

Ecological site R058DY020SD

Loamy Overflow

Accessed: 05/08/2024

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

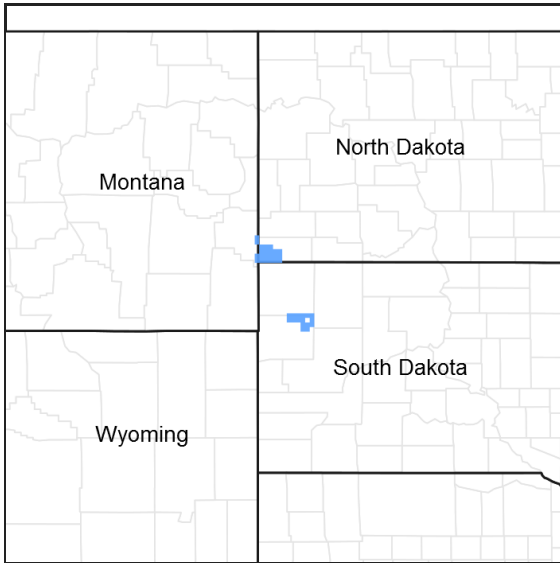


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

Classification relationships

Level IV Ecoregions of the Conterminous United States: 43e – Sagebrush Steppe.

Associated sites

R058DY009SD	Sandy
R058DY010SD	Loamy
R058DY022SD	Loamy Terrace

Similar sites

R058DY022SD	Loamy Terrace Loamy Terrace [less big bluestem; less production]
-------------	--

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified

Herbaceous	(1) <i>Andropogon gerardii</i> (2) <i>Pascopyrum smithii</i>
------------	---

Physiographic features

This site occurs on concave to nearly level areas adjacent to streams and on gently sloping uplands.

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Swale (3) Drainageway
Flooding duration	Brief (2 to 7 days)
Flooding frequency	Occasional to frequent
Ponding frequency	None
Elevation	701–1,219 m
Slope	0–3%
Water table depth	203 cm
Aspect	Aspect is not a significant factor

Climatic features

The climate in this MLRA is typical of the drier portions of the Northern Great Plains where sagebrush steppes to the west yield to grassland to the east. Annual precipitation ranges from 14 to 16 inches. Most of the rainfall occurs as frontal storms early in the growing season. Some high intensity, convective thunderstorms occur in the summer. Precipitation in winter occurs as snow. Temperatures show a wide range between summer and winter and between daily maximums and minimums due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Outbreaks of cold air from Canada in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring. The normal average annual temperature is about 44°F. January is the coldest month with average temperatures ranging from about 12°F (Marmarth, North Dakota (ND)), to about 20°F (Baker, Montana (MT)). July is the warmest month with temperatures averaging from about 70°F (Marmarth, ND), to about 76°F (Baker, MT). The range of normal average monthly temperatures between the coldest and warmest months is about 55°F.

Hourly winds are estimated to average about 11 miles per hour (mph) annually, ranging from about 13 mph during the spring to about 10 mph during the summer. Daytime winds are generally stronger than nighttime and 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 features common to soils in this site are the silt loam and loam textured surface layers and slopes of zero to three percent. The soils in this site are well-drained and formed in fine-loamy alluvium derived from sedimentary rock. The surface layer is 10 to 15 inches thick. The texture of the subsurface layers range from fine sand to silty clay loam. 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. The soil surface is stable and intact. These soils are susceptible to water erosion. The hazard of water erosion increases when vegetation is greatly reduced and bare ground increases. Headcuts can begin resulting in gullies to occur.

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) Silt loam (2) Loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Slow
Soil depth	203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0–15%
Available water capacity (0-101.6cm)	17.78 cm
Calcium carbonate equivalent (0-101.6cm)	0–15%
Electrical conductivity (0-101.6cm)	0–4 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–2
Soil reaction (1:1 water) (0-101.6cm)	6.1–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–5%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

