

# Ecological site R058DY016SD Very Shallow

Accessed: 05/05/2024

## 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.

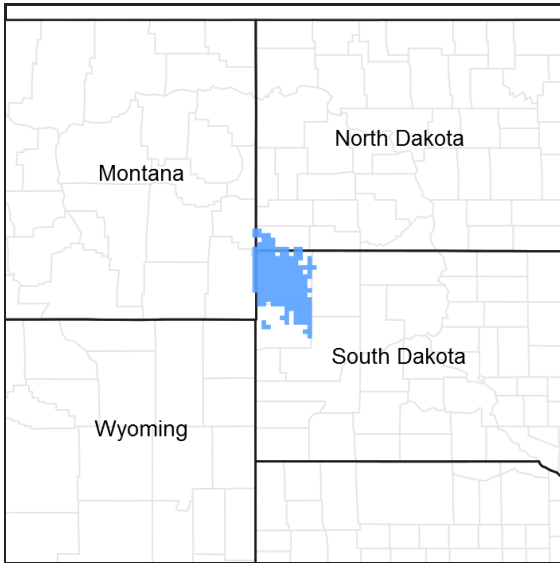


Figure 1. Mapped extent

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	<b>Sandy</b>
R058DY024SD	<b>Shallow Loamy</b>
R058DY028SD	<b>Shallow Sandy</b>

## Similar sites

R058DY010SD	<b>Loamy</b> Shallow Loamy [less needleandthread; more production]
R058DY028SD	<b>Shallow Sandy</b> Shallow Sandy [more prairie sandreed; more production]

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Hesperostipa comata</i> var. <i>comata</i> (2) <i>Bouteloua gracilis</i>

## Physiographic features

This site occurs on moderately steep to steep uplands.

**Table 2. Representative physiographic features**

Landforms	(1) Ridge (2) Hill
Flooding frequency	None
Ponding frequency	None
Elevation	701–1,219 m
Slope	15–40%
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 site.

## Soil features

The soils in this site are excessively to somewhat excessively drained and formed in colluvium or alluvium. The channery sandy loam to very gravelly loam surface layer is three to seven inches thick. The soils have a moderate infiltration rate. 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 debris dams or vegetative barriers. The soil surface is stable and intact. Subsurface soil layers are restrictive to water movement and root penetration.

These soils are mainly susceptible to water erosion. The hazard of water erosion increases on slopes greater than about 15 percent. Low available water capacity caused by the shallow rooting depth strongly influences the soil-water-plant relationship.

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

**Table 4. Representative soil features**

Surface texture	(1) Channery loam (2) Very gravelly sandy loam
Family particle size	(1) Loamy
Drainage class	Somewhat excessively drained to excessively drained
Permeability class	Moderate
Soil depth	8–25 cm
Surface fragment cover ≤3"	25–60%
Surface fragment cover >3"	0–10%
Available water capacity (0-101.6cm)	2.54–7.62 cm
Calcium carbonate equivalent (0-101.6cm)	0–15%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	6.6–8.4
Subsurface fragment volume ≤3" (Depth not specified)	45–90%
Subsurface fragment volume >3" (Depth not specified)	0–30%

