

# Ecological site R058DY024SD Shallow Loamy

Accessed: 05/03/2024

## 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.

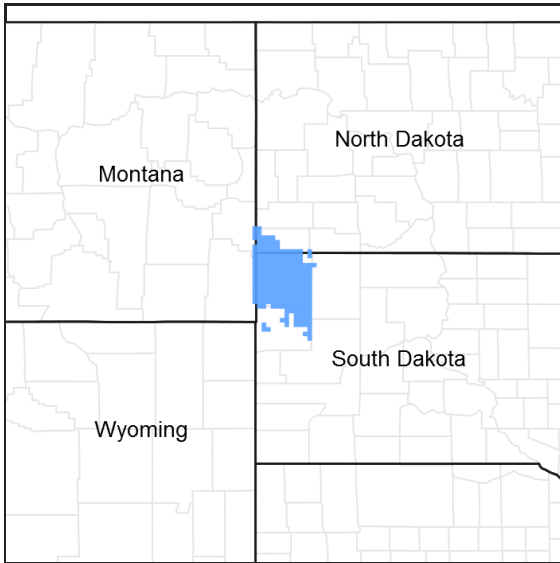


Figure 1. Mapped extent

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>
R058DY015SD	<b>Thin Claypan</b>
R058DY016SD	<b>Very Shallow</b>
R058DY029SD	<b>Stony Hills</b>

## Similar sites

R058DY009SD	<b>Sandy</b> Sandy [more prairie sandreed; more needleandthread; more productive]
R058DY015SD	<b>Thin Claypan</b> Thin Claypan [more western wheatgrass; more blue grama; less productive]

R058DY010SD	<b>Loamy</b> Loamy [more green needlegrass; needleandthread; more productive]
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**Table 1. Dominant plant species**

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Pascopyrum smithii</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 (2) Ridge
Flooding frequency	None
Ponding frequency	None
Elevation	701–1,219 m
Slope	5–48%
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 occasional 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 common features of soils in this site are the loam to silty clay loam textured substratum and slopes of 5 to 48 percent. The soils in this site are well-drained and formed in residuum from sandstone or siltstone. The silt loam to loam surface layer is four to six inches thick. The soils have a moderately slow 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.

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 coupled with high accumulations of lime and slow permeability strongly influences the soil-water-plant relationship. Loss of the soil surface layer 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) Loam (2) Silt loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately slow
Soil depth	25–51 cm
Surface fragment cover <=3"	10–15%
Surface fragment cover >3"	0–45%
Available water capacity (0-101.6cm)	2.54–5.08 cm
Calcium carbonate equivalent (0-101.6cm)	0–25%
Electrical conductivity (0-101.6cm)	0–8 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–2
Soil reaction (1:1 water) (0-101.6cm)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	10–15%
Subsurface fragment volume >3" (Depth not specified)	0–5%