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

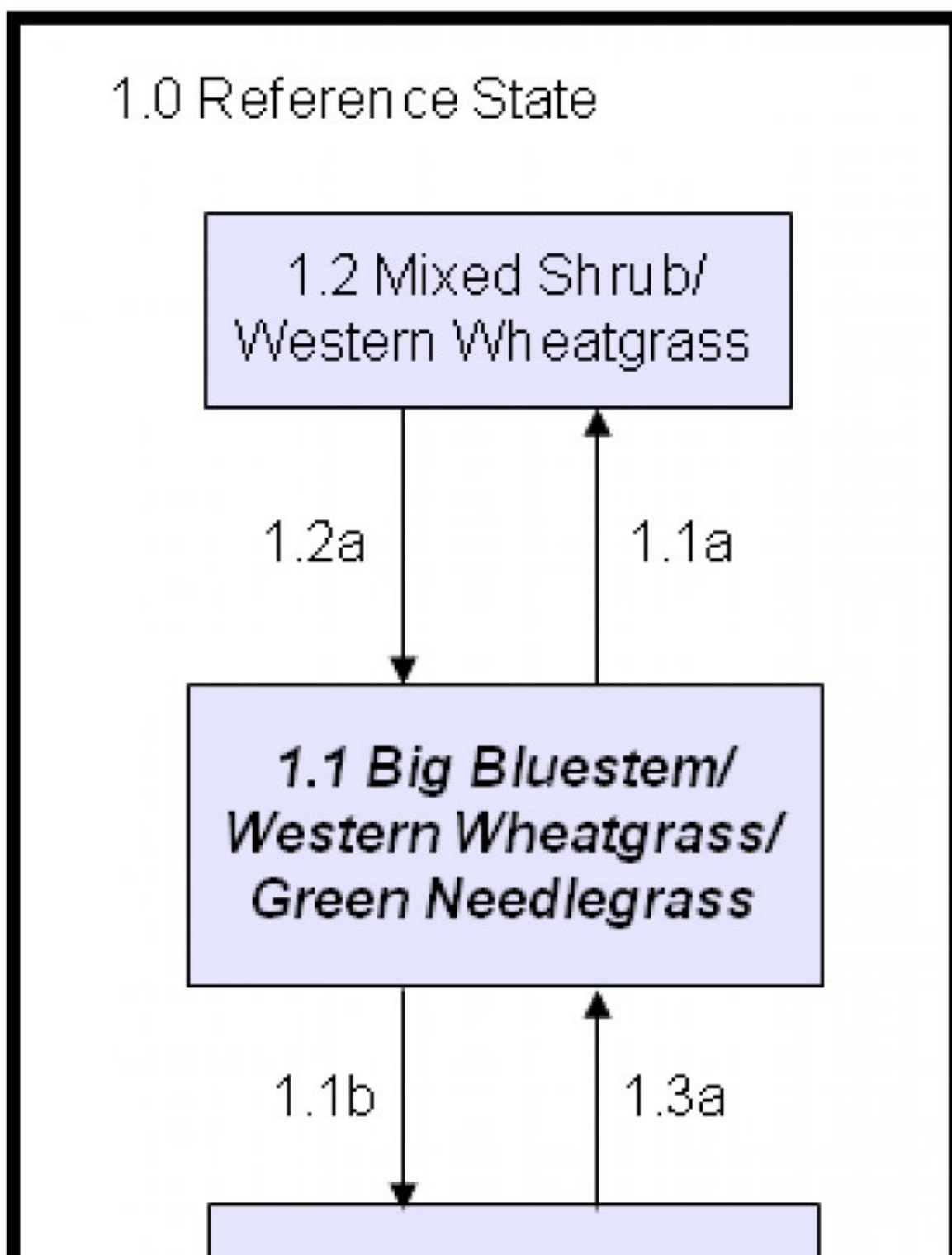
The plant community upon which interpretations are primarily based is the Big Bluestem/Western Wheatgrass/Green Needlegrass Plant Community. This plant community has been determined by studying rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing 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.

