

Ecological site R058DY009SD Sandy

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.

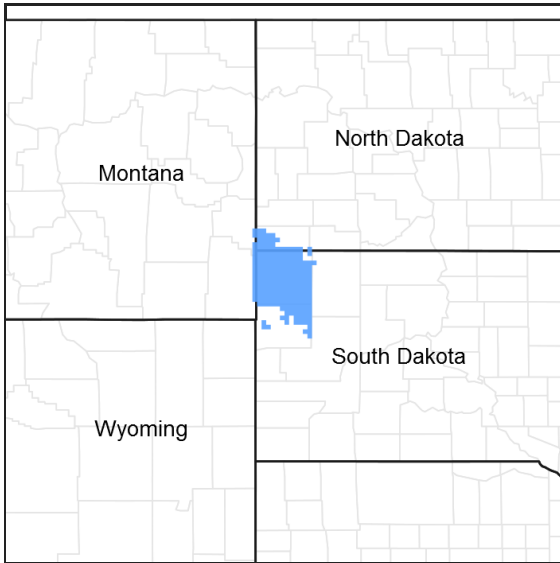


Figure 1. Mapped extent

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

R058DY008SD	Sands
R058DY010SD	Loamy
R058DY015SD	Thin Claypan
R058DY026SD	Thin Sandy
R058DY027SD	Sandy Claypan

Similar sites

R058DY010SD	Loamy Loamy [more western wheatgrass; more big sagebrush; more productive]
R058DY013SD	Claypan Claypan [more western wheatgrass; more green needlegrass; less productive]

R058DY008SD	Sands Sands [more prairie sandreed and sand bluestem; less productive]
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Table 1. Dominant plant species

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

Physiographic features

This site occurs on nearly level to undulating slopes on uplands and river valleys.

Table 2. Representative physiographic features

Landforms	(1) Fan (2) Terrace (3) Hill
Flooding frequency	None
Ponding frequency	None
Elevation	701–1,219 m
Slope	1–15%
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 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 features common to soils in this site are the fine sandy loam textured surface layers and slopes of 1 to 15 percent. The soils in this site are well to somewhat excessively drained and formed in eolian deposits, alluvium, or residuum from sandstone. The surface layer is 4 to 15 inches thick. The texture of the subsurface generally ranges from loamy fine sand to sandy clay loam. This site should show slight to no evidence of rills, wind scoured areas or pedestalled plants. If present, water flow paths are broken, irregular in appearance or discontinuous. The soil surface is stable and intact. Subsurface soil layers are not restrictive to water movement and root penetration.

These soils are susceptible to wind and water erosion. The hazard of water erosion increases on slopes greater than about 12 percent. Loss of 50 percent or more of the surface layer of the soils on this site can result in a shift in species composition and/or production.

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

Table 4. Representative soil features

Surface texture	(1) Fine sandy loam
Family particle size	(1) Sandy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderately slow to moderately rapid
Soil depth	51–203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	7.62–15.24 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)	6.1–8.4
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