## 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.

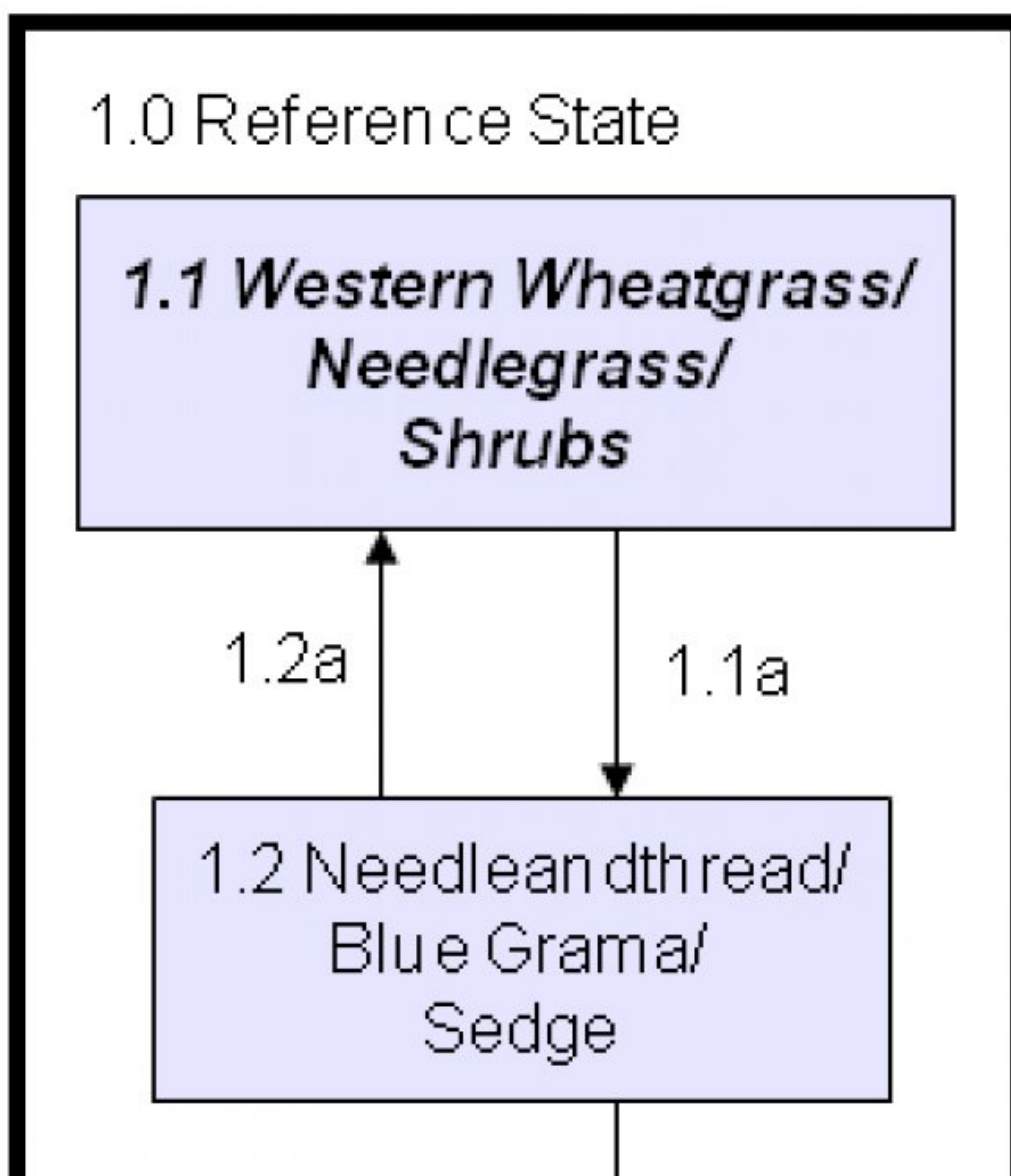
The plant community upon which interpretations are primarily based is the Western Wheatgrass/  
Needlegrass/Shrubs Plant Community. This plant community has been determined by studying rangeland relic

