

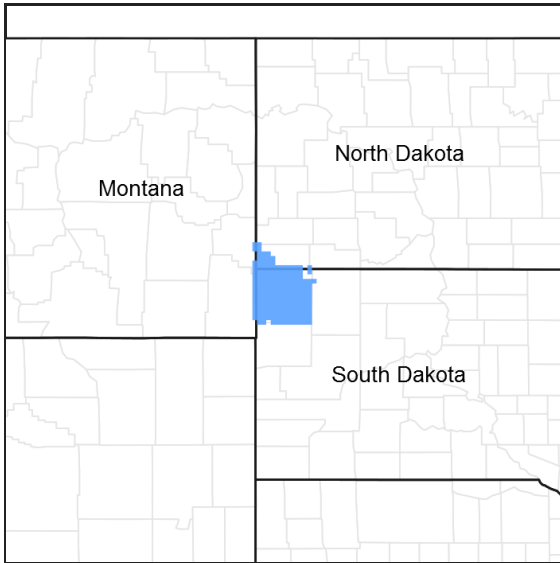
# Ecological site R058DY012SD

## Thin Loamy

Accessed: 05/08/2024

### 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>
R058DY010SD	<b>Loamy</b>
R058DY011SD	<b>Clayey</b>
R058DY024SD	<b>Shallow Loamy</b>

### Similar sites

R058DY024SD	<b>Shallow Loamy</b> Shallow Loamy [less little bluestem; less production]
R058DY010SD	<b>Loamy</b> Loamy [more western wheatgrass; less needleandthread; more production]
R058DY028SD	<b>Shallow Sandy</b> Shallow Sandy [more prairie sandreed, less production]

**Table 1. Dominant plant species**

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Hesperostipa comata</i> ssp. <i>comata</i> (2) <i>Pascopyrum smithii</i>

## Physiographic features

This site occurs on moderately steep to steep uplands.

**Table 2. Representative physiographic features**

Landforms	(1) Hill (2) Ridge
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 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, ND) to about 20° F (Baker, 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 annually, ranging from about 13 miles per hour during the spring to about 10 miles per hour during the summer. Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 50 miles per hour.

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. Green up of cool season plants may occur in September and October when adequate soil moisture is present.

**Table 3. Representative climatic features**

Frost-free period (average)	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 well-drained and formed in residuum weathered from shale and siltstone. The surface layer is four to seven inches thick. The texture of the profile ranges from loam to clay loam. The soils have a moderate infiltration rate. The soils on this site are weakly developed as is evidenced by carbonates that typically occur at or near the surface. This site should show slight to no evidence of rills, wind scoured areas, or pedestalled plants. Water flow paths are typically not present, but when visible they are broken and irregular in appearance or discontinuous. The soil surface is stable and intact. Subsurface soil layers are nonrestrictive 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 10 percent. 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) Loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately slow
Soil depth	51–127 cm
Surface fragment cover <=3"	0–5%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	12.7 cm
Calcium carbonate equivalent (0-101.6cm)	0–25%
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)	0–5%
Subsurface fragment volume >3" (Depth not specified)	0%