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

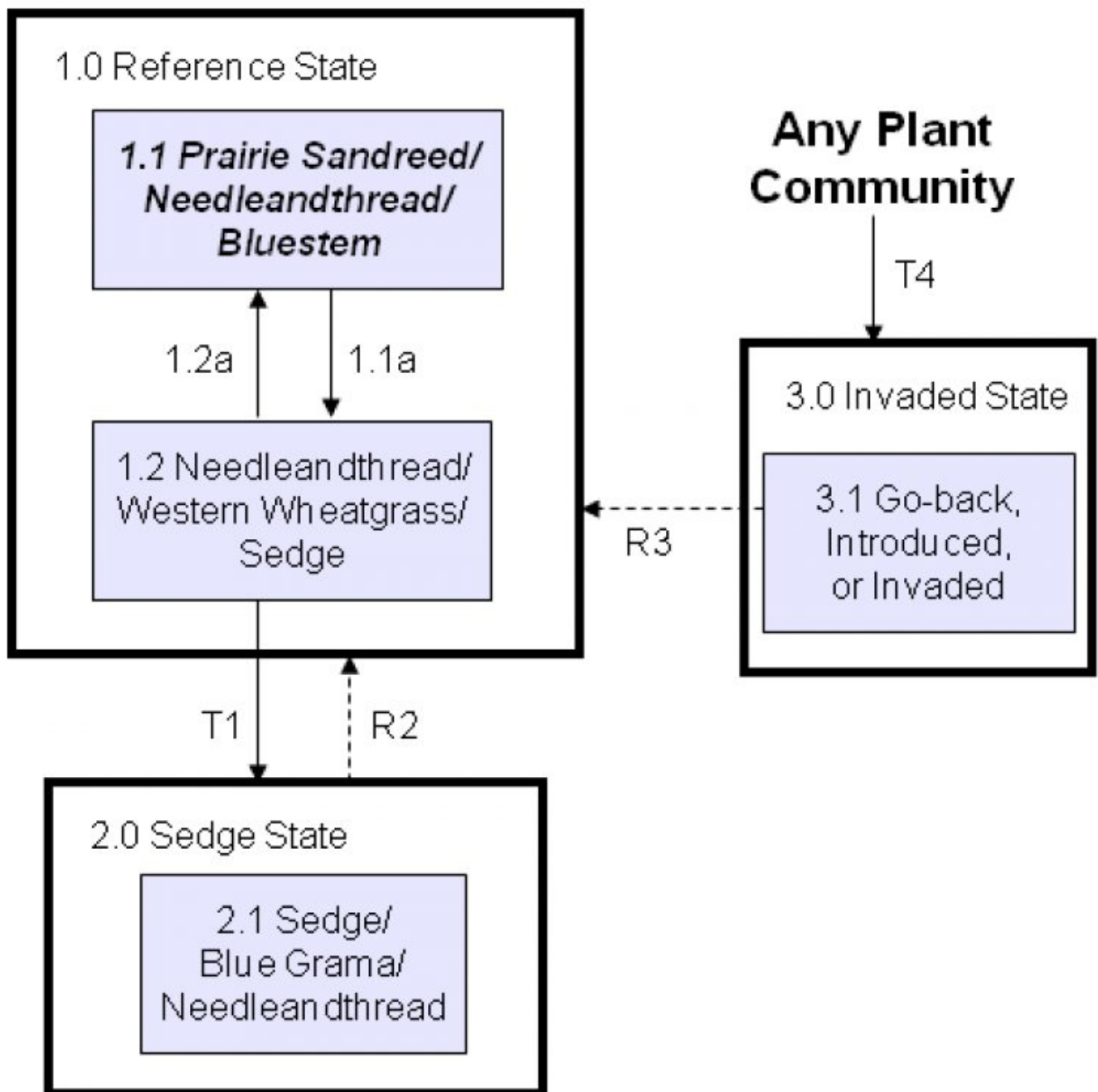
Continuous season-long grazing (during the typical growing season of May through October) and/or repeated seasonal grazing (e.g., every spring, every summer) without adequate recovery periods following each grazing

occurrence causes this site to depart from the Prairie Sandreed/Needleandthread/Bluestem Plant Community. Species such as needleandthread, blue grama, and sedge will increase. Continued deterioration results in a community dominated by sedge, sand dropseed, and western ragweed. Warm-season grasses such as sand bluestem, big bluestem, little bluestem, and eventually prairie sandreed will decrease in frequency and production.

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

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

State and transition model



**State 1
Reference**

The State narrative is under development.

**Community 1.1
Prairie Sandreed/Needleandthread/Bluestem**

The interpretive plant community for this site is the Prairie Sandreed/Needleandthread/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 sometimes on areas receiving occasional short periods of deferment. The potential vegetation is about 80-90 percent grasses or grass-like plants, 5-10 percent forbs, 5-10 percent shrubs, and 0-1 percent cryptogams. Cool-season and warm-season grasses codominate this plant community. The major grasses include needleandthread, prairie sandreed, and little bluestem. Other grasses or grass-likes occurring on the site include blue grama, big bluestem, western wheatgrass, plains muhly, slender wheatgrass, prairie

Junegrass, and sedge. Significant forbs include cudweed sagewort, dotted gayfeather, and prairie clover. The significant shrubs that occur include fringed sagewort, leadplant, big sagebrush, and silver sagebrush. 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	1356	1894	2606
Forb	106	168	252
Shrub/Vine	106	168	252
Moss	–	11	28
Total	1568	2241	3138

