatum</i>	20–40	–
	field sagewort	ARCA12	<i>Artemisia campestris</i>	20–40	–
	purple prairie clover	DAPU5	<i>Dalea purpurea</i>	20–40	–
	silky prairie clover	DAVI	<i>Dalea villosa</i>	20–40	–
	blacksamson echinacea	ECAN2	<i>Echinacea angustifolia</i>	20–40	–
	scarlet beeblossom	GACO5	<i>Gaura coccinea</i>	20–40	–
	stiff sunflower	HEPA19	<i>Helianthus pauciflorus</i>	20–40	–
	hairy false goldenaster	HEVI4	<i>Heterotheca villosa</i>	20–40	–
	blazing star	LIATR	<i>Liatris</i>	20–40	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–20	–
	purple locoweed	OXLA3	<i>Oxytropis lambertii</i>	0–20	–
	large Indian breadroot	PEES	<i>Pedimelum esculentum</i>	0–20	–
	beardtongue	PENST	<i>Penstemon</i>	0–20	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	0–20	–
	huckleberry	ERIOG	<i>Eriogonum</i>	0–20	–



	duckwheat	ERIOG	<i>Eriogonum</i>	0–20	–
	milkvetch	ASTRA	<i>Astragalus</i>	0–20	–
	Gunnison's mariposa lily	CAGU	<i>Calochortus gunnisonii</i>	0–20	–
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	0–20	–
	longbract spiderwort	TRBR	<i>Tradescantia bracteata</i>	0–20	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0–20	–
	cutleaf anemone	PUPAM	<i>Pulsatilla patens</i> ssp. <i>multifida</i>	0–20	–
	pussytoes	ANTEN	<i>Antennaria</i>	0–20	–
<b>Shrub/Vine</b>					
8	<b>Shrubs</b>			101–202	
	Shrub (>.5m)	2SHRUB	<i>Shrub (&gt;.5m)</i>	20–101	–
	rose	ROSA5	<i>Rosa</i>	20–61	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	0–40	–
	western sandcherry	PRPUB	<i>Prunus pumila</i> var. <i>besseyi</i>	0–40	–
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	0–40	–
	dwarf false indigo	AMNA	<i>Amorpha nana</i>	20–40	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	20–40	–
	creeping juniper	JUHO2	<i>Juniperus horizontalis</i>	20–40	–
	pricklypear	OPUNT	<i>Opuntia</i>	0–20	–

Table 9. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Tall Warm-Season Grasses</b>			15–117	
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	15–117	–
	big bluestem	ANGE	<i>Andropogon gerardii</i>	0–29	–
	sand bluestem	ANHA	<i>Andropogon hallii</i>	0–29	–
2	<b>Warm-Season Grasses</b>			146–364	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	146–364	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–44	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	0–29	–
	plains muhly	MUCU3	<i>Muhlenbergia cuspidata</i>	0–29	–
3	<b>Cool-Season Grasses</b>			219–364	
	needle and thread	HECOC8	<i>Hesperostipa comata</i> ssp. <i>comata</i>	15–117	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	15–73	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	15–58	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–58	–
	sixweeks fescue	VUOC	<i>Vulpia octoflora</i>	0–29	–
4	<b>Short-Warm Season Grasses</b>			146–291	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	73–219	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	15–117	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	15–117	–
	Fendler threeawn	ARPI11	<i>Aristida purpurea</i> var. <i>longicoma</i>	15–73	–