## 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.

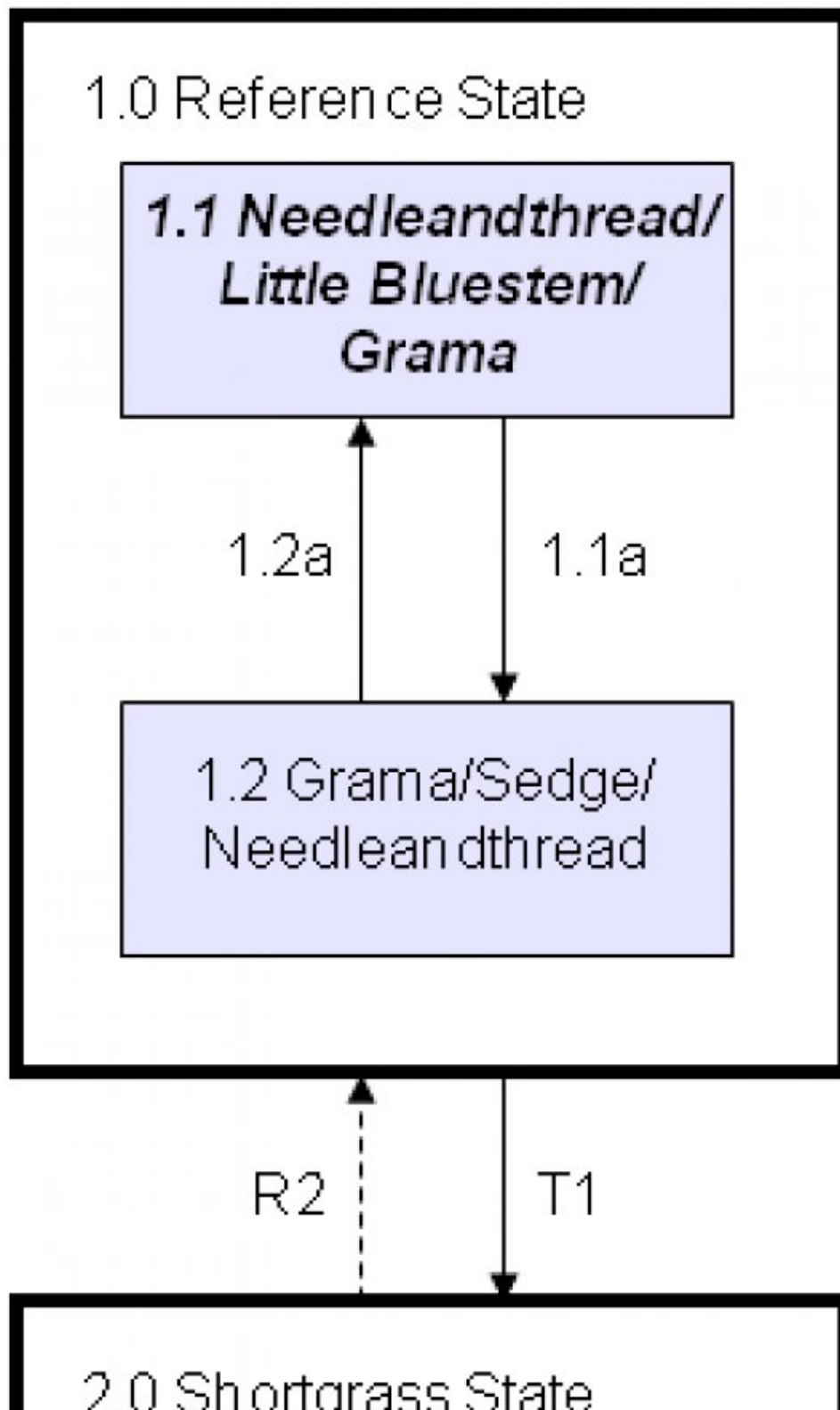
Continuous grazing without adequate recovery periods following each grazing occurrence over several years causes this site to depart from the Needleandthread/Little Bluestem/Grama Plant Community. Species such as threadleaf sedge and blue grama will initially increase. Plains muhly, western wheatgrass, little bluestem, and sideoats grama will decrease in frequency and production and later disappear. Heavy continuous grazing causes blue grama and/or threadleaf sedge to dominate.

The plant community upon which interpretations are primarily based is the Needleandthread/Little Bluestem/Grama

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



## 2.1 Grama/Sedge/ Clubmoss

### State 1 Reference

The State narrative is under development.