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

Needleandthread/Western Wheatgrass/Sedge

This plant community develops under continuous season-long grazing or 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 80-95 percent grasses and grass-like species, 1-7 percent forbs, and 5-10 percent shrubs. The dominant grass or grass-like species include needleandthread, western wheatgrass, and sedge. Other grasses include blue grama, little bluestem, sand dropseed, and prairie Junegrass. Significant forbs include cudweed sagewort, green sagewort, scarlet globemallow, and scurpea. The dominant shrubs that occur include cactus, fringed sagewort, big sagebrush, and silver sagebrush. Compared to the Prairie Sandreed/Needleandthread/Bluestem Plant Community, the shortgrass species including blue grama and threadleaf sedge have increased. The warm-season species such as prairie sandreed, little bluestem, big bluestem, and sand bluestem decreased in composition. Bluegrass, annual bromes, 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 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 low, and runoff is moderate to high. Typically, the runoff is very clean because of the low potential for onsite 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	813	1365	1900
Shrub/Vine	73	118	174
Forb	11	63	118
Moss	–	24	50
Total	897	1570	2242

Figure 7. 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

Pathway 1.1a Community 1.1 to 1.2

Continuous season-long grazing or continuous seasonal grazing (grazing at the same time of year each year without adequate recovery periods) will lead to the Needleandthread/Western Wheatgrass/Sedge Plant Community. This occurs with exposure to herbivory during the entire growing season at light to moderate stocking rates or with a lack of adequate recovery periods for extended periods.

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 Prairie Sandreed/Needleandthread/Bluestem Plant Community.

Conservation practices

Prescribed Grazing

State 2 Sedge

The State narrative is under development.

Community 2.1 Sedge/Blue Grama/Needleandthread

This plant community develops under continuous season-long grazing, often with concentrated use in the early part of the growing season (as in calving/lambing pastures). It is made up of approximately 75-85 percent grasses (primarily short grass and grass-like species), 1-5 percent forbs, 5-15 percent shrubs, and 1-5 percent cryptogams (clubmoss). The dominant grass and grass-like species include sedge and blue grama. Other grasses may include western wheatgrass, prairie Junegrass, bluegrass, and cheatgrass. The dominant forbs include common pepperweed, curlycup gumweed, cudweed sagewort, green sagewort, sweetclover, and western yarrow. The dominant shrubs include fringed sagewort and cactus. Compared to the Prairie Sandreed/Needleandthread/Bluestem Plant Community, blue grama, and sedge have increased, and the cool- and warm-season mid and tall grasses 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/Western Wheatgrass/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	499	942	1373
Shrub/Vine	50	112	185
Forb	6	34	62
Moss	6	34	62
Total	561	1122	1682

Figure 9. 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

State 3 Go-back, Introduced, or Invaded

The State narrative is under development.

Community 3.1 Go-back, Introduced, or Invaded Plant Community

This group includes three separate vegetation states that are highly variable in nature. They are derived through four distinct management scenarios, and are not related successional. Infiltration, runoff and soil erosion vary depending on the vegetation present on the site. The Go-back state can be reached whenever severe mechanical disturbance (i.e., abandoned farmland) occurs. During the early successional stages, the species that mainly dominate are annual grasses and forbs, later being replaced by both native and introduced perennials. The vegetation on this site varies greatly, sometimes being dominated by needleandthread, blue grama and sedge. The Introduced state is normally those areas seeded to crested wheatgrass, pubescent or intermediate wheatgrass and alfalfa. They require considerable investment to establish and have a variable life expectancy. They do produce up to 50% more than native range, but their value as forage is somewhat limited due to the single species usually seeded. The Invaded state includes areas that have been invaded by species such as smooth brome grass, Kentucky bluegrass, crested wheatgrass, non-native thistles, field bindweed, knapweeds, leafy spurge, hoary cress and other introduced species.

Transition T1 State 1 to 2

With continuous seasonal grazing this plant community will move towards the Sedge/Blue Grama/Needleandthread Plant Community.

Transition T4 State 1 to 3

Heavy, continuous season-long grazing, or frequent and severe defoliation (e.g., rodents) will move this plant community to the Go-back or Invaded Plant Community.