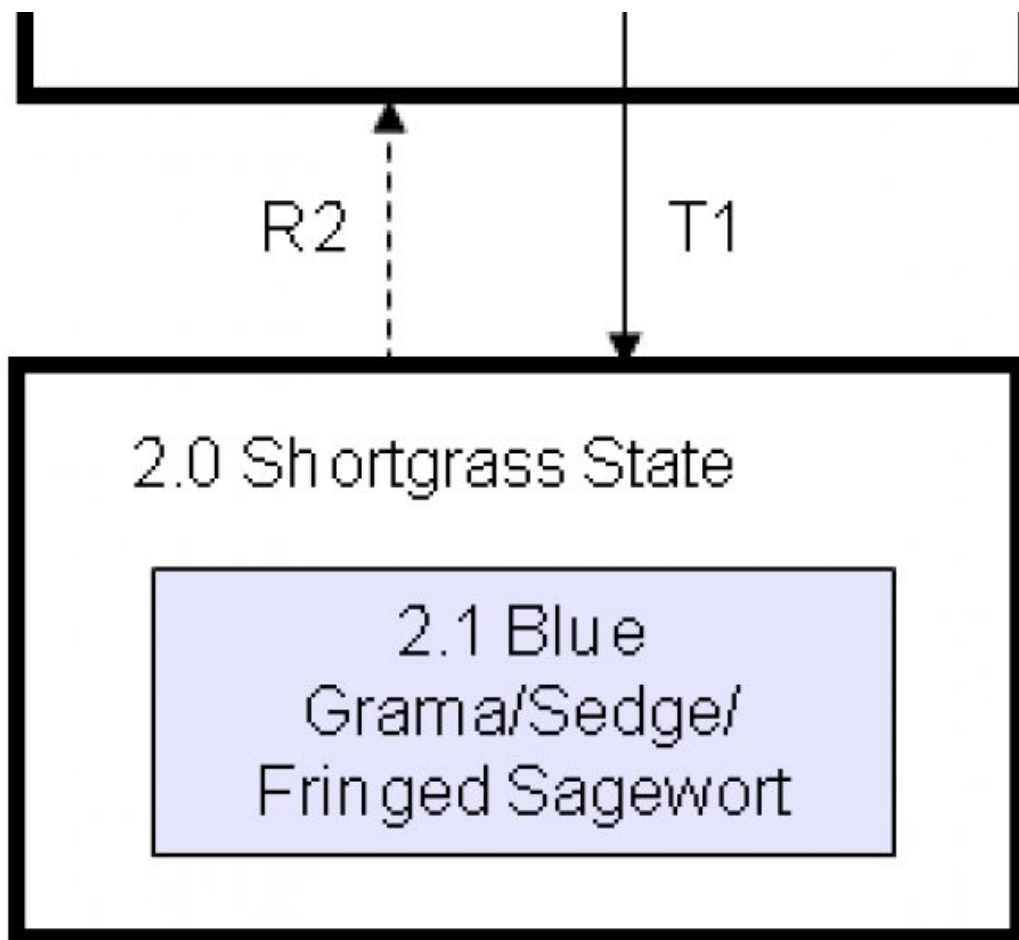
areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily grazed to lightly grazed areas, seasonal use pastures, and historical accounts also have been used. Plant communities, states, transitional 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 Western Wheatgrass/Needlegrass/Shrubs 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. This resulting plant community is relatively stable and the competitive advantage prevents other species from establishing. This plant community is less productive than the Western Wheatgrass/Needlegrass/Shrubs 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  
Western Wheatgrass/Needlegrass/Shrubs**

The interpretive plant community for this site is the Western Wheatgrass/Needlegrass/Shrubs 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 70-85 percent grasses or grass-like plants, 5-15 percent forbs, 10-15 percent shrubs, and 0-1 percent cryptogams. Cool-season grasses dominate this plant community. The major grasses include western wheatgrass, green needlegrass, and needleandthread. Other grasses or grass-likes occurring on the site include blue grama, big bluestem, prairie Junegrass, buffalograss, and sedge. Significant forbs include scarlet globemallow, prairie coneflower, purple prairie clover, penstemon, American vetch, and green sagewort. The significant shrubs that occur include big sagebrush, leadplant, snowberry, winterfat, and rose. 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	796	1208	1575
Forb	73	157	269
Shrub/Vine	140	196	269
Moss	–	8	17
<b>Total</b>	<b>1009</b>	<b>1569</b>	<b>2130</b>

Figure 5. Plant community growth curve (percent production by month). SD5802, Northern Rolling High Plains, cool-season dominant, warm-season subdominant. Cool-season dominant, warm-season subdominant..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	10	23	34	15	6	5	4	0	0