## Ecological dynamics

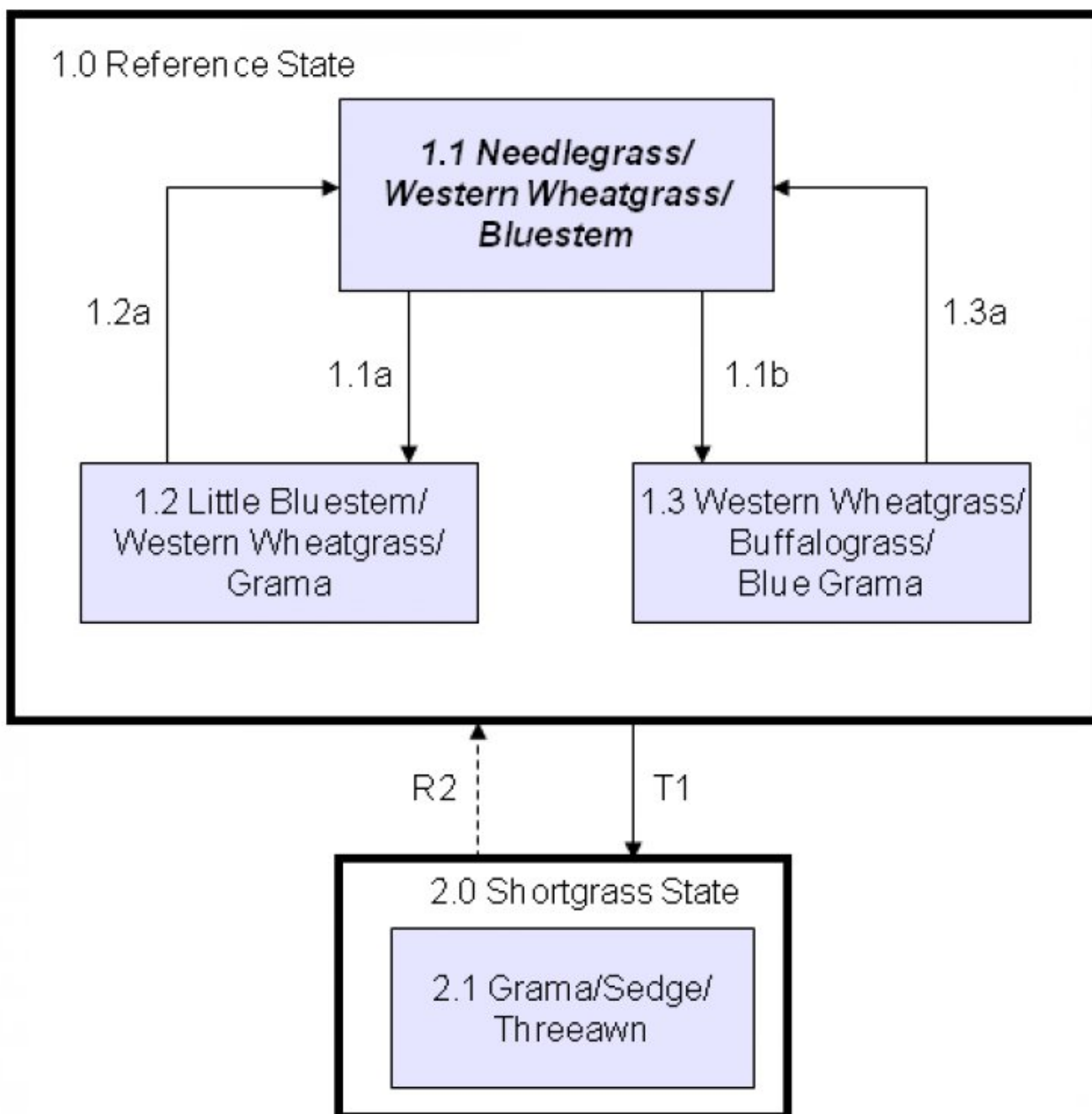
This site developed under Northern Great Plains climatic conditions, natural influences of large herbivores, occasional fire, and other biotic and abiotic factors that typically influence soil/site development. Changes will occur in the plant communities due to short-term weather variations, impacts 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.

The plant community upon which interpretations are primarily based is the Needlegrass/Western Wheatgrass/Bluestem 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. Heavy continuous grazing and/or continuous seasonal (spring) grazing, without adequate recovery periods following each grazing occurrence causes this site to depart from the Needlegrass/Western Wheatgrass/Bluestem Plant Community. Blue grama will begin to increase. Western

wheatgrass will increase initially and then begin to decrease. Green needlegrass will decrease in frequency and production. In time, heavy continuous grazing will likely cause upland sedges and blue grama to dominate and clubmoss to increase. This resulting plant community is relatively stable and the competitive advantage prevents other species from establishing. This plant community is less productive than the Needlegrass/Western Wheatgrass/Bluestem Plant Community. Runoff increases and infiltration will decrease. Soil erosion will be minimal.

