Ecological site R061XY016SD
Very Shallow

Accessed: 05/18/2024

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.

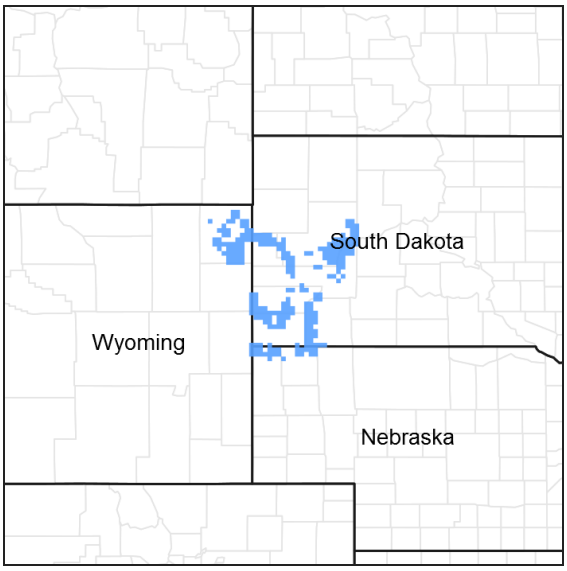


Figure 1. Mapped extent

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: 17a – Black Hills Foothills.

Associated sites

R061XN012SD	**Thin Upland-North (18-22" PZ)**
R061XN024SD	**Shallow Loamy-North (18-22" PZ)**
R061XS012SD	**Thin Upland-South (16-18" PZ)**
R061XS024SD	**Shallow Loamy-South (16-18" PZ)**

Similar sites

R061XS024SD	**Shallow Loamy-South (16-18" PZ)** (R061XN024SD & R061XS024SD) – Shallow Loamy [more little bluestem and big bluestem, higher production]
R061XN012SD	**Thin Upland-North (18-22" PZ)** (R061XN012SD & R061XS012SD) – Thin Upland [more little bluestem and big bluestem, higher production]

R061XS012SD	**Thin Upland-South (16-18" PZ)** (R061XN012SD & R061XS012SD) – Thin Upland [more little bluestem and big bluestem, higher production]
R061XN024SD	**Shallow Loamy-North (18-22" PZ)** (R061XN024SD & R061XS024SD) – Shallow Loamy [more little bluestem and big bluestem, higher production]

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Hesperostipa comata ssp. comata* (2) *Pseudoroegneria spicata*

Physiographic features

This site occurs on moderately to steeply sloping uplands.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Terrace
Flooding frequency	None
Ponding frequency	None
Elevation	884–1,219 m
Slope	10–45%
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 steppes to the east. Annual precipitation ranges from 18 to 21 inches per year, with most occurring during the growing season. 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. Cold air outbreaks from Canada in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Chinook winds may occur in winter and bring rapid rises in temperature. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring.

The average annual temperature is about 46° F. January is the coldest month with average temperatures ranging from about 20° F (Sundance, Wyoming (WY)) to about 26° F (Fort Meade, South Dakota (SD)). July is the warmest month with temperatures averaging from about 69° F (Sundance, WY) to about 72° F (Fort Meade, SD). The range of average monthly temperatures between the coldest and warmest months is about 48° 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 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 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)	140 days

Freeze-free period (average)	167 days
Precipitation total (average)	533 mm

Influencing water features

No riparian areas or wetland features are directly associated with this site.

Soil features

The soils in this site are well to somewhat excessively well drained and formed in alluvium over residuum or residuum. The gravelly loam to gravelly silt loam surface layer is about 4 to 7 inches thick. The soils have a moderate to moderately rapid 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. Sub-surface soil layers are restrictive to water movement and root penetration. Erosion potential on this site is very low due to the relatively rapid infiltration and the high amounts of gravel on the surface and throughout the profile. Low available water capacity caused by the shallow rooting depth strongly influences the soil-water-plant relationship.