Transition T4 State 1 to 3

Heavy, continuous season-long grazing, or frequent and severe defoliation (e.g., rodents) will move this plant community to the Go-back or Invaded Plant Community.

Restoration pathway R2

State 2 to 1

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

Conservation practices

Prescribed Grazing

Transition T4

State 2 to 3

Heavy, continuous season-long grazing, or frequent and severe defoliation (e.g., rodents) will move this plant community to the Go-back or Invaded Plant Community.

Restoration pathway R3

State 3 to 1

Range seeding native species, along with long-term prescribed grazing with adequate recovery periods following each grazing event and proper stocking over long periods of time has the potential to move this plant community toward the Prairie Sandreed/Needleandthread/Bluestem Plant Community.

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Tall Warm-Season Grasses			336–673	
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	224–560	–
	big bluestem	ANGE	<i>Andropogon gerardii</i>	45–224	–
	sand bluestem	ANHA	<i>Andropogon hallii</i>	45–224	–
2	Needlegrass			224–560	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	224–560	–
	porcupinegrass	HESP11	<i>Hesperostipa spartea</i>	0–112	–
3	Mid Warm-Season			45–336	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	45–336	–
	plains muhly	MUCU3	<i>Muhlenbergia cuspidata</i>	0–112	–
4	Cool-Season Grasses			112–224	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	45–179	–
	Graminoid (grass or grass-like)	2GRAM	<i>Graminoid (grass or grass-like)</i>	0–112	–
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	0–112	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	22–67	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	0–67	–
5	Short-Warm Season Grasses			45–112	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	22–112	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	22–112	–
6	Grass-Likes			112–336	
	needleleaf sedge	CADU6	<i>Carex duriuscula</i>	45–224	–

	threadleaf sedge	CAFI	<i>Carex filifolia</i>	45–224	–
	sun sedge	CAINH2	<i>Carex inops ssp. heliophila</i>	22–112	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–112	–
Forb					
8	Forbs			112–224	
	Forb, native	2FN	<i>Forb, native</i>	22–112	–
	prairie clover	DALEA	<i>Dalea</i>	22–67	–
	field sagewort	ARCA12	<i>Artemisia campestris</i>	0–67	–
	stiff sunflower	HEPA19	<i>Helianthus pauciflorus</i>	22–67	–
	scurfpea	PSORA2	<i>Psoralegium</i>	22–67	–
	beardtongue	PENST	<i>Penstemon</i>	22–45	–
	hairy false goldenaster	HEVI4	<i>Heterotheca villosa</i>	22–45	–
	dotted blazing star	LIPU	<i>Liatris punctata</i>	22–45	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	22–45	–
	false boneset	BREU	<i>Brickellia eupatorioides</i>	22–45	–
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	0–45	–
	scarlet beeblossom	GACO5	<i>Gaura coccinea</i>	22–45	–
	Missouri goldenrod	SOMI2	<i>Solidago missouriensis</i>	0–45	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0–45	–
	white prairie aster	SYFA	<i>Symphotrichum falcatum</i>	22–45	–
	longbract spiderwort	TRBR	<i>Tradescantia bracteata</i>	22–45	–
	American vetch	VIAM	<i>Vicia americana</i>	0–45	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	0–22	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–22	–
	tenpetal blazingstar	MEDE2	<i>Mentzelia decapetala</i>	0–22	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	0–22	–
Shrub/Vine					
9	Shrubs			112–224	
	leadplant	AMCA6	<i>Amorpha canescens</i>	22–179	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	22–112	–
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	0–112	–
	pricklypear	OPUNT	<i>Opuntia</i>	0–90	–
	big sagebrush	ARTR2	<i>Artemisia tridentata</i>	0–67	–
	western snowberry	SYOC	<i>Symphoricarpos occidentalis</i>	0–67	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	0–67	–
	silver sagebrush	ARCA13	<i>Artemisia cana</i>	0–67	–
	prairie rose	ROAR3	<i>Rosa arkansana</i>	22–45	–
Moss					
10	Cryptogams			0–22	
	lesser spikemoss	SEDE2	<i>Selaginella densa</i>	0–22	–