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 Needleandthread/Western Wheatgrass/Bluestem

The plant community upon which interpretations are primarily based is the Needlegrass/Western Wheatgrass/Bluestem 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 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. A mixture of cool- and warm-season grasses dominates the plant community. Major grasses include western wheatgrass, needleandthread, and little bluestem. Other grasses and grass-like species include green needlegrass, big bluestem, sideoats grama, blue grama, and sedge. Significant forbs include purple coneflower, cudweed sagewort, scurfpea, and prairie clover. Significant shrubs found in this plant community include leadplant, sagebrush, and western snowberry. This plant community is extremely resilient and well adapted to the Northern Great Plains climatic conditions. The diversity in plant species allows for high drought tolerance. Community dynamics, nutrient cycle, water cycle, and energy flow are functioning properly. Plant litter is properly distributed with very little movement offsite and natural plant mortality is very 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	964	1429	1872
Shrub/Vine	78	127	185
Forb	78	126	185
<b>Total</b>	<b>1120</b>	<b>1682</b>	<b>2242</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 Little Bluestem/Western Wheatgrass/Grama

This plant community develops under continuous seasonal grazing and a low fire frequency. Little bluestem increases and sometimes dominates this plant community, as it takes advantage of soil disturbance (resulting from hoof action, or increased bare ground due to reduced plant vigor). Other significant grasses or grass-like species include western wheatgrass, blue grama, threadleaf sedge, and needleandthread. Forbs commonly found in this plant community include cudweed sagewort, green sagewort, scurfpea, and purple coneflower. Significant shrubs include fringed sagewort and sagebrush. 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. Although production remains relatively high, little bluestem plants often become "wooly," and largely not grazed due to lower palatability. This plant community is moderately resistant to change. The herbaceous species present are well adapted to grazing; however, species composition can be altered through long-term overgrazing. Also, certain species and/or classes of livestock will readily consume the little bluestem in any condition and result in a shift away from this plant community phase. If the herbaceous component is intact, it tends to be resilient if the disturbance is not long-term.

**Table 6. Annual production by plant type**

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	773	1143	1502
Shrub/Vine	62	101	146
Forb	62	101	146
<b>Total</b>	<b>897</b>	<b>1345</b>	<b>1794</b>

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

#### Western Wheatgrass/Buffalograss/Blue Grama

This plant community develops under continuous seasonal grazing (grazing at the same time of year every year for extended periods) later in the growing season and a low fire frequency. This pattern of grazing reduces the warm-season grasses with the exception of the short warm-season species. Significant grasses or grass-like species include western wheatgrass, blue grama, threadleaf sedge, and needleandthread. Forbs commonly found in this plant community include cudweed sagewort, green sagewort, scurfpea, and purple coneflower. Significant shrubs include fringed sagewort, sagebrush, and yucca. 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. This plant community is moderately resistant to change. The herbaceous species present are well adapted to grazing; however, species composition can be altered through long-term overgrazing. If the herbaceous component is intact, it tends to be resilient if the disturbance is not long-term. Transitions and/or community pathways leading away from this plant community phase are as follows: • Heavy continuous seasonal grazing or heavy continuous season-long grazing will convert the plant community to the Grama/Sedge/Threeawn Plant Community. • Prescribed grazing will convert this plant community to the Needlegrass/Western Wheatgrass/Bluestem Plant Community.

Table 7. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	673	1048	1412
Shrub/Vine	56	93	135
Forb	56	92	135
<b>Total</b>	<b>785</b>	<b>1233</b>	<b>1682</b>

Figure 9. 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

### Pathway 1.1a

#### Community 1.1 to 1.2

Continuous seasonal grazing (grazing at the same time of year every year for extended periods) will convert this plant community to the Little Bluestem/Western Wheatgrass/Grama Plant Community.

### Pathway 1.1b

## Community 1.1 to 1.3

Summer continuous seasonal grazing (grazing later in the season every year) will shift this plant community to the Western Wheatgrass/Buffalograss/Blue Grama Plant Community.

### Pathway 1.2a

#### Community 1.2 to 1.1

Prescribed grazing will convert this plant community to Needlegrass/Western Wheatgrass/Bluestem

#### Conservation practices

Prescribed Grazing

### Pathway 1.3a

#### Community 1.3 to 1.1

Prescribed grazing will convert this plant community to the Needlegrass/Western Wheatgrass/Bluestem Plant Community.

#### Conservation practices

Prescribed Grazing

## State 2

### Shortgrass

The State narrative is under development.