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

Table 4. Representative soil features

Surface texture	(1) Gravelly loam (2) Silt loam
Family particle size	(1) Loamy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderate to moderately rapid
Soil depth	10–25 cm
Surface fragment cover <=3"	20–30%
Surface fragment cover >3"	0–15%
Available water capacity (0-101.6cm)	2.54–10.16 cm
Calcium carbonate equivalent (0-101.6cm)	0–8%
Electrical conductivity (0-101.6cm)	0–1 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)	39–55%
Subsurface fragment volume >3" (Depth not specified)	2–35%

Ecological dynamics

This site developed under Northern Great Plains climatic conditions, light to severe grazing by bison and other large herbivores, sporadic natural or man-caused wildfire (often of light intensities), 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 that will occur, severe disturbances, such as periods

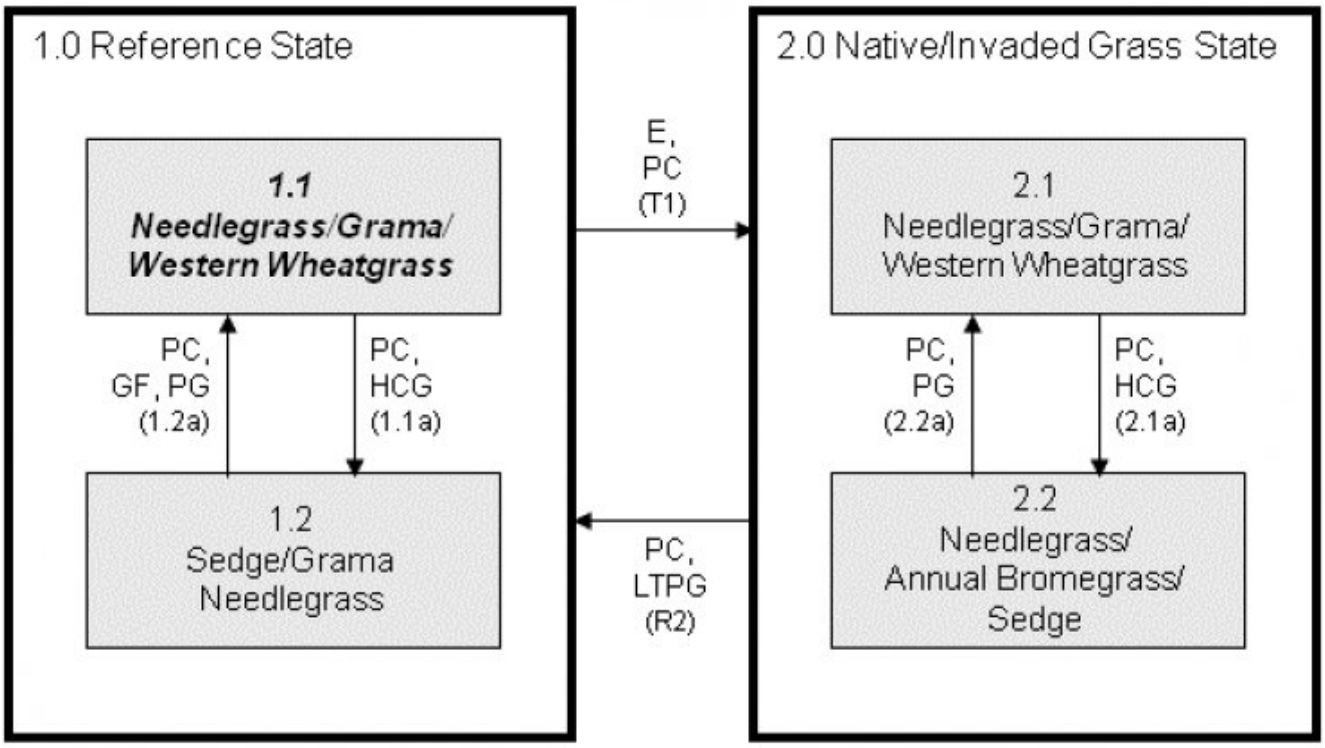
of well-below average precipitation, can cause significant shifts in plant communities and/or species composition.