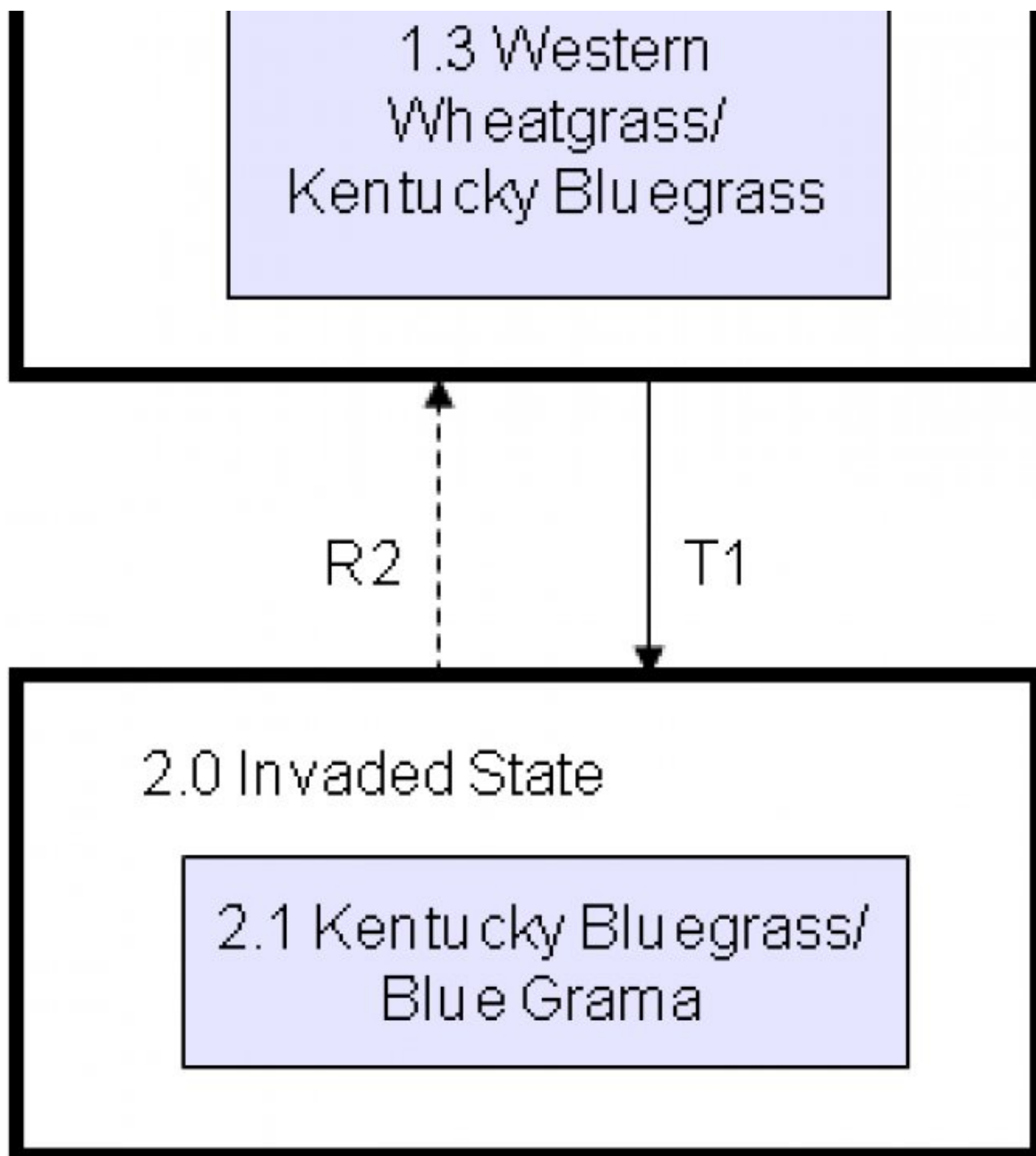
Continuous grazing without adequate recovery periods following each grazing occurrence over several years

causes this site to depart from the Big Bluestem/Western Wheatgrass/Green Needlegrass Plant Community. Species such as western wheatgrass and blue grama will initially increase. Big bluestem, green needlegrass, and switchgrass will decrease in frequency and production. Heavy continuous grazing causes Kentucky bluegrass to increase and eventually develops into a sod condition. Extended periods of nonuse and no fire will result in a plant community having high litter levels, which favors an increase in Kentucky bluegrass and annual bromes. In time, shrubs such as western snowberry and chokecherry will also increase.