## Community 2.1

### Grama/Sedge/Threeawn

This plant community is a result from heavy grazing over many years. Diversity is diminished, as the short grasses become dominant in the plant community. The grazing tolerant blue grama and sedges replace little bluestem, western wheatgrass, and the needlegrasses. Sideoats grama remains in the plant community, but is less productive because of competition and grazing pressure. Due to low palatability, cudweed sagewort, green sagewort, scurfpea, western ragweed, and western yarrow become more prevalent in the plant community. Fringed sagewort is the dominant shrub in this plant community. Other shrubs commonly found in this plant community include cactus, yucca, and silver sagebrush. The potential vegetation is about 75 to 90 percent grasses or grass-like plants, 5 to 10 percent forbs, and 5 to 15 percent shrubs. This plant community is resistant to change. The herbaceous species present are less palatable and/or more grazing tolerant than the dominant species in the Needlegrass/Western Wheatgrass/Bluestem Plant Community. The dominant grass and grass-like species typically have short, compact rooting systems near the soil surface. This results in reduced infiltration and increased runoff. Onsite soil erosion may remain low, but the increased runoff may have damaging effects on adjacent ecological sites (ES).

Table 8. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	583	832	1070
Shrub/Vine	45	101	168
Forb	45	76	106
<b>Total</b>	<b>673</b>	<b>1009</b>	<b>1344</b>

Figure 11. 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

## Transition T1 State 1 to 2

Heavy continuous seasonal grazing or heavy continuous season-long grazing will convert the plant community to the Grama/Sedge/Threawn Plant Community.

## Restoration pathway R2 State 2 to 1

Long-term prescribed grazing that includes changing season of use and allowing adequate recovery periods will slowly lead this plant community back through successional stages that may eventually result in a plant community resembling the Needlegrass/Western Wheatgrass/Bluestem Plant Community.

### Conservation practices

Prescribed Grazing
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## Additional community tables

Table 9. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Needlegrass</b>			252–420	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	168–336	–
	green needlegrass	NAVI4	<i>Nassella viridula</i>	34–168	–
	porcupinegrass	HESP11	<i>Hesperostipa spartea</i>	0–84	–
2	<b>Wheatgrass</b>			168–336	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	168–336	–
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	0–84	–
3	<b>Mid Warm-Season Grasses</b>			168–336	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	84–252	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	34–168	–
	plains muhly	MUCU3	<i>Muhlenbergia cuspidata</i>	17–84	–
	prairie dropseed	SPHE	<i>Sporobolus heterolepis</i>	0–50	–
4	<b>Tall Warm-Season Grasses</b>			34–168	
	big bluestem	ANGE	<i>Andropogon gerardii</i>	34–168	–
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	0–84	–
5	<b>Short-Warm Season Grasses</b>			84–168	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	34–168	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	0–84	–
	buffalograss	BODA2	<i>Bouteloua dactyloides</i>	0–84	–
6	<b>Other Native Grasses</b>			17–84	
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	17–84	–
	Sandberg bluegrass	BOSE	<i>Bouteloua curtipendula</i>	0–50	–