## Community 1.2 Needleandthread/Blue Grama/Sedge

This plant community develops under continuous seasonal grazing (i.e., grazing an area during the same season every year) or from over utilization during extended drought periods. The potential vegetation is made up of approximately 60-80 percent grasses and grass-like species, 5-15 percent forbs, 10-20 percent shrubs, and 1-4 percent cryptogams. The dominant grasses include blue grama and western wheatgrass. Other grasses or grass-likes may include sedge, needleandthread, and prairie Junegrass. Significant forbs include cudweed sagewort, goldenrod, purple coneflower, scurfpea, and western yarrow. The dominant shrubs that occur include big sagebrush, silver sagebrush, and fringed sagewort. Compared to the Western Wheatgrass/Needlegrass/Shrubs Plant Community, the shortgrass species including blue grama and threadleaf sedge have increased. The cool-season species including western wheatgrass 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 somewhat resistant to change. The dominant herbaceous species are very adapted to grazing; however, the mid-grass species and the more palatable forbs will decrease. If the herbaceous component is intact, it tends to be resilient if disturbance is not long-term. Because of the sod forming habit of the shortgrass species, water infiltration is lower and runoff is moderate to high. Typically, the runoff is very clean because of the low potential for on-site soil erosion. However, offsite areas may be affected by increased runoff.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	611	893	1143
Shrub/Vine	112	185	280
Forb	56	123	207
Moss	6	31	50
<b>Total</b>	<b>785</b>	<b>1232</b>	<b>1680</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

Continuous seasonal grazing will lead to the Needleandthread/Blue Grama/Sedge Plant Community. This occurs with exposure to herbivory during the entire growing season at moderate stocking rates.

**Pathway 1.2a  
Community 1.2 to 1.1**

Prescribed grazing, which allows for adequate plant recovery periods will move this plant community to the Western Wheatgrass/Needlegrass/Shrubs Plant Community.

**Conservation practices**

Prescribed Grazing
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**State 2  
Shortgrass**

The State narrative is under development.

**Community 2.1  
Blue Grama/Sedge/Fringed Sagewort**

This plant community develops under heavy continuous grazing. It is made up of approximately 70-80 percent grasses, 5-10 percent forbs, 5-15 percent shrubs, and 1-7 percent cryptogams. The dominant grasses/grass-likes include blue grama and threadleaf sedge. Other grasses may include western wheatgrass, prairie Junegrass, threeawn, bluegrass, and cheatgrass. The dominant forbs include common pepperweed, cudweed sagewort, goldenrod, and western yarrow. The dominant shrubs include fringed sagewort and cactus. Compared to the Western Wheatgrass/Needlegrass/Shrubs Plant Community, blue grama and sedge have increased and the cool-season midgrasses have diminished greatly. Nonpalatable forbs and cactus have increased and nonnative species have invaded the site. Plant diversity is low. This plant community is very stable. Generally, this plant community will require significant management inputs (i.e., high animal impact, long-term prescribed grazing, favorable climatic conditions, etc.) and time to move it towards the Needleandthread/Blue Grama/Sedge Plant Community. Onsite soil erosion is low. Infiltration is low and runoff is high. Typically, the runoff is very clean because of the low potential for onsite soil erosion. However, offsite areas can be significantly impacted due to the increased runoff.

Table 7. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	364	704	1037
Shrub/Vine	39	90	146
Forb	39	67	95
Moss	6	36	67
<b>Total</b>	<b>448</b>	<b>897</b>	<b>1345</b>

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 heavy continuous grazing this plant community will move towards the Blue Grama/Sedge/Fringed Sagewort Plant Community.

## Restoration pathway R2 State 2 to 1

Long-term prescribed grazing, possibly including prescribed burning, and favorable climatic conditions, which allow for adequate plant recovery periods, may cause a shift to the Needleandthread/Blue Grama/Sedge Plant Community.