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 Big Bluestem/Western Wheatgrass/Green Needlegrass

The interpretive plant community for this site is the Big Bluestem/Western Wheatgrass/Green Needlegrass 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 75 to 90 percent grasses or grass-like plants, 2 to 10 percent forbs, 5 to 12 percent shrubs, and 0 to 2 percent trees. This plant community is co-dominated by warm- and cool-season grasses. The major grasses include big bluestem, western wheatgrass, and green needlegrass. Other grasses or grass-likes occurring on the site include needleandthread, blue grama, switchgrass, prairie Junegrass, and sedge. Significant forbs include cudweed sagewort, goldenrod, heath aster, and scurfpea. The significant shrubs that occur include rose, snowberry, and wild plum. 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	1928	2652	3391
Shrub/Vine	140	267	443
Forb	62	188	359
Tree	–	31	67
Total	2130	3138	4260

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 Mixed Shrub/Western Wheatgrass

This plant community develops after an extended period of nonuse and exclusion of fire. This plant community will also develop with moderate continuous seasonal grazing (grazing the same time of year every year). In either case, shrubs increase and can sometimes dominate the plant community. Cool-season grasses make up the majority of the understory with the balance made up of short warm-season grasses and miscellaneous forbs. Western wheatgrass is the dominant grass. Grasses of secondary importance include green needlegrass, needleandthread, prairie Junegrass, and blue grama. Woody plants such as snowberry, wild plum, rose, chokecherry, and silver buffaloberry increase with canopy cover up to 20 percent or more. Forbs commonly found in this plant community include cudweed sagewort, goldenrod, western yarrow, white prairie aster, and scurfpea. This plant community is resistant to change without prescribed grazing and/or fire. The combination of both grazing and fire or other means to reduce shrub cover is most effective in moving this plant community toward the Big Bluestem/Western Wheatgrass/Green Needlegrass Plant Community. Soil erosion is low, but runoff is increased. Once the advanced stage of this plant community is reached, time and external resources will be needed to see recovery in the diversity of the site.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1121	1948	2668
Shrub/Vine	112	308	588
Forb	112	185	280
Tree	–	25	50
Total	1345	2466	3586

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

Community 1.3 Western Wheatgrass/Kentucky Bluegrass

This plant community develops under continuous season-long grazing or from over utilization during extended drought periods. The potential vegetation is made up of approximately 80 to 90 percent grasses and grass-like species, 5 to 10 percent forbs, 5 to 10 percent shrubs, and 0 to 2 percent trees. The dominant grasses include western wheatgrass and Kentucky bluegrass. Other grasses or grass-likes may include sedge, blue grama, big bluestem, green needlegrass, cheatgrass, and prairie Junegrass. Significant forbs include cudweed sagewort, goldenrod, scurfpea, western yarrow, and white prairie aster. The dominant shrubs that occur include western snowberry, wild plum, and rose. Compared to the Big Bluestem/Western Wheatgrass/Green Needlegrass Plant Community, big bluestem and green needlegrass have decreased while the shortgrass species including blue grama and Kentucky bluegrass have increased. 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 relatively stable and less productive than the Big Bluestem/Western Wheatgrass/Green Needlegrass Plant Community. Reduction of litter and short plant heights result in higher soil temperatures, poor water infiltration rates, and increased runoff. This plant community can occur throughout the site, on spot grazed areas, and around water sources where season-long grazing patterns occur. Soil erosion will be minimal due to the sod forming habit of the bluegrasses.

Table 7. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	953	1506	2023
Shrub/Vine	84	135	202
Forb	84	135	202
Tree	–	18	39
Total	1121	1794	2466

Figure 9. Plant community growth curve (percent production by month).
SD5801, Northern Rolling High Plains, cool-season dominant.. Cool-season dominant, uplands..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	4	12	25	36	10	5	4	4	0	0

Pathway 1.1a Community 1.1 to 1.2

Continuous seasonal grazing with no fire or non-use and no fire will lead this plant community to the Mixed Shrub//Western Wheatgrass Plant Community.

Pathway 1.1b Community 1.1 to 1.3

Continuous season-long grazing will lead to the Western Wheatgrass/Kentucky Bluegrass 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 with brush management and favorable climatic conditions, which allow for adequate plant recovery periods, may cause a shift to the Big Bluestem/Western Wheatgrass/Green Needlegrass Plant Community.