	threadleaf sedge	CAFI	<i>Carex filifolia</i>	73–219	–
	sun sedge	CAINH2	<i>Carex inops ssp. heliophila</i>	15–117	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–117	–
6	<b>Non-Native Grasses</b>			15–73	
	cheatgrass	BRTE	<i>Bromus tectorum</i>	15–73	–
	bluegrass	POA	<i>Poa</i>	0–73	–
<b>Forb</b>					
7	<b>Forbs</b>			73–146	
	Forb, native	2FN	<i>Forb, native</i>	15–73	–
	field sagewort	ARCA12	<i>Artemisia campestris</i>	15–58	–
	Forb, introduced	2FI	<i>Forb, introduced</i>	0–58	–
	scurfpea	PSORA2	<i>Psoralegium</i>	15–44	–
	goldenrod	SOLID	<i>Solidago</i>	15–44	–
	white prairie aster	SYFA	<i>Symphyotrichum falcatum</i>	15–44	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0–29	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	15–29	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	0–29	–
	stiff sunflower	HEPA19	<i>Helianthus pauciflorus</i>	0–29	–
	blazing star	LIATR	<i>Liatris</i>	0–29	–
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	0–29	–
	purple prairie clover	DAPU5	<i>Dalea purpurea</i>	0–29	–
	silky prairie clover	DAVI	<i>Dalea villosa</i>	0–29	–
	blacksamson echinacea	ECAN2	<i>Echinacea angustifolia</i>	0–15	–
	buckwheat	ERIOG	<i>Eriogonum</i>	0–15	–
	scarlet beeblossom	GACO5	<i>Gaura coccinea</i>	0–15	–
	milkvetch	ASTRA	<i>Astragalus</i>	0–15	–
	pussytoes	ANTEN	<i>Antennaria</i>	0–15	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–15	–
	purple locoweed	OXLA3	<i>Oxytropis lambertii</i>	0–15	–
	large Indian breadroot	PEES	<i>Pediomelum esculentum</i>	0–15	–
	hairy false goldenaster	HEVI4	<i>Heterotheca villosa</i>	0–15	–
<b>Shrub/Vine</b>					
8	<b>Shrubs</b>			73–146	
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	15–73	–
	creeping juniper	JUHO2	<i>Juniperus horizontalis</i>	15–73	–
	Shrub (>.5m)	2SHRUB	<i>Shrub (&gt;.5m)</i>	0–58	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	0–44	–
	rose	ROSA5	<i>Rosa</i>	15–29	–
	pricklypear	OPUNT	<i>Opuntia</i>	0–29	–
	western sandcherry	PRPUB	<i>Prunus pumila var. besseyi</i>	0–15	–
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	0–15	–
	dwarf false indigo	AMNA	<i>Amorpha nana</i>	0–15	–

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>Tall Warm-Season Grasses</b>			0–20	
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	0–20	–
2	<b>Warm-Season Grasses</b>			0–50	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	0–50	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–20	–
3	<b>Cool-Season Grasses</b>			20–101	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	10–81	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	0–50	–
	Scribner's rosette grass	DIOLS	<i>Dichanthelium oligosanthos var. scribnerianum</i>	10–40	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–30	–
	sixweeks fescue	VUOC	<i>Vulpia octoflora</i>	0–30	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	10–30	–
4	<b>Short-Warm Season Grasses</b>			151–303	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	101–252	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	10–101	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	10–101	–
	Fendler threeawn	ARPUL	<i>Aristida purpurea var. longiseta</i>	10–71	–
5	<b>Grass-Likes</b>			252–353	
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	202–303	–
	sun sedge	CAINH2	<i>Carex inops ssp. heliophila</i>	20–101	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–101	–
6	<b>Non-Native Grasses</b>			10–81	
	cheatgrass	BRTE	<i>Bromus tectorum</i>	10–71	–
	bluegrass	POA	<i>Poa</i>	0–50	–
<b>Forb</b>					
7	<b>Forbs</b>			50–101	
	field sagewort	ARCA12	<i>Artemisia campestris</i>	10–50	–
	Forb, introduced	2FI	<i>Forb, introduced</i>	0–50	–
	Forb, native	2FN	<i>Forb, native</i>	10–50	–
	scurfpea	PSORA2	<i>Psoraleidum</i>	10–30	–
	white prairie aster	SYFA	<i>Symphyotrichum falcatum</i>	10–30	–
	goldenrod	SOLID	<i>Solidago</i>	10–30	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0–10	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	0–10	–
	pussytoes	ANTEN	<i>Antennaria</i>	0–10	–
	milkvetch	ASTRA	<i>Astragalus</i>	0–10	–
	buckwheat	ERIOG	<i>Eriogonum</i>	0–10	–

	blazing star	LIATR	<i>Liatris</i>	0–10	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–10	–
	purple locoweed	OXLA3	<i>Oxytropis lambertii</i>	0–10	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	0–10	–
<b>Shrub/Vine</b>					
8	<b>Shrubs</b>			50–151	
	creeping juniper	JUHO2	<i>Juniperus horizontalis</i>	20–101	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	10–81	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	0–40	–
	pricklypear	OPUNT	<i>Opuntia</i>	0–30	–
	Shrub (>.5m)	2SHRUB	<i>Shrub (&gt;.5m)</i>	0–30	–
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	0–10	–
	rose	ROSA5	<i>Rosa</i>	0–10	–

## 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, in-stream 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 Thin Sandy 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 the Thin Sandy 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 brome grasses and crested wheat have impacted the biological integrity of the site for some grassland birds.