Table 9. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					

Grass/Grasslike

1	Tall Warm-Season Grasses			16–78	
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	16–78	–
	big bluestem	ANGE	<i>Andropogon gerardii</i>	0–31	–
	sand bluestem	ANHA	<i>Andropogon hallii</i>	0–31	–
2	Needlegrass			235–549	
	needle and thread	HECOC8	<i>Hesperostipa comata</i> ssp. <i>comata</i>	235–549	–
3	Mid Warm-Season Grasses			0–78	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	0–78	–
	plains muhly	MUCU3	<i>Muhlenbergia cuspidata</i>	0–31	–
4	Cool-Season Grasses			157–392	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	157–392	–
	Graminoid (grass or grass-like)	2GRAM	<i>Graminoid (grass or grass-like)</i>	0–78	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	0–78	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	16–63	–
5	Short-Warm Season Grasses			78–157	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	31–157	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	16–126	–
6	Grass-Likes			157–392	
	needleleaf sedge	CADU6	<i>Carex duriuscula</i>	78–235	–
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	78–235	–
	sun sedge	CAINH2	<i>Carex inops</i> ssp. <i>heliophila</i>	31–126	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–78	–
7	Non-Native Grasses			0–78	
	Graminoid (grass or grass-like)	2GRAM	<i>Graminoid (grass or grass-like)</i>	0–78	–
	bluegrass	POA	<i>Poa</i>	0–78	–
Forb					
8	Forbs			16–110	
	field sagewort	ARCA12	<i>Artemisia campestris</i>	0–63	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	16–47	–
	Forb, introduced	2FI	<i>Forb, introduced</i>	0–47	–
	Forb, native	2FN	<i>Forb, native</i>	0–47	–
	scurfpea	PSORA2	<i>Psoraleidium</i>	16–47	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0–31	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	0–31	–
	prairie clover	DALEA	<i>Dalea</i>	0–31	–
	hairy false goldenaster	HEVI4	<i>Heterotheca villosa</i>	0–16	–
	dotted blazing star	LIPU	<i>Liatris punctata</i>	0–16	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–16	–
	tenpetal blazingstar	MEDE2	<i>Mentzelia decapetala</i>	0–16	–
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	0–16	–
	white prairie aster	SYFA	<i>Symphotrichum falcatum</i>	0–16	–

	longbract spiderwort	TRBR	<i>Tradescantia bracteata</i>	0–16	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	0–16	–
	Missouri goldenrod	SOMI2	<i>Solidago missouriensis</i>	0–16	–
Shrub/Vine					
9	Shrubs			78–157	
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	16–110	–
	pricklypear	OPUNT	<i>Opuntia</i>	16–94	–
	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>	0–63	–
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	0–47	–
	leadplant	AMCA6	<i>Amorpha canescens</i>	0–47	–
	prairie rose	ROAR3	<i>Rosa arkansana</i>	16–31	–
	western snowberry	SYOC	<i>Symphoricarpos occidentalis</i>	0–31	–
Moss					
10	Cryptogams			0–47	
	lesser spikemoss	SEDE2	<i>Selaginella densa</i>	0–47	–

Table 10. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
2	Needlegrass			56–168	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	56–168	–
4	Cool-Season Grasses			22–112	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	11–112	–
	Graminoid (grass or grass-like)	2GRAM	<i>Graminoid (grass or grass-like)</i>	0–56	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	0–56	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	11–34	–
5	Short-Warm Season Grasses			112–224	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	56–168	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	22–112	–
6	Grass-Likes			224–448	
	needleleaf sedge	CADU6	<i>Carex duriuscula</i>	112–280	–
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	112–280	–
	sun sedge	CAINH2	<i>Carex inops ssp. heliophila</i>	22–168	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–56	–
7	Non-Native Grasses			0–56	
	Graminoid (grass or grass-like)	2GRAM	<i>Graminoid (grass or grass-like)</i>	0–56	–
	bluegrass	POA	<i>Poa</i>	0–56	–
Forb					
8	Forbs			11–56	
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	0–34	–

	field sagewort	ARCA12	<i>Artemisia campestris</i>	0–34	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	11–34	–
	Forb, introduced	2FI	<i>Forb, introduced</i>	0–34	–
	Forb, native	2FN	<i>Forb, native</i>	0–22	–
	scurfpea	PSORA2	<i>Psoralegium</i>	0–22	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0–11	–
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	0–11	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–11	–
Shrub/Vine					
9	Shrubs			56–168	
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	22–112	–
	pricklypear	OPUNT	<i>Opuntia</i>	11–90	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	11–56	–
	big sagebrush	ARTR2	<i>Artemisia tridentata</i>	0–56	–
	silver sagebrush	ARCA13	<i>Artemisia cana</i>	0–56	–
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	0–22	–
	prairie rose	ROAR3	<i>Rosa arkansana</i>	0–11	–
	western snowberry	SYOC	<i>Symphoricarpos occidentalis</i>	0–11	–
Moss					
10	Cryptogams			11–56	
	lesser spikemoss	SEDE2	<i>Selaginella densa</i>	11–56	–