	sandberg bluegrass	FOSE	<i>Poa secunda</i>	0-50	-
	Graminoid (grass or grass-like)	2GRAM	<i>Graminoid (grass or grass-like)</i>	0-50	-
	squirreltail	ELEL5	<i>Elymus elymoides</i>	0-50	-
7	<b>Grass-Likes</b>			84-168	
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	34-168	-
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0-84	-
<b>Forb</b>					
9	<b>Forbs</b>			84-168	
	Forb, native	2FN	<i>Forb, native</i>	17-84	-
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	17-50	-
	blacksamson echinacea	ECAN2	<i>Echinacea angustifolia</i>	17-50	-
	scurfpea	PSORA2	<i>Psoraleum</i>	17-50	-
	cutleaf anemone	PUPAM	<i>Pulsatilla patens ssp. multifida</i>	17-34	-
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	0-34	-
	goldenrod	SOLID	<i>Solidago</i>	17-34	-
	white prairie aster	SYFA	<i>Symphotrichum falcatum</i>	17-34	-
	scarlet beeblossom	GACO5	<i>Gaura coccinea</i>	17-34	-
	old man's whiskers	GETR	<i>Geum triflorum</i>	0-34	-
	Nuttall's sensitive-briar	MINU6	<i>Mimosa nuttallii</i>	0-34	-
	beardtongue	PENST	<i>Penstemon</i>	17-34	-
	false boneset	BREU	<i>Brickellia eupatorioides</i>	0-34	-
	sego lily	CANU3	<i>Calochortus nuttallii</i>	17-34	-
	prairie clover	DALEA	<i>Dalea</i>	17-34	-
	field sagewort	ARCA12	<i>Artemisia campestris</i>	0-34	-
	milkvetch	ASTRA	<i>Astragalus</i>	0-17	-
	western yarrow	ACMIO	<i>Achillea millefolium var. occidentalis</i>	0-17	-
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	0-17	-
	pussytoes	ANTEN	<i>Antennaria</i>	0-17	-
	spiny phlox	PHHO	<i>Phlox hoodii</i>	0-17	-
	woolly plantain	PLPA2	<i>Plantago patagonica</i>	0-17	-
<b>Shrub/Vine</b>					
10	<b>Shrubs</b>			84-168	
	silver sagebrush	ARCA13	<i>Artemisia cana</i>	0-84	-
	big sagebrush	ARTR2	<i>Artemisia tridentata</i>	0-84	-
	leadplant	AMCA6	<i>Amorpha canescens</i>	17-67	-
	Shrub (>.5m)	2SHRUB	<i>Shrub (&gt;.5m)</i>	0-50	-
	western snowberry	SYOC	<i>Symphoricarpos occidentalis</i>	0-50	-
	rose	ROSA5	<i>Rosa</i>	17-34	-
	dwarf false indigo	AMNA	<i>Amorpha nana</i>	17-34	-
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	17-34	-
	pricklypear	OPUNT	<i>Opuntia</i>	0-17	-
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	0-17	-
	soapweed yucca	YUGL	<i>Yucca glauca</i>	0-17	-

Table 10. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Needlegrass</b>			27–135	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	27–135	–
	green needlegrass	NAVI4	<i>Nassella viridula</i>	0–67	–
2	<b>Wheatgrass</b>			67–202	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	67–202	–
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	0–27	–
3	<b>Mid Warm-Season Grasses</b>			135–269	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	135–269	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	27–135	–
	plains muhly	MUCU3	<i>Muhlenbergia cuspidata</i>	0–40	–
	prairie dropseed	SPHE	<i>Sporobolus heterolepis</i>	0–13	–
4	<b>Tall Warm-Season Grasses</b>			0–67	
	big bluestem	ANGE	<i>Andropogon gerardii</i>	0–67	–
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	0–40	–
5	<b>Short-Warm Season Grasses</b>			135–269	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	67–202	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	13–135	–
	buffalograss	BODA2	<i>Bouteloua dactyloides</i>	13–135	–
	threeawn	ARIST	<i>Aristida</i>	0–40	–
6	<b>Other Native Grasses</b>			13–67	
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	13–67	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0–40	–
	Graminoid (grass or grass-like)	2GRAM	<i>Graminoid (grass or grass-like)</i>	0–40	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	0–40	–
7	<b>Grass-Likes</b>			67–202	
	threadleaf sedge	CAF1	<i>Carex filifolia</i>	67–202	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–67	–
8	<b>Non-Native Grasses</b>			13–67	
	cheatgrass	BRTE	<i>Bromus tectorum</i>	13–67	–
	bluegrass	POA	<i>Poa</i>	13–67	–
<b>Forb</b>					
9	<b>Forbs</b>			67–135	
	Forb, native	2FN	<i>Forb, native</i>	13–67	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	13–54	–
	Forb, introduced	2FI	<i>Forb, introduced</i>	13–40	–
	field sagewort	ARCA12	<i>Artemisia campestris</i>	13–40	–
	scurfpea	PSORA2	<i>Psoraleidum</i>	13–40	–
	goldenrod	SOLID	<i>Solidago</i>	13–27	–