### Community 1.1 Needleandthread/Little Bluestem/Grama

The plant community upon which interpretations are primarily based is the Needleandthread/Little Bluestem/Grama Plant Community. This is also considered to be climax. This plant community can be found on areas that are properly managed with prescribed grazing that allows for proper utilization, changes in season of use and adequate recovery periods following each grazing event. The potential vegetation is about 80 to 90 percent grass or grass-like species, 5 to 10 percent forbs, 5 to 10 percent shrubs, and 0 to 1 percent cryptogams. An even mix of both warm- and cool-season species dominates this plant community. The major grasses include needleandthread, little bluestem, and blue grama. Other grasses occurring on the site include sideoats grama, western wheatgrass, and threadleaf sedge. The significant forbs include gayfeather, purple coneflower, prairie clover, and cutleaf ironplant. Significant shrubs are fringed sagewort, rose, skunkbush sumac, 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). Community dynamics, nutrient cycle, water cycle, and energy flow are functioning at the sites potential. Plant litter is properly distributed with some movement offsite and natural plant mortality is low. The diversity in plant species allows for high drought tolerance.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	482	758	1031
Forb	39	67	95
Shrub/Vine	39	67	95
Moss	–	4	11
<b>Total</b>	<b>560</b>	<b>896</b>	<b>1232</b>

Figure 5. 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

### Community 1.2 Grama/Sedge/Needleandthread

This plant community typically develops over a period of several years with heavy continuous season-long grazing. It is made up of approximately 70 to 85 percent grass and grass-like species, 5 to 15 percent forbs, 5 to 15 percent shrubs, and 1 to 3 percent cryptogams. The dominant grasses are blue grama, threadleaf sedge, and needleandthread. Significant forbs include cudweed sagewort, green sagewort, and white prairie aster. Dominant shrubs include fringed sagewort, yucca, and broom snakeweed. Compared to the Needleandthread/Little Bluestem/Grama Plant Community, blue grama and sedge have greatly increased. Little bluestem, sideoats grama, plains muhly, and western wheatgrass are greatly diminished. 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 6. Annual production by plant type**

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	392	525	773
Forb	28	67	106
Shrub/Vine	28	67	106
Moss	–	13	22
<b>Total</b>	<b>448</b>	<b>672</b>	<b>1007</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 season long grazing will convert the plant community to the Grama/Sedge/Needleandthread Plant Community.

**Pathway 1.2a**  
**Community 1.2 to 1.1**

With prescribed grazing and favorable climatic conditions, this plant community can shift to the Needleandthread/Little Bluestem/Grama Plant Community.

**Conservation practices**

Prescribed Grazing

**State 2**  
**Shortgrass**

The State narrative is under development.

**Community 2.1**  
**Grama/Sedge/Clubmoss**

This plant community can develop from the adverse effects of heavy, continuous season-long grazing. Short grasses/grass-likes and forbs increase to dominate the site and annual production decreases dramatically. Lack of litter and short plant heights result in higher soil temperatures, poor water infiltration rates, and higher evaporation, which gives blue grama and sedges a competitive advantage over cool- and warm-season mid-grasses. Clubmoss, while not dominant by weight, forms an extensive mat, and restricts infiltration. Other grasses may include hairy

grama, threeawn, buffalograss, and little bluestem. Significant forbs include green sagewort and cudweed sagewort. The significant shrubs include broom snakeweed, cactus, and fringed sagewort. This plant community is relatively stable. The competitive advantage of blue grama, threadleaf sedge, and clubmoss prevents other species from establishing. This plant community is less productive than the Needleandthread/Little Bluestem/Grama Plant Community. Runoff increases and infiltration has decreased. Soil erosion does not increase appreciably.

Table 7. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	224	323	476
Forb	39	67	95
Shrub/Vine	17	45	73
Moss	–	13	28
<b>Total</b>	<b>280</b>	<b>448</b>	<b>672</b>

Figure 9. Plant community growth curve (percent production by month). SD6003, Pierre Shale Plains, cool-season/warm-season co-dominant.. Cool-season, warm-season co-dominant.

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

Heavy, continuous season-long grazing will shift this plant community to the Grama/Sedge/Clubmoss Plant Community.

### Restoration pathway R2 State 2 to 1

Long-term prescribed grazing may eventually shift this plant community back to the Grama/Sedge/Needleandthread Plant Community.