### Conservation practices

Prescribed Burning
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 (%)
<b>Grass/Grasslike</b>					
1	<b>Rhizomatous Wheatgrasses</b>			235–392	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	235–392	–
	thickspike wheatgrass	ELLAL	<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>	0–78	–
2	<b>Cool-Season Bunch Grasses</b>			78–314	
	needle and thread	HECOC8	<i>Hesperostipa comata</i> ssp. <i>comata</i>	31–235	–
	green needlegrass	NAVI4	<i>Nassella viridula</i>	31–157	–
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	16–78	–
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	0–47	–
3	<b>Mid/Tall Warm-Season Grasses</b>			78–235	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	78–235	–
	plains muhly	MUCU3	<i>Muhlenbergia cuspidata</i>	16–126	–
	big bluestem	ANGE	<i>Andropogon gerardii</i>	0–78	–
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	0–78	–
4	<b>Short-Warm Season Grasses</b>			78–157	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	78–157	–
	threeawn	ARIST	<i>Aristida</i>	0–16	–
5	<b>Other Native Grasses</b>			16–78	
	Graminoid (grass or grass-like)	2GRAM	<i>Graminoid (grass or grass-like)</i>	0–78	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	16–78	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0–31	–
	plains reedgrass	CAMO	<i>Calamagrostis montanensis</i>	0–31	–
6	<b>Grass-Likes</b>			78–235	
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	31–157	–
	needleleaf sedge	CADU6	<i>Carex duriuscula</i>	16–126	–
	sun sedge	CAINH2	<i>Carex inops</i> ssp. <i>heliophila</i>	0–47	–
<b>Forb</b>					
8	<b>Forbs</b>			78–235	



	blacksamson echinacea	ECAN2	<i>Echinacea angustifolia</i>	16-78	-
	buckwheat	ERIOG	<i>Eriogonum</i>	0-47	-
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	16-47	-
	dotted blazing star	LIPU	<i>Liatris punctata</i>	16-47	-
	Forb, native	2FN	<i>Forb, native</i>	16-47	-
	goldenrod	SOLID	<i>Solidago</i>	16-47	-
	American vetch	VIAM	<i>Vicia americana</i>	16-31	-
	scurfpea	PSORA2	<i>Psoralea</i>	16-31	-
	beardtongue	PENST	<i>Penstemon</i>	0-31	-
	milkvetch	ASTRA	<i>Astragalus</i>	16-31	-
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	16-31	-
	purple prairie clover	DAPU5	<i>Dalea purpurea</i>	16-31	-
	scarlet beeblow	GACO5	<i>Gaura coccinea</i>	16-31	-
	old man's whiskers	GETR	<i>Geum triflorum</i>	0-16	-
	spiny phlox	PHHO	<i>Phlox hoodii</i>	0-16	-
	woolly plantain	PLPA2	<i>Plantago patagonica</i>	0-16	-
	western yarrow	ACMIO	<i>Achillea millefolium</i> var. <i>occidentalis</i>	0-16	-
	pussytoes	ANTEN	<i>Antennaria</i>	0-16	-
	American bird's-foot trefoil	LOUNU	<i>Lotus unifoliolatus</i> var. <i>unifoliolatus</i>	0-16	-
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0-16	-
	lacy tansyaster	MAPI	<i>Machaeranthera pinnatifida</i>	0-16	-
	purple locoweed	OXLA3	<i>Oxytropis lambertii</i>	0-16	-
	cutleaf anemone	PUPAM	<i>Pulsatilla patens</i> ssp. <i>multifida</i>	0-16	-
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	0-16	-
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0-16	-
	white prairie aster	SYFA	<i>Symphotrichum falcatum</i>	0-16	-
	stemless four-nerve daisy	TEACA2	<i>Tetaneuris acaulis</i> var. <i>acaulis</i>	0-16	-