	white prairie aster	SYFA	<i>Symphotrichum falcatum</i>	13–27	–
	prairie clover	DALEA	<i>Dalea</i>	0–27	–
	blacksamson echinacea	ECAN2	<i>Echinacea angustifolia</i>	13–27	–
	western yarrow	ACMIO	<i>Achillea millefolium var. occidentalis</i>	13–27	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	13–27	–
	woolly plantain	PLPA2	<i>Plantago patagonica</i>	13–27	–
	pussytoes	ANTEN	<i>Antennaria</i>	0–13	–
	milkvetch	ASTRA	<i>Astragalus</i>	0–13	–
	false boneset	BREU	<i>Brickellia eupatorioides</i>	0–13	–
	scarlet beeblossom	GACO5	<i>Gaura coccinea</i>	0–13	–
	old man's whiskers	GETR	<i>Geum triflorum</i>	0–13	–
	Nuttall's sensitive-briar	MINU6	<i>Mimosa nuttallii</i>	0–13	–
	beardtongue	PENST	<i>Penstemon</i>	0–13	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	0–13	–
	cutleaf anemone	PUPAM	<i>Pulsatilla patens ssp. multifida</i>	0–13	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	0–13	–
<b>Shrub/Vine</b>					
10	<b>Shrubs</b>			67–135	
	silver sagebrush	ARCA13	<i>Artemisia cana</i>	0–54	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	13–54	–
	big sagebrush	ARTR2	<i>Artemisia tridentata</i>	0–54	–
	Shrub (>.5m)	2SHRUB	<i>Shrub (&gt;.5m)</i>	0–40	–
	leadplant	AMCA6	<i>Amorpha canescens</i>	0–27	–
	pricklypear	OPUNT	<i>Opuntia</i>	0–27	–
	rose	ROSA5	<i>Rosa</i>	13–27	–
	western snowberry	SYOC	<i>Symphoricarpos occidentalis</i>	0–27	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	0–27	–
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	0–13	–
	dwarf false indigo	AMNA	<i>Amorpha nana</i>	0–13	–

Table 11. Community 1.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Needlegrass</b>			62–185	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	62–185	–
	green needlegrass	NAVI4	<i>Nassella viridula</i>	0–62	–
2	<b>Wheatgrass</b>			123–308	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	123–308	–
3	<b>Mid Warm-Season Grasses</b>			25–99	
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	12–62	–
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	12–62	–
5	<b>Short-Warm Season Grasses</b>			185–308	

	blue grama	BOGR2	<i>Bouteloua gracilis</i>	123–247	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	12–123	–
	buffalograss	BODA2	<i>Bouteloua dactyloides</i>	12–123	–
	threeawn	ARIST	<i>Aristida</i>	0–37	–
6	<b>Other Native Grasses</b>			12–62	
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	12–62	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0–37	–
	Graminoid (grass or grass-like)	2GRAM	<i>Graminoid (grass or grass-like)</i>	0–37	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	0–37	–
7	<b>Grass-Likes</b>			62–185	
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	62–185	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–62	–
8	<b>Non-Native Grasses</b>			12–62	
	cheatgrass	BRTE	<i>Bromus tectorum</i>	12–62	–
	bluegrass	POA	<i>Poa</i>	12–62	–
<b>Forb</b>					
9	<b>Forbs</b>			62–123	
	Forb, native	2FN	<i>Forb, native</i>	12–62	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	12–49	–
	Forb, introduced	2FI	<i>Forb, introduced</i>	12–37	–
	field sagewort	ARCA12	<i>Artemisia campestris</i>	12–37	–
	scurfpea	PSORA2	<i>Psoralegium</i>	12–37	–
	goldenrod	SOLID	<i>Solidago</i>	12–25	–
	white prairie aster	SYFA	<i>Symphotrichum falcatum</i>	12–25	–
	prairie clover	DALEA	<i>Dalea</i>	0–25	–
	blacksamson echinacea	ECAN2	<i>Echinacea angustifolia</i>	12–25	–
	western yarrow	ACMIO	<i>Achillea millefolium var. occidentalis</i>	12–25	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	12–25	–
	woolly plantain	PLPA2	<i>Plantago patagonica</i>	12–25	–
	pussytoes	ANTEN	<i>Antennaria</i>	0–12	–
	milkvetch	ASTRA	<i>Astragalus</i>	0–12	–
	false boneset	BREU	<i>Brickellia eupatorioides</i>	0–12	–
	scarlet beeblossom	GACO5	<i>Gaura coccinea</i>	0–12	–
	old man's whiskers	GETR	<i>Geum triflorum</i>	0–12	–
	Nuttall's sensitive-briar	MINU6	<i>Mimosa nuttallii</i>	0–12	–
	beardtongue	PENST	<i>Penstemon</i>	0–12	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	0–12	–
	cutleaf anemone	PUPAM	<i>Pulsatilla patens ssp. multifida</i>	0–12	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	0–12	–
<b>Shrub/Vine</b>					
10	<b>Shrubs</b>			62–123	
	silver sagebrush	ARCA13	<i>Artemisia cana</i>	0–49	–