### Conservation practices

Prescribed Grazing
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### Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Mid-Cool Season Bunchgrasses</b>			135–224	
	needle and thread	HECOC8	<i>Hesperostipa comata</i> ssp. <i>comata</i>	135–224	–
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	0–45	–
2	<b>Mid/Tall Warm-Season Grasses</b>			135–224	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	45–135	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	18–90	–
	plains muhly	MUCU3	<i>Muhlenbergia cuspidata</i>	18–72	–
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	0–45	–

3	<b>Short-warm Season Grasses</b>			135–224	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	45–161	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	9–45	–
	threeawn	ARIST	<i>Aristida</i>	9–45	–
	buffalograss	BODA2	<i>Bouteloua dactyloides</i>	0–45	–
4	<b>Wheatgrasses</b>			18–90	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	18–90	–
	thickspike wheatgrass	ELLAL	<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>	0–45	–
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	0–27	–
5	<b>Other Native Grasses</b>			9–45	
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	9–36	–
	Graminoid (grass or grass-like)	2GRAM	<i>Graminoid (grass or grass-like)</i>	0–27	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0–18	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	0–18	–
	plains reedgrass	CAMO	<i>Calamagrostis montanensis</i>	0–9	–
6	<b>Grass-Likes</b>			45–90	
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	45–90	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–45	–
<b>Forb</b>					
7	<b>Forbs</b>			45–90	
	Forb, native	2FN	<i>Forb, native</i>	0–36	–
	field sagewort	ARCA12	<i>Artemisia campestris</i>	9–27	–
	purple prairie clover	DAPU5	<i>Dalea purpurea</i>	9–27	–
	hairy false goldenaster	HEVI4	<i>Heterotheca villosa</i>	9–27	–
	dotted blazing star	LIPU	<i>Liatris punctata</i>	9–18	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	9–18	–
	cutleaf anemone	PUPAM	<i>Pulsatilla patens</i> ssp. <i>multifida</i>	9–18	–
	blacksamson echinacea	ECAN2	<i>Echinacea angustifolia</i>	0–18	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	9–18	–
	milkvetch	ASTRA	<i>Astragalus</i>	9–18	–
	white prairie aster	SYFA	<i>Symphotrichum falcatum</i>	9–18	–
	stemless four-nerve daisy	TEACA2	<i>Tetaneuris acaulis</i> var. <i>acaulis</i>	9–18	–
	pussytoes	ANTEN	<i>Antennaria</i>	9–18	–
	textile onion	ALTE	<i>Allium textile</i>	0–9	–
	white prairie clover	DACA7	<i>Dalea candida</i>	0–9	–
	buckwheat	ERIOG	<i>Eriogonum</i>	0–9	–
	scarlet beeblossom	GACO5	<i>Gaura coccinea</i>	0–9	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	0–9	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0–9	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–9	–
	lacy tansyaster	MAPI	<i>Machaeranthera pinnatifida</i>	0–9	–
<b>Shrub/Vine</b>					
8	<b>Shrubs</b>			45–90	



	Shrub (>.5m)	2SHRUB	<i>Shrub (&gt;.5m)</i>	0–36	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	9–36	–
	kinnikinnick	ARUV	<i>Arctostaphylos uva-ursi</i>	0–18	–
	creeping juniper	JUHO2	<i>Juniperus horizontalis</i>	0–18	–
	pricklypear	OPUNT	<i>Opuntia</i>	9–18	–
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	0–18	–
	rose	ROSA5	<i>Rosa</i>	9–18	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	9–18	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	0–9	–
<b>Moss</b>					
9	<b>Cryptogams</b>			0–9	
	lesser spikemoss	SEDE2	<i>Selaginella densa</i>	0–9	–