### Shrub/Vine

9	<b>Shrubs</b>			157-235	
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	16-126	-
	silver sagebrush	ARCA13	<i>Artemisia cana</i>	0-78	-
	big sagebrush	ARTR2	<i>Artemisia tridentata</i>	0-78	-
	soapweed yucca	YUGL	<i>Yucca glauca</i>	0-78	-
	prairie rose	ROAR3	<i>Rosa arkansana</i>	16-47	-
	Shrub (>.5m)	2SHRUB	<i>Shrub (&gt;.5m)</i>	16-47	-
	dwarf false indigo	AMNA	<i>Amorpha nana</i>	0-47	-
	western snowberry	SYOC	<i>Symphoricarpos occidentalis</i>	0-31	-
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	16-31	-
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	16-31	-
	creeping juniper	JUHO2	<i>Juniperus horizontalis</i>	0-16	-

### Moss

10	<b>Cryptogams</b>			0-16	
	lesser spikemoss	SEDE2	<i>Selaginella densa</i>	0-16	-

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>Rhizomatous Wheatgrasses</b>			25–123	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	25–123	–
	thickspike wheatgrass	ELLAL	<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>	0–62	–
2	<b>Cool-Season Bunch Grasses</b>			123–247	
	needle and thread	HECOC8	<i>Hesperostipa comata</i> ssp. <i>comata</i>	123–247	–
	green needlegrass	NAVI4	<i>Nassella viridula</i>	0–62	–
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	0–12	–
3	<b>Mid/Tall Warm-Season Grasses</b>			12–62	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	12–62	–
	plains muhly	MUCU3	<i>Muhlenbergia cuspidata</i>	0–37	–
4	<b>Short-Warm Season Grasses</b>			123–247	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	123–247	–
	threeawn	ARIST	<i>Aristida</i>	12–49	–
5	<b>Other Native Grasses</b>			12–62	
	Graminoid (grass or grass-like)	2GRAM	<i>Graminoid (grass or grass-like)</i>	0–62	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	12–37	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0–37	–
	plains reedgrass	CAMO	<i>Calamagrostis montanensis</i>	0–12	–
6	<b>Grass-Likes</b>			62–185	
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	62–185	–
	needleleaf sedge	CADU6	<i>Carex duriuscula</i>	25–123	–
	sun sedge	CAINH2	<i>Carex inops</i> ssp. <i>heliophila</i>	0–62	–
7	<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>					
8	<b>Forbs</b>			62–185	
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	12–62	–
	goldenrod	SOLID	<i>Solidago</i>	12–49	–
	Forb, introduced	2FI	<i>Forb, introduced</i>	0–37	–
	blacksamson echinacea	ECAN2	<i>Echinacea angustifolia</i>	0–37	–
	scurfpea	PSORA2	<i>Psoraleidum</i>	12–37	–
	buckwheat	ERIOG	<i>Eriogonum</i>	0–25	–
	dotted blazing star	LIPU	<i>Liatris punctata</i>	12–25	–
	Forb, native	2FN	<i>Forb, native</i>	12–25	–
	western yarrow	ACMIO	<i>Achillea millefolium</i> var. <i>occidentalis</i>	12–25	–
	wavyleaf thistle	CIIIN	<i>Cirsium undulatum</i>	0–25	–