This ecological site is naturally resilient, and quite resistant to change. Also, due to the relatively steep slopes and naturally low fertility of the soils, this site generally avoids more intensive disturbances such as farming. However, 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 can cause this site to depart from the Needlegrass/Grama/Western Wheatgrass Plant Community Phase. Sedges and gramas can increase and eventually develop into a sod, while many of the tall and mid statured grasses will decrease (e.g., little bluestem, green needlegrass, needleandthread, bluebunch wheatgrass, and western wheatgrass). Even with these disturbances, many of the tall and mid statured grasses will remain in the community at reduced levels, allowing recovery after removal of disturbances.

Interpretations are primarily based on the Needlegrass/Grama/Western Wheatgrass Plant Community Phase. It has been determined by study of 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 community phases, states, transitional pathways, and thresholds have been determined through similar studies and experience.

The following is a diagram that illustrates the common plant community phases that can occur on the site and the transition pathways between communities. These are the most common plant community phases based on current knowledge and experience, and changes may be made as more data is collected. Narratives following the diagram contain more detail pertaining to the ecological processes.

State and transition model



Refer to narrative for details on pathways: **E** – Encroachment of non-native species; **GF** – Grazing and fire returned to normal disturbance regime levels and frequencies; **HCG** – Heavy continuous grazing (repeated grazing during the growing season without adequate recovery periods; **LTPG** – Long-term presribed grazing; **PC** – Precipitation cycles; **PG** – Prescribed grazing.

State 1
Reference

This state represents the natural range of variability that dominates the dynamics of this ecological site. This state is dominated by cool-season grasses, with warm-season grasses being subdominant. In pre-European times, the primary disturbance mechanisms for this site in the reference condition included grazing by large herding ungulates and fluctuations in levels of precipitation. Grazing coupled with weather events dictated the dynamics that occurred within the natural range of variability. Today, this state can be found on areas that are properly managed with grazing and/or prescribed burning, and sometimes on areas receiving occasional short periods of rest. The dominant tall and mid grass species can decline and a corresponding increase in short statured species will occur.

Community 1.1
Needlegrass/Grama/Western Wheatgrass

The Needlegrass/Grama/Western Wheatgrass Plant Community Phase is the plant community upon which interpretations are primarily based. This is also considered to be climax. This plant community can be found on areas that are properly managed with prescribed grazing that allows for proper utilization, changes in season of use and adequate recovery periods following each grazing event. The potential vegetation is about 75 percent grasses or grass-like plants, 15 percent forbs, and 10 percent shrubs. Cool-season grass and grass-like species dominate this plant community, with warm-season grasses being subdominant. The major grass or grass-like species include needleandthread, bluebunch wheatgrass, blue and/or hairy grama, western wheatgrass, threadleaf sedge, and sideoats grama. Other grasses occurring on the site include threeawn, plains muhly, little bluestem, and prairie junegrass. The significant forbs include dotted gayfeather, hairy goldaster, purple coneflower, prairie clover and stemless hymenoxys. Significant shrubs are fringed sagewort, rose, skunkbush sumac and yucca. 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. This plant community is stable and protected from excessive erosion.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	773	1110	1423
Forb	62	135	224
Shrub/Vine	62	101	146
Total	**897**	**1346**	**1793**

Figure 5. Plant community growth curve (percent production by month). SD6102, Black Hills Foot Slopes, cool-season dominant, warm-season sub-dominant. Cool-season dominant, warm-season sub-dominant.

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

Community 1.2
Sedge/Grama/Needlegrass

This plant community can develop from the adverse effects of heavy, continuous grazing in conjunction with extended periods of below-average precipitation. Short grass and grass-like species increase to dominate the site and annual production decreases. Lack of litter and short plant heights result in higher soil temperatures, poor water infiltration rates, and higher evaporation, which gives blue grama and sedges a competitive advantage over cool and warm-season mid-grasses. Blue grama and threadleaf sedge are the dominant grass/grass-like species. Other grasses may include western wheatgrass, needleandthread, prairie junegrass and threeawn. Significant forbs include green sagewort, cutleaf ironplant, silverleaf scurfpea, white prairie aster, milkvetch, and spiny phlox. Common shrubs include cactus, yucca, and fringed sagewort. This plant community is relatively stable. The competitive advantage of blue grama and threadleaf sedge prevents other species from establishing. This plant community is less productive than the 1.1 Needlegrass/Grama/Western Wheatgrass Plant Community Phase. Runoff has increased and infiltration has decreased. Soil erosion does not increase substantially.