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>Mid-Cool Season Bunchgrasses</b>			34–101	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	34–101	–
2	<b>Mid/Tall Warm-Season Grasses</b>			7–67	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	7–54	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	0–34	–
	plains muhly	MUCU3	<i>Muhlenbergia cuspidata</i>	0–20	–
3	<b>Short-Warm Season Grasses</b>			135–235	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	101–168	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	7–67	–
	threeawn	ARIST	<i>Aristida</i>	7–67	–
	buffalograss	BODA2	<i>Bouteloua dactyloides</i>	0–54	–
4	<b>Wheatgrasses</b>			7–34	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	7–34	–
	thickspike wheatgrass	ELLAL	<i>Elymus lanceolatus ssp. lanceolatus</i>	0–7	–
5	<b>Other Native Grasses</b>			7–54	
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	7–34	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	0–27	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0–20	–
	Graminoid (grass or grass-like)	2GRAM	<i>Graminoid (grass or grass-like)</i>	0–20	–
6	<b>Grass-Likes</b>			67–135	
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	67–135	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–67	–
<b>Forb</b>					
7	<b>Forbs</b>			34–101	
	Forb, introduced	2FI	<i>Forb, introduced</i>	0–34	–

	Forb, native	2FN	<i>Forb, native</i>	0–34	–
	field sagewort	ARCA12	<i>Artemisia campestris</i>	7–34	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	7–34	–
	white prairie aster	SYFA	<i>Symphotrichum falcatum</i>	7–27	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	7–13	–
	milkvetch	ASTRA	<i>Astragalus</i>	7–13	–
	purple prairie clover	DAPU5	<i>Dalea purpurea</i>	7–13	–
	hairy false goldenaster	HEVI4	<i>Heterotheca villosa</i>	0–13	–
	pussytoes	ANTEN	<i>Antennaria</i>	7–13	–
	dotted blazing star	LIPU	<i>Liatris punctata</i>	0–7	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–7	–
	lacy tansyaster	MAPI	<i>Machaeranthera pinnatifida</i>	0–7	–
	blacksamson echinacea	ECAN2	<i>Echinacea angustifolia</i>	0–7	–
	buckwheat	ERIOG	<i>Eriogonum</i>	0–7	–
	cutleaf anemone	PUPAM	<i>Pulsatilla patens ssp. multifida</i>	0–7	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0–7	–
	textile onion	ALTE	<i>Allium textile</i>	0–7	–
	stemless four-nerve daisy	TEACA2	<i>Tetranneuris acaulis var. acaulis</i>	0–7	–
<b>Shrub/Vine</b>					
8	<b>Shrubs</b>			34–101	
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	13–54	–
	Shrub (>.5m)	2SHRUB	<i>Shrub (&gt;.5m)</i>	0–27	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	7–20	–
	creeping juniper	JUHO2	<i>Juniperus horizontalis</i>	0–20	–
	pricklypear	OPUNT	<i>Opuntia</i>	7–20	–
	rose	ROSA5	<i>Rosa</i>	7–20	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	7–20	–
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	0–13	–
	kinnikinnick	ARUV	<i>Arctostaphylos uva-ursi</i>	0–13	–
<b>Moss</b>					
9	<b>Cryptogams</b>			7–20	
	lesser spikemoss	SEDE2	<i>Selaginella densa</i>	7–20	–

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>Mid-Cool Season Bunchgrasses</b>			0–22	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	0–22	–
2	<b>Mid/Tall Warm-Season Grasses</b>			0–22	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	0–18	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	0–4	–
3	<b>Short-Warm Season Grasses</b>			135–202	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	112–179	–