	purple prairie clover	DAPU5	<i>Dalea purpurea</i>	0–12	–
	milkvech	ASTRA	<i>Astragalus</i>	0–12	–
	pussytoes	ANTEN	<i>Antennaria</i>	0–12	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–12	–
	lacy tansyaster	MAPI	<i>Machaeranthera pinnatifida</i>	0–12	–
	purple locoweed	OXLA3	<i>Oxytropis lambertii</i>	0–12	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	0–12	–
	woolly plantain	PLPA2	<i>Plantago patagonica</i>	0–12	–
	scarlet beeblossom	GACO5	<i>Gaura coccinea</i>	0–12	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	0–12	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0–12	–
	white prairie aster	SYFA	<i>Symphotrichum falcatum</i>	0–12	–
	stemless four-nerve daisy	TEACA2	<i>Tetraneuris acaulis var. acaulis</i>	0–12	–
	American vetch	VIAM	<i>Vicia americana</i>	0–12	–
<b>Shrub/Vine</b>					
9	<b>Shrubs</b>			123–247	
	silver sagebrush	ARCA13	<i>Artemisia cana</i>	0–86	–
	big sagebrush	ARTR2	<i>Artemisia tridentata</i>	0–86	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	0–74	–
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	12–62	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	12–62	–
	Shrub (>.5m)	2SHRUB	<i>Shrub (&gt;.5m)</i>	12–49	–
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	12–37	–
	western snowberry	SYOC	<i>Symphoricarpos occidentalis</i>	0–37	–
	prairie rose	ROAR3	<i>Rosa arkansana</i>	12–25	–
	creeping juniper	JUHO2	<i>Juniperus horizontalis</i>	0–25	–
	dwarf false indigo	AMNA	<i>Amorpha nana</i>	0–12	–
<b>Moss</b>					
10	<b>Cryptogams</b>			12–49	
	lesser spikemoss	SEDE2	<i>Selaginella densa</i>	12–49	–

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>Rhizomatous Wheatgrasses</b>			0–45	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	0–45	–
	thickspike wheatgrass	ELLAL	<i>Elymus lanceolatus ssp. lanceolatus</i>	0–27	–
2	<b>Cool-Season Bunch Grasses</b>			0–90	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	0–90	–
4	<b>Short-Warm Season Grasses</b>			179–269	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	179–269	–
	threeawn	ARIST	<i>Aristida</i>	9–63	–

5	<b>Other Native Grasses</b>			9-45	
	Graminoid (grass or grass-like)	2GRAM	<i>Graminoid (grass or grass-like)</i>	0-45	-
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	9-18	-
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0-18	-
6	<b>Grass-Likes</b>			135-269	
	threadleaf sedge	CAF1	<i>Carex filifolia</i>	90-224	-
	needleleaf sedge	CADU6	<i>Carex duriuscula</i>	45-135	-
	sun sedge	CAINH2	<i>Carex inops ssp. heliophila</i>	0-72	-
<b>Moss</b>					
7	<b>Non-Native Grasses</b>			9-45	
	cheatgrass	BRTE	<i>Bromus tectorum</i>	9-45	-
	bluegrass	POA	<i>Poa</i>	9-45	-
10	<b>Cryptogams</b>			9-63	
	lesser spikemoss	SEDE2	<i>Selaginella densa</i>	9-63	-
<b>Forb</b>					
8	<b>Forbs</b>			45-90	
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	9-63	-
	goldenrod	SOLID	<i>Solidago</i>	9-36	-
	Forb, introduced	2FI	<i>Forb, introduced</i>	0-36	-
	western yarrow	ACMIO	<i>Achillea millefolium var. occidentalis</i>	9-36	-
	scurfpea	PSORA2	<i>Psoralegium</i>	9-27	-
	Forb, native	2FN	<i>Forb, native</i>	9-18	-
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	0-18	-
	blacksamson echinacea	ECAN2	<i>Echinacea angustifolia</i>	0-9	-
	buckwheat	ERIOG	<i>Eriogonum</i>	0-9	-
	dotted blazing star	LIPU	<i>Liatris punctata</i>	0-9	-
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0-9	-
	spiny phlox	PHHO	<i>Phlox hoodii</i>	0-9	-
	woolly plantain	PLPA2	<i>Plantago patagonica</i>	0-9	-
	pussytoes	ANTEN	<i>Antennaria</i>	0-9	-
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0-9	-
<b>Shrub/Vine</b>					
9	<b>Shrubs</b>			45-135	
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	27-90	-
	Shrub (>.5m)	2SHRUB	<i>Shrub (&gt;.5m)</i>	9-45	-
	soapweed yucca	YUGL	<i>Yucca glauca</i>	0-45	-
	silver sagebrush	ARCA13	<i>Artemisia cana</i>	0-36	-
	big sagebrush	ARTR2	<i>Artemisia tridentata</i>	0-36	-
	creeping juniper	JUHO2	<i>Juniperus horizontalis</i>	0-27	-
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	9-27	-
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	0-27	-
	prairie rose	ROAR3	<i>Rosa arkansana</i>	9-18	-