Figure 6. Plant community growth curve (percent production by month). SD6102, Black Hills Foot Slopes, cool-season dominant, warm-season sub-dominant. Cool-season dominant, warm-season sub-dominant.

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

Pathway 1.1a
Community 1.1 to 1.2

Heavy continuous grazing (grazing the same area for extended portions of the growing season well above recommended stocking rates and without adequate recovery periods), especially when coupled with extended periods of below average precipitation will convert the plant community to the 1.2 Sedge/Grama/Needlegrass Plant Community Phase.

Pathway 1.2a
Community 1.2 to 1.1

Grazing and fire returned to normal disturbance regime levels and frequencies or prescribed grazing (alternating season of use and providing adequate recovery periods) will convert this plant community to the 1.1 Needlegrass/Grama/Western Wheatgrass Plant Community Phase.

State 2
Native/Invaded Grass

Community 2.1
Needlegrass/Grama/Western Wheatgrass

This plant community is the result of encroachment of non-native species, often as a result of fluctuations in precipitation cycles, typically extended periods of below-average precipitation followed by a mild winter and/or a cool, wet spring. The potential vegetation is about 75 percent grasses or grass-like plants, 15 percent forbs, and 10 percent shrubs. Cool-season grass and grass-like species dominate this plant community, with warm-season grasses being subdominant. The major grass or grass-like species include needleandthread, bluebunch wheatgrass, blue and/or hairy grama, western wheatgrass, threadleaf sedge, and sideoats grama. Other grasses occurring on the site include threeawn, plains muhly, little bluestem, prairie junegrass, and non-native species such as cheatgrass and/or Japanese bromegrass. The significant forbs include dotted gayfeather, hairy goldaster, purple coneflower, prairie clover and stemless hymenoxys. Significant shrubs are fringed sagewort, rose, skunkbush sumac and yucca. This plant community is very similar to the 1.1 Needlegrass/Grama/Western Wheatgrass Plant

Community Phase (see plant composition tables for specific species composition). The main difference is that this plant community will have a minor amount on non-native grasses, up to about 10 to 15 percent by weight. 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. This plant community is stable and protected from excessive erosion.

Figure 7. Plant community growth curve (percent production by month). SD6102, Black Hills Foot Slopes, cool-season dominant, warm-season sub-dominant. Cool-season dominant, warm-season sub-dominant.

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

Community 2.2
Needlegrass/Annual Bromegrass/Sedge

This plant community can develop from the adverse effects of heavy, continuous grazing in conjunction with extended periods of below-average precipitation. This plant community phase is further impacted by the invasion of non-native species such as cheatgrass, Japanese bromegrass, and/or Kentucky bluegrass. Needlegrasses will be evident on the aspect of this phase, but will be reduced in vigor and production. Annual bromegrass and sedge will make up a bulk of the composition on this plant community phase. The dominant grass and grass-like species will include threadleaf sedge, needleandthread, blue grama, and cheatgrass and/or Japanese bromegrass. Other grasses present include western wheatgrass, threeawn, Kentucky bluegrass, hairy grama, and prairie junegrass. Significant forbs include cudweed sagewort, green sagewort, milkvetch, white prairie aster, and spiny phlox. Common shrubs include cactus, yucca, and fringed sagewort. Lack of litter and short plant heights result in higher soil temperatures, poor water infiltration rates, and higher evaporation, which gives sedges and annual bromegrass a competitive advantage over cool and warm-season mid-grasses. This plant community is relatively stable. The competitive advantage of blue grama and threadleaf sedge prevents other species from establishing. This plant community is less productive than the 1.1 Needlegrass/Grama/Western Wheatgrass Plant Community Phase. Runoff has increased and infiltration has decreased. Soil erosion does not increase substantially.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	392	538	796
Shrub/Vine	28	67	106
Forb	28	67	106
Total	**448**	**672**	**1008**

Figure 9. Plant community growth curve (percent production by month). SD6101, Black Hills Foot Slopes, cool-season dominant. Cool-season dominant.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		4	12	25	36	10	5	4	4		

Pathway 2.1a
Community 2.1 to 2.2

Heavy continuous grazing (grazing the same area for extended portions of the growing season well above recommended stocking rates and without adequate recovery periods), especially when coupled with extended periods of below average precipitation will convert the plant community to the 2.2 Needlegrass/Annual Bromegrass/Sedge Plant Community Phase.