	prairie sagewort	ARFR4	<i>Artemisia trrigiaa</i>	12-49	-
	big sagebrush	ARTR2	<i>Artemisia tridentata</i>	0-49	-
	soapweed yucca	YUGL	<i>Yucca glauca</i>	0-37	-
	Shrub (>.5m)	2SHRUB	<i>Shrub (&gt;.5m)</i>	0-37	-
	rose	ROSA5	<i>Rosa</i>	12-25	-
	western snowberry	SYOC	<i>Symphoricarpos occidentalis</i>	0-25	-
	pricklypear	OPUNT	<i>Opuntia</i>	0-25	-
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	0-12	-
	leadplant	AMCA6	<i>Amorpha canescens</i>	0-12	-
	dwarf false indigo	AMNA	<i>Amorpha nana</i>	0-12	-

Table 12. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Needlegrass</b>			0-50	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	0-50	-
2	<b>Wheatgrass</b>			0-50	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	0-50	-
3	<b>Mid Warm-Season Grasses</b>			0-50	
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	0-50	-
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	0-30	-
5	<b>Short-Warm Season Grasses</b>			202-454	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	151-353	-
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	10-101	-
	threeawn	ARIST	<i>Aristida</i>	20-101	-
	buffalograss	BODA2	<i>Bouteloua dactyloides</i>	0-50	-
6	<b>Other Native Grasses</b>			10-50	
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	10-30	-
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0-20	-
	Graminoid (grass or grass-like)	2GRAM	<i>Graminoid (grass or grass-like)</i>	0-20	-
	squirreltail	ELEL5	<i>Elymus elymoides</i>	0-20	-
7	<b>Grass-Likes</b>			101-252	
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	101-252	-
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0-50	-
8	<b>Non-Native Grasses</b>			10-50	
	cheatgrass	BRTE	<i>Bromus tectorum</i>	10-50	-
	bluegrass	POA	<i>Poa</i>	10-50	-
<b>Forb</b>					
9	<b>Forbs</b>			50-101	
	Forb, introduced	2FI	<i>Forb, introduced</i>	10-50	-
	field sagewort	ARCA12	<i>Artemisia campestris</i>	10-50	-
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	10-50	-
	Forb, native	2FN	<i>Forb, native</i>	10-10	-

	FORB, native	ZFIN	FORB, native	10-40	-
	western yarrow	ACMIO	<i>Achillea millefolium var. occidentalis</i>	10-30	-
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	10-30	-
	scurfpea	PSORA2	<i>Psoraleidium</i>	10-30	-
	spiny phlox	PHHO	<i>Phlox hoodii</i>	0-20	-
	woolly plantain	PLPA2	<i>Plantago patagonica</i>	10-20	-
	pussytoes	ANTEN	<i>Antennaria</i>	0-20	-
	goldenrod	SOLID	<i>Solidago</i>	10-20	-
	white prairie aster	SYFA	<i>Symphotrichum falcatum</i>	10-20	-
	milkvetch	ASTRA	<i>Astragalus</i>	0-10	-
	prairie clover	DALEA	<i>Dalea</i>	0-10	-
	blacksamson echinacea	ECAN2	<i>Echinacea angustifolia</i>	0-10	-
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</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 Loamy ES site provides upland grassland cover with an associated forb and shrub component. It was typically part of an expansive grassland landscape that included combinations of Shallow Loamy, Shallow Clayey, Claypan, Thin Claypan, Sandy, Sandy Claypan, Loamy, and Clayey ESs. This site provided habitat for species requiring unfragmented grassland. Important habitat features and components found commonly or exclusively on this site may include greater sage-grouse and sharp-tailed grouse leks; 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 Loamy ES remains intact and provides increasingly important habitat for grassland and shrub steppe nesting birds, small rodents, coyotes, and a variety of reptiles, amphibians, and insects. Invasive species such as annual brome grasses and crested wheatgrass have impacted the biological integrity of the site for some grassland birds such as greater sage-grouse. Changes in historic fire regime and domestic grazing have impacted the forb/shrub/grass percentages. Greater sage-grouse and Brewer's sparrow benefit when big sagebrush increases.