## Animal community

### Animal Community – Wildlife Interpretations

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

Historically, the Northern mixed-grass prairie was a disturbance-driven ecosystem with fire, herbivory, and climate functioning as the primary disturbance factors either singly or in combination. Following European settlement, livestock grazing, cropland conversion, elimination of fire, energy development, and other anthropogenic factors influenced species composition and abundance. Introduced and invasive species further impacted plant and animal communities. Bison were historically a keystone species but have been extirpated as a free-ranging herbivore. The loss of the bison, reduction of prairie dog colonies, and loss of fire as ecological drivers greatly influenced the character of the remaining native plant communities and altered wildlife habitats. Human development has reduced habitat quality for area-sensitive species.

Within MLRA 58D, the Shallow Loamy 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 Clayey, Thin Loamy, Claypan, Sandy, Sandy Claypan, Clayey, and Thin Claypan 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 Shallow Loamy ES remains intact and provides increasingly important habitat for grassland and shrub steppe nesting birds, small rodents, coyote, and a variety of reptiles, amphibians, and insects. Invasive species such as annual bromegrasses and crested wheat have impacted the biological integrity of the site for some grassland birds 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.

Western Wheatgrass/Needlegrass/Shrubs and Needleandthread/Blue Grama/Sedge: 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.

Brewer's and grasshopper sparrow, lark bunting, western meadowlark, greater sage-grouse, and sharp-tailed grouse are common and benefit from the structure and composition this plant community provides. This site provides important breeding habitat for loggerhead shrike. This site provides excellent nesting and brood rearing habitat for sharp-tailed grouse. 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. This ES provides excellent wintering habitat for pronghorn. 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 toad, Great Plains toad, bull snake, and western rattlesnake.

Resulting from continuous seasonal grazing or from over utilization during extended drought periods, the shift to a needleandthread, blue grama, and sedge community occurs. The forb and shrub diversity has not decreased. The shift from the HCPC to the needleandthread/blue grama/sedge community does not result in a significant change to the wildlife community.

**Blue Grama/Sedge/Fringed Sagewort:** This plant community develops under heavy continuous grazing. The forb diversity has decreased; however, the shrub community remains diverse. The abundance of big sagebrush has diminished. The shift from a taller to shorter herbaceous plant community may favor prairie dog expansion and associate species such as ferruginous hawk, burrowing owl, tiger salamander, and swift fox. Species such as horned larks, upland sandpipers, and white-tailed jackrabbit will increase due to the loss of big sagebrush. The density of species such as Brewer's sparrow, greater sage-grouse, as well as, desert cottontail will decline based on the abundance of big sagebrush. However, this plant community may provide areas suitable for lek site development.

The short stature of this plant community limits thermal, protective, and escape cover. Predators utilizing this plant community include coyote, American badger, red fox, and long-tailed weasel.

#### **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 Blue Grama/Sedge/Fringed Sagewort 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 D. 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 variety 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, US 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 collected in 2004 from Harding County, South Dakota.

## Other references

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## Contributors

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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, Ryan Beer, Mitch Iverson, 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.

- 
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):** 0 to 15 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.
- 
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, B horizons 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: Rhizomatous wheatgrass > Mid/tall cool-season bunchgrasses >
- Sub-dominant: Mid/tall warm-season grasses = Grass-likes = Forbs = Shrubs >
- Other: Short warm-season grasses > Mid/short cool-season grasses



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.
- 
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 900-1,900 lbs./acre (air-dry weight). Reference value production is 1,400 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.
-