Pathway 2.2a

Community 2.2 to 2.1

Prescribed grazing (alternating season of use and providing adequate recovery periods) especially when coupled with a return to more normal precipitation cycles will convert this plant community to the 2.1 Needlegrass/Grama/Western Wheatgrass Plant Community Phase.

Conservation practices

Prescribed Grazing

Transition T1
State 1 to 2

Encroachment of non-native species and fluctuations in precipitation cycles (typically extended periods of below-average precipitation) will cause a shift across a threshold from the Reference State (State 1) to the Native/Invaded Grass State (State 2).

Restoration pathway R2
State 2 to 1

Long-term prescribed grazing (moderate stocking levels coupled with adequate recovery periods, or other grazing systems such as high-density, low-frequency intended to treat specific species dominance, or periodic light to moderate stocking levels possibly including periodic rest) coupled with a return to more normal precipitation cycles may lead this plant community phase over a threshold to the Reference State (State 1). This will likely take a long period of time, possibly up to 10 years or more, and recovery may not be attainable.

Conservation practices

Prescribed Grazing

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Cool-season Bunchgrasses**			269–471	
	needle and thread	HECOC8	*Hesperostipa comata ssp. comata*	135–336	–
	bluebunch wheatgrass	PSSP6	*Pseudoroegneria spicata*	67–269	–
	green needlegrass	NAVI4	*Nassella viridula*	0–67	–
2	**Short Warm-Season Grasses**			135–269	
	blue grama	BOGR2	*Bouteloua gracilis*	67–202	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	27–135	–
	threeawn	ARIST	*Aristida*	13–40	–
3	**Wheatgrass**			67–202	
	western wheatgrass	PASM	*Pascopyrum smithii*	67–202	–
4	**Mid Warm-Season Grasses**			40–135	
	little bluestem	SCSC	*Schizachyrium scoparium*	13–81	–
	sideoats grama	BOCU	*Bouteloua curtipendula*	13–54	–
	plains muhly	MUCU3	*Muhlenbergia cuspidata*	0–40	–
5	**Other Native Grasses**			27–67	
	prairie Junegrass	KOMA	*Koeleria macrantha*	13–40	–