Needlegrass/Western Wheatgrass/Bluestem (HCPC): 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. Brewer's sparrow and greater sage grouse may be present depending on the frequency and distribution of big sagebrush. 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/Western Wheatgrass/Grama: This plant community develops under continuous seasonal grazing and a low fire frequency. 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 increase in little bluestem, a medium height bunchgrass, provides complex plant structural diversity for a wide array of migratory and resident birds. Grasshopper sparrow, lark bunting, western meadowlark, and sharp-tailed grouse are common. Brewer's sparrow and greater sage-grouse may be present depending on the frequency and distribution of big sagebrush. 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 moderate stature of this plant community provides suitable thermal, protective, and escape cover for small 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 spade foot and Great Plains toad; and bull snake and western rattlesnake.

Western Wheatgrass/Buffalograss/Blue Grama: This plant community results from continuous seasonal grazing later in the growing season and a low fire frequency. Western wheatgrass, buffalograss, and blue grama will dominate. A shift to shorter plant structure will favor prairie dog expansion and associate species such as ferruginous hawk, burrowing owl, and swift fox. Species such as horned lark, long-billed curlew, upland sandpiper, and white-tailed jackrabbit will increase due to the loss of big sagebrush. Brewer's sparrow and greater sage-grouse may be present depending on the frequency and distribution of big sagebrush. The shorter stature of this plant community limits suitable thermal, protective, and escape cover. Predators utilizing this plant community include the coyote, American badger, red fox, and long-tailed weasel.

Grama/Sedge/Threeawn: Resulting from heavy grazing over many years' grama, sedge, and threeawn will dominate. The forb diversity and abundance has decreased, while shrub diversity has decreased. A shift to short plant structure will favor prairie dog expansion with prairie dog town sites and associate species such as ferruginous hawk and burrowing owl. Species such as horned lark, long-billed curlew, upland sandpiper, and white-tailed jackrabbit will increase. 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 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 short grass 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 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; Chuck Berdan, Biologist (BIO), Bureau of Land Management (BLM); Stan Boltz, RMS, NRCS; Dave Dewald, Wildlife BIO, NRCS; Jody Forman, RMS, NRCS; Dennis Froemke, RMS, NRCS; Tom Juntti, BIO, United States Forest Service (USFS); Cheryl Nielsen, RMS, NRCS; Jeff Printz, RMS, NRCS; Mike Stirling, RMS, NRCS; Dan Svingen, BIO, USFS; Darrell Vanderbusch, Soil Scientist, NRCS; Cindy Zachmeier, BIO, NRCS; and Tim Zachmeier, BIO, BLM.

There is 1 SCS-RANGE-417 compiled in 2004 from Harding County, South Dakota.

## **Other references**

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(<http://www.hprcc.unl.edu/>)

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## 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:** Slight to none, typically on steeper slopes and discontinuous.  

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- 2. Presence of water flow patterns:** None, or barely visible and discontinuous with numerous debris dams when present.  

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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):** 0 to 15 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 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 6 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 subangular blocky structure parting to weak fine granular.
- 
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 – when dry, subsoil can be hard and appear to be compacted, but no platy structure will be present.
- 
12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**
- Dominant: Mid/tall cool-season bunchgrasses > Mid warm-season grasses = Wheatgrass >
- Sub-dominant: Tall warm-season grass = Short warm-season grass = Grass-likes = Forbs = Shrubs >
- Other: Short cool-season bunchgrasses
- 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 1,000-2,000 lbs./acre (air-dry weight). Reference value production is 1,500 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

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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.
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