Bluestem/Prairie Sandreed: 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, chestnut-collared longspur, Sprague's pipit, 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, 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.

Little Bluestem/Needleandthread/Sedge/Blue Grama: Resulting from continuous seasonal and heavy continuous grazing the warm-season grass component has been substantially reduced and a shift to a medium to short height plant community occurs. The forb and shrub diversity is substantially decreased.

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.

Sedge/Blue Grama/Creeping Juniper: Resulting from heavy, continuous grazing or continuous, seasonal grazing sedges, blue grama and creeping juniper will dominate. The decrease in diversity of grasses, forbs, and shrubs will result in less seed production or lower quality nutrition for small herbivores including voles, mice, and thirteen-lined ground squirrel.

The short stature of this plant community limits suitable thermal, protective, and escape cover. Prey populations are reduced and are more vulnerable to raptor and mammalian predation. Predators utilizing this plant community include the coyote, American badger, red fox, and long-tailed weasel.

Extreme impairment of the ecological processes impacts offsite aquatic habitats through excessive runoff, nutrient, and sediment loads. Elevated surface temperatures resulting from reduced cover and litter will greatly reduce habitat for most amphibian species, grassland birds, and mammals.

#### 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 Sedge/Blue Grama/Creeping Juniper 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 B. 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; Dennis Froemke, RMS, NRCS; Cheryl Nielsen, RMS, NRCS; Jeff Printz, RMS, NRCS; Mike Stirling, RMS, NRCS; and Darrell Vanderbusch, Soil Scientist, NRCS.

## Other references

High Plains Regional Climate Center, University of Nebraska, 830728 Chase Hall, Lincoln, NE 68583-0728.  
(<http://www.hprcc.unl.edu/>)

USDA, NRCS. National Water and Climate Center, 101 SW Main, Suite 1600, Portland, OR 97204-3224.  
(<http://www.wcc.nrcs.usda.gov/>)

USDA, NRCS. National Range and Pasture Handbook, September 1997

USDA, NRCS. National Soil Information System, Information Technology Center, 2150 Centre Avenue, Building A, Fort Collins, CO 80526. (<http://nasis.nrcs.usda.gov>)

USDA, NRCS. 2001. The PLANTS Database, Version 3.1 (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874-4490 USA

USDA, NRCS, Various Published Soil Surveys

## 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.

Author(s)/participant(s)	Stan Boltz
Contact for lead author	stanley.boltz@sd.usda.gov, 605-352-1236
Date	05/07/2010
Approved by	Stan Boltz

Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

## Indicators

1. **Number and extent of rills:** Slight to none, typically on steeper slopes and discontinuous.  
\_\_\_\_\_
2. **Presence of water flow patterns:** None, or barely visible and discontinuous with numerous debris dams when present.  
\_\_\_\_\_
3. **Number and height of erosional pedestals or terracettes:** Few pedestalled plants typically on steeper slopes.  
\_\_\_\_\_
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.  
\_\_\_\_\_
5. **Number of gullies and erosion associated with gullies:** None should be present.  
\_\_\_\_\_
6. **Extent of wind scoured, blowouts and/or depositional areas:** None.  
\_\_\_\_\_
7. **Amount of litter movement (describe size and distance expected to travel):** Small size litter classes will generally move short distances, some medium size class litter will move very short distances. Litter debris dams are occasionally present.  
\_\_\_\_\_
8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil aggregate stability ratings should typically be 5 to 6, normally 6. Surface organic matter adheres to the soil surface. Soil surface fragments will typically retain structure indefinitely when dipped in distilled water.  
\_\_\_\_\_
9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** A-horizon should be 2 to 5 inches thick with light to dark brownish gray colors. Structure should typically be fine granular at least in the upper A-horizon. Some soils have single grain structure of the sandy material.  
\_\_\_\_\_
10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Combination of shallow and deep rooted species (mid & tall rhizomatous and tufted perennial cool- and warm-season grasses) with fine and coarse roots positively influences infiltration.  
\_\_\_\_\_
11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None.  
\_\_\_\_\_

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

Dominant: Tall warm-season grasses > Mid warm-season grasses >

Sub-dominant: Cool-season grasses >

Other: Short warm-season grasses = Grass-likes = Forbs = Shrubs

Additional:

---

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

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

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Production ranges from 1,200-2,400 lbs./acre (air-dry weight). Reference value production is 1,800 lbs./acre (air-dry weight).
- 

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
- 

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.
-