	Sandberg bluegrass	POSE	*Poa secunda*	13–27	–
	Graminoid (grass or grass-like)	2GRAM	*Graminoid (grass or grass-like)*	0–27	–
	squirreltail	ELEL5	*Elymus elymoides*	0–27	–
6	**Grass-likes**			27–135	
	threadleaf sedge	CAFI	*Carex filifolia*	27–108	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	0–67	–
Forb					
7	**Forbs**			67–202	
	hairy false goldenaster	HEVI4	*Heterotheca villosa*	13–40	–
	Forb, native	2FN	*Forb, native*	13–40	–
	milkvetch	ASTRA	*Astragalus*	13–40	–
	blacksamson echinacea	ECAN2	*Echinacea angustifolia*	13–40	–
	buckwheat	ERIOG	*Eriogonum*	13–27	–
	purple prairie clover	DAPU5	*Dalea purpurea*	13–27	–
	Indian paintbrush	CASTI2	*Castilleja*	13–27	–
	pussytoes	ANTEN	*Antennaria*	13–27	–
	rayless tansyaster	MAGR2	*Machaeranthera grindelioides*	13–27	–
	lacy tansyaster	MAPI	*Machaeranthera pinnatifida*	13–27	–
	field locoweed	OXCAS3	*Oxytropis campestris var. spicata*	13–27	–
	spiny phlox	PHHO	*Phlox hoodii*	13–27	–
	white prairie aster	SYFA	*Symphyotrichum falcatum*	13–27	–
	stemless four-nerve daisy	TEACA2	*Tetraneuris acaulis var. acaulis*	13–27	–
	American vetch	VIAM	*Vicia americana*	13–27	–
	bush morning-glory	IPLE	*Ipomoea leptophylla*	0–27	–
	white sagebrush	ARLU	*Artemisia ludoviciana*	13–27	–
	dotted blazing star	LIPU	*Liatris punctata*	0–13	–
	silverleaf Indian breadroot	PEAR6	*Pediomelum argophyllum*	0–13	–
	field sagewort	ARCA12	*Artemisia campestris*	0–13	–
	white prairie clover	DACA7	*Dalea candida*	0–13	–
	little larkspur	DEBI	*Delphinium bicolor*	0–13	–
	scarlet beeblossom	GACO5	*Gaura coccinea*	0–13	–
Shrub/Vine					
8	**Shrubs**			67–135	
	prairie sagewort	ARFR4	*Artemisia frigida*	13–40	–
	creeping juniper	JUHO2	*Juniperus horizontalis*	13–40	–
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–34	–
	kinnikinnick	ARUV	*Arctostaphylos uva-ursi*	13–27	–
	skunkbush sumac	RHTR	*Rhus trilobata*	0–27	–
	rose	ROSA5	*Rosa*	13–27	–
	soapweed yucca	YUGL	*Yucca glauca*	13–27	–
	pricklypear	OPUNT	*Opuntia*	0–13	–

Table 8. Community 2.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Cool-Season Bunchgrasses**			34–135	
	needle and thread	HECOC8	*Hesperostipa comata ssp. comata*	0–135	–
	bluebunch wheatgrass	PSSP6	*Pseudoroegneria spicata*	0–20	–
2	**Short Warm-Season Grasses**			34–101	
	threeawn	ARIST	*Aristida*	13–81	–
	blue grama	BOGR2	*Bouteloua gracilis*	13–67	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	0–47	–
3	**Wheatgrass**			0–20	
	western wheatgrass	PASM	*Pascopyrum smithii*	0–20	–
4	**Other Native Grasses**			0–27	
	Graminoid (grass or grass-like)	2GRAM	*Graminoid (grass or grass-like)*	0–13	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	0–13	–
	Sandberg bluegrass	POSE	*Poa secunda*	0–13	–
	squirreltail	ELEL5	*Elymus elymoides*	0–7	–
5	**Grass-likes**			101–202	
	threadleaf sedge	CAFI	*Carex filifolia*	67–168	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	0–67	–
6	**Non-Native Grasses**			67–168	
	field brome	BRAR5	*Bromus arvensis*	34–135	–
	cheatgrass	BRTE	*Bromus tectorum*	34–135	–
	bluegrass	POA	*Poa*	0–20	–
Forb					
7	**Forbs**			34–101	
	white sagebrush	ARLU	*Artemisia ludoviciana*	7–47	–
	Forb, introduced	2FI	*Forb, introduced*	7–40	–
	field sagewort	ARCA12	*Artemisia campestris*	7–40	–
	white prairie aster	SYFA	*Symphyotrichum falcatum*	7–20	–
	spiny phlox	PHHO	*Phlox hoodii*	7–13	–
	Forb, native	2FN	*Forb, native*	0–13	–
	milkvetch	ASTRA	*Astragalus*	7–13	–
	little larkspur	DEBI	*Delphinium bicolor*	0–7	–
	buckwheat	ERIOG	*Eriogonum*	0–7	–
	rayless tansyaster	MAGR2	*Machaeranthera grindelioides*	0–7	–
	lacy tansyaster	MAPI	*Machaeranthera pinnatifida*	0–7	–
	field locoweed	OXCAS3	*Oxytropis campestris var. spicata*	0–7	–
	pussytoes	ANTEN	*Antennaria*	0–7	–
Shrub/Vine					
8	**Shrubs**			34–101	

	prairie sagewort	ARFR4	*Artemisia frigida*	13–54	–
	soapweed yucca	YUGL	*Yucca glauca*	7–34	–
	pricklypear	OPUNT	*Opuntia*	7–27	–
	creeping juniper	JUHO2	*Juniperus horizontalis*	7–20	–
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–20	–
	kinnikinnick	ARUV	*Arctostaphylos uva-ursi*	0–7	–