	threeawn	ARIST	<i>Aristida</i>	13–67	–
	buffalograss	BODA2	<i>Bouteloua dactyloides</i>	0–45	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	4–45	–
4	<b>Wheatgrasses</b>			0–13	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	0–13	–
	thickspike wheatgrass	ELLAL	<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>	0–4	–
5	<b>Other Native Grasses</b>			4–31	
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	4–13	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	0–13	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0–9	–
6	<b>Grass-Likes</b>			67–112	
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	67–112	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–45	–
<b>Forb</b>					
7	<b>Forbs</b>			45–90	
	field sagewort	ARCA12	<i>Artemisia campestris</i>	4–36	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	4–31	–
	Forb, introduced	2FI	<i>Forb, introduced</i>	0–22	–
	Forb, native	2FN	<i>Forb, native</i>	0–22	–
	white prairie aster	SYFA	<i>Symphotrichum falcatum</i>	4–22	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	4–13	–
	pussytoes	ANTEN	<i>Antennaria</i>	4–9	–
	milkvetch	ASTRA	<i>Astragalus</i>	4–9	–
	purple prairie clover	DAPU5	<i>Dalea purpurea</i>	0–4	–
	buckwheat	ERIOG	<i>Eriogonum</i>	0–4	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–4	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0–4	–
<b>Shrub/Vine</b>					
8	<b>Shrubs</b>			22–67	
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	9–45	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	4–22	–
	Shrub (>.5m)	2SHRUB	<i>Shrub (&gt;.5m)</i>	0–18	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	0–18	–
	creeping juniper	JUHO2	<i>Juniperus horizontalis</i>	0–13	–
	pricklypear	OPUNT	<i>Opuntia</i>	4–13	–
	rose	ROSA5	<i>Rosa</i>	0–4	–
<b>Moss</b>					
9	<b>Cryptogams</b>			4–22	
	lesser spikemoss	SEDE2	<i>Selaginella densa</i>	4–22	–

## Animal community

Animal Community – Wildlife Interpretations

Major Land Resource Area 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 Very Shallow 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 Very Shallow ES remains intact and provides increasingly important habitat for grassland nesting birds, small rodents, coyotes, and a variety of reptiles, amphibians, and insects.

Needleandthread/Little Bluestem/Grama: The predominance of grasses in this community favors herbivores. Insects, such as pollinators, play a role in maintaining the forb community and provide a forage base for grassland birds and other species. The 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 and forbs provide high nutrition levels for small and large herbivores including voles, mice, thirteen-lined ground squirrel, and white-tailed jackrabbit. This plant community provides adequate 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.

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

The predominance of short grass and grass-like species and the loss of forbs in this community cause a reduction in 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, and white-tailed jackrabbit. 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.

Grama/Sedge/Clubmoss: This plant community develops under heavy, continuous season-long grazing. The forb diversity has decreased. Species such as the horned lark, upland sandpiper, and white-tailed jackrabbit will increase due to shrub loss. Species such as Brewer's sparrow, greater sage-grouse, as well as, desert cottontail will rarely use this site.

The short stature of this plant community limits thermal, protective, and escape cover. Prey populations are reduced but are more vulnerable to predation by raptors and mammalian predators. 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 Grama/Sedge/Clubmoss 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.

### 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

Stan Boltz

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, Thad Berrett, Cheryl Nielsen
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:** None on slopes of about 15% or less, slight to none and discontinuous on slopes greater than 15%.

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- 2. Presence of water flow patterns:** None on slopes of about 15% or less; barely visible and discontinuous with numerous debris dams on slopes greater than 15%.

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- 3. Number and height of erosional pedestals or terracettes:** Few pedestalled plants typically on steeper slopes.

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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:** None.

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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.

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil aggregate stability ratings should typically be 3 or greater. Surface organic matter adheres to the soil surface. Soil surface fragments will typically retain structure for 1 minute or longer when dipped in distilled water.

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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 with light to dark brownish gray colors, but not typically mollic. Structure should typically be weak fine granular at least in the upper 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 rhizomatous and tufted perennial cool- and warm-season grasses) with fine and coarse roots positively influences infiltration. Infiltration is typically high due to gravelly nature of 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 – very shallow to gravel, but no platy structure will 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: Mid cool-season bunchgrasses = Mid/tall warm-season grasses = Short warm-season grasses >

Sub-dominant: Rhizomatous cool-season grasses = Grass-likes = Forbs = Shrubs >

Other: Short cool-season bunchgrasses

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 500-1,100 lbs./acre (air-dry weight). Reference value production is 800 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:** Species exhibit somewhat lower vigor than what would normally be expected for these species on other ecological sites. The droughty nature of the soils of this site causes plant stress even in typical precipitation patterns. Do not rate based solely on seed production.
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