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, 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 Sandy Ecological Site (ES) provides upland grassland cover with an associated forb and shrub component. It was typically part of an expansive grassland landscape that included combinations of Loamy, Shallow Loamy, Shallow Clayey, Thin Loamy, Claypan, 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 Sandy 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 brome grasses 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.

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

plant community provides.

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 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.

Needleandthread/Western Wheatgrass/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 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 mid to short structure and composition this plant community provides. This site provides limited nesting and brood rearing habitat for greater sage-grouse. 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 toad, Great Plains toad, bull snake, and western rattlesnake.

Sedge/Blue Grama/Needleandthread: Resulting from heavy continuous season-long grazing without adequate recovery periods between grazing events; sedges, and blue grama will dominate. The forb diversity has decreased. A shift to shorter plant structure will favor prairie dog expansion and associate species such as ferruginous hawk, burrowing owl, tiger salamander, and swift fox. Species such as horned lark, long-billed curlew, upland sandpiper, and white-tailed jackrabbit will increase due to the loss of the tall grass component. Density of species such as Brewer's sparrow, greater sage-grouse, as well as, desert cottontail will decline. 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.

Go Back, Introduced, and/or Invaded States

This group includes separate vegetation states that are highly variable in nature. They are derived through distinct management scenarios. These plant communities have been or are highly susceptible to invasion of annual brome grasses, blue grasses, crested wheat grass, and other nonnative species.

Since secondary succession is highly variable plant and wildlife species will vary. This plant community provides habitat for generalist or early successional species. In addition, these communities may contain prairie dog towns. Prairie dog towns are sites of high plant and wildlife diversity.

The Go-back state can be reached whenever severe mechanical disturbance (i.e., abandoned farmland) is eliminated. Early successional plant communities include annual and perennial weedy type species first to occupy the site. These sites provide diverse foraging, reproductive, and escape cover favoring multiple edge species. This pioneer plant community provides abundant opportunity for insect, bird, and small mammal foraging due to abundant flowers and seed sources.

The Introduced state provides increased forage and; therefore, a potential for increased herbivore populations such as deer, pronghorn, and various small mammals. These sites provide diverse foraging, reproductive, and escape cover favoring multiple edge species.

The Invaded state includes areas that have been invaded, and are dominated by species such as smooth brome, Kentucky bluegrass, crested wheat grass, nonnative thistles, field bindweed, knapweeds, leafy spurge, hoary cress, and other introduced species. These sites greatly reduce foraging, reproductive, and escape cover for grassland nesting bird species.

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 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, 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 are 9 SCS-RANGE-417's collected from 1985 to 2004 in Harding County, South Dakota.

Other references

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

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

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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, Ryan Beer, Mitch Iverson, Thad Berrett, Cheryl Nielsen
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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.

2. **Presence of water flow patterns:** None, or barely visible and discontinuous.

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3. **Number and height of erosional pedestals or terracettes:** Typically non-existent, but steeper areas may have limited pedestalling of bunchgrasses. No exposed roots should be present.
-
4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 0 to 10 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):** Litter should fall in place. Slight amount of movement of smallest size class litter is possible, but not normal.
-
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 4 to 8 inches thick with mollic (dark) colors when moist. Structure typically is medium to 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.
-
12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**
- Dominant: Tall warm-season rhizomatous grasses > Mid/tall cool-season bunchgrasses >
- Sub-dominant: Mid warm-season bunchgrasses = Grass-likes >
- Other: Forbs = Shrubs > Mid/short cool-season grasses > Short warm-season grasses
- 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 1,400-2,800 lbs./acre (air-dry weight). Reference value production is 2,000 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.