Animal community

Animal Community – Grazing Interpretations
The following table lists annual, suggested initial stocking rates with average growing conditions. These are conservative estimates that should be used only as guidelines in the initial stages of conservation planning. Often, the current plant composition does not entirely match any particular plant community (as described in this ecological site description). Because of this a resource inventory is necessary to document plant composition and production. More accurate carrying capacity estimates should eventually be calculated using the following stocking rate information along with animal preference data and actual stocking records, particularly when grazers other than cattle are involved. With consultation of the land manager, more intensive grazing management may result in improved harvest efficiencies and increased carrying capacity.

Needlegrass/Grama/Western Wheatgrass (1.1 & 2.1)
Average Annual Production (lbs./acre, air-dry): 1,200
Stocking Rate* (AUM/acre): 0.33

Sedge/Grama/Needlegrass (1.2)
Average Annual Production (lbs./acre, air-dry): 900
Stocking Rate* (AUM/acre): 0.25

Needlegrass/Annual Bromegrass/Sedge (2.2)
Average Annual Production (lbs./acre, air-dry): 600
Stocking Rate* (AUM/acre): 0.16

* Based on 912 lbs./acre (air-dry weight) per Animal Unit Month (AUM), and on 25% harvest efficiency (refer to USDA NRCS, National Range and Pasture Handbook).

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% ground cover have the greatest potential for high infiltration and lower runoff. An example of an exception would be where shortgrasses form a strong sod and dominate the site. Dominance by blue grama, buffalograss, bluegrass, and/or smooth bromegrass will result in reduced infiltration and increased runoff. Areas where ground cover is less than 50% 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, hiking, photography, bird watching and other opportunities. The wide variety of plants that 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 from range-trained personnel were also used. Those involved in developing this site include: Stan Boltz, Range Management Specialist, NRCS; Cynthia Englebert, Range Management Specialist, Forest Service; George Gamblin, Range Management Specialist, NRCS; Tate Lantz, Range Management Specialist, NRCS; Ryan Murray, Range Management Specialist, NRCS; Cheryl Nielsen, Range Management Specialist, NRCS; L. Michael Stirling, Range Management Specialist, NRCS; Jim Westerman, Soil Scientist, NRCS.

Other references

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Contributors

Stan Boltz

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.

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Date	09/30/2009
Approved by	Stan Boltz
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None usually present.

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 pedastalled plants typically on steeper slopes. Terracettes not present.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground is roughly 5 to 15 percent, and patches are less than 2 inches in diameter.

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5. **Number of gullies and erosion associated with gullies:** Active gullies should not 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 typically 5 to 6, normally 6. Surface organic matter adheres to the soil surface.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface structure is typically granular, and mollic (higher organic matter) colors of surface horizon about 3 to 5 inches deep. If conditions are other than this, refer to map unit component descriptions for component on which the site occurs.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Combination of shallow and deep rooted species (mid & tall rhizomatous and tufted perennial cool- and warm-season grasses) with fine and coarse roots positively influences infiltration.

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None.

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

    Dominant: Mid and tall, cool-season bunchgrasses > short, warm-season grasses >

    Sub-dominant: Wheatgrass (mid, cool-season rhizomatous) = forbs > mid, warm-season grasses = grass-like species = shrubs >

    Other: Short, cool-season bunchgrasses

Additional:

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

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14. **Average percent litter cover (%) and depth (in):** 65 to 75 percent plant litter cover, roughly 0.25 to 0.5 inch depth. Litter cover is in contact with soil surface.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Ranges from 800 to 1,600 pounds/acre. Reference value is 1,200 pounds/acre (air-dry weight basis).

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** Refer to State and Local Noxious Weed List.

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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 typically have vigorous rhizomes or tillers.