Conservation practices

Brush Management
Prescribed Grazing

**Pathway 1.3a
Community 1.3 to 1.1**

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

Conservation practices

Prescribed Grazing

**State 2
Degraded**

The State narrative is under development.

**Community 2.1
Kentucky Bluegrass/Blue Grama**

This plant community developed with heavy continuous season-long grazing. Kentucky bluegrass dominates the community and can develop into a “sodbound” appearance. Low vigor western wheatgrass can be found scattered throughout the community. Green needlegrass has been greatly reduced. Big bluestem may persist in minor amounts, greatly reduced in vigor and not readily seen. Western yarrow, scurfpea, ragweed, and goldenrod have increased. Nonnative grasses and forbs such as annual bromes, thistle, and cocklebur may invade this plant community. This plant community is resistant to change due to grazing tolerance of Kentucky bluegrass. A significant amount of production and diversity has been lost when compared to the Big Bluestem/Western Wheatgrass/Green Needlegrass Plant Community. The dominance of Kentucky bluegrass and loss of other desirable species has negatively impacted energy flow and nutrient cycling. Water infiltration is reduced significantly. Soil loss may be accelerated where concentrated flows occur. It will take a very long time with improved management to restore this plant community. Renovation would be very costly.

Table 8. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	813	1150	1698
Shrub/Vine	22	81	146
Forb	62	101	146
Tree	–	13	28
Total	897	1345	2018

**Figure 11. Plant community growth curve (percent production by month).
SD5801, Northern Rolling High Plains, cool-season dominant.. Cool-season dominant, uplands..**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	4	12	25	36	10	5	4	4	0	0

**Transition T1
State 1 to 2**

With heavy continuous season-long grazing this plant community will move towards the Kentucky Bluegrass/Blue Grama Plant Community.

Restoration pathway R2 State 2 to 1

Under long-term prescribed grazing, including adequate recovery periods, this plant community may eventually move towards a plant community resembling the Big Bluestem/Western Wheatgrass/Green Needlegrass Plant Community. This will take a long period of time and intensive management.

Conservation practices

Prescribed Grazing

Additional community tables

Table 9. 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			785–1098	
	big bluestem	ANGE	<i>Andropogon gerardii</i>	628–1098	–
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	0–157	–
	switchgrass	PAVI2	<i>Panicum virgatum</i>	31–157	–
2	Wheatgrasses			471–942	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	471–942	–
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	0–157	–
3	Cool-Season Bunch Grasses			314–785	
	green needlegrass	NAVI4	<i>Nassella viridula</i>	314–628	–
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	157–314	–
	Canada wildrye	ELCA4	<i>Elymus canadensis</i>	0–94	–
4	Warm-Season Bunchgrasses			31–157	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	31–157	–
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	0–157	–
5	Other Native Grasses			31–157	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–157	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	31–94	–
	composite dropseed	SPCOC2	<i>Sporobolus compositus var. compositus</i>	0–63	–
6	Grass-Likes			31–157	
	sedge	CAREX	<i>Carex</i>	31–157	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–94	–
Forb					
8	Forbs			63–314	
	Forb, native	2FN	<i>Forb, native</i>	31–157	–
	Maximilian sunflower	HEMA2	<i>Helianthus maximiliani</i>	31–94	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	31–94	–
	goldenrod	SOLID	<i>Solidago</i>	31–94	–
	white prairie aster	SYFA	<i>Symphotrichum falcatum</i>	31–63	–
	scurfpea	PSORA2	<i>Psoraleidium</i>	31–63	–

	western yarrow	ACMIO	<i>Achillea millefolium var. occidentalis</i>	31–63	–
	Canadian anemone	ANCA8	<i>Anemone canadensis</i>	0–31	–
	cinquefoil	POTEN	<i>Potentilla</i>	0–31	–
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	0–31	–
	purple prairie clover	DAPU5	<i>Dalea purpurea</i>	0–31	–
	American licorice	GLLE3	<i>Glycyrrhiza lepidota</i>	0–31	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	0–31	–
	blue-eyed grass	SISYR	<i>Sisyrinchium</i>	0–31	–
	American vetch	VIAM	<i>Vicia americana</i>	0–31	–
Shrub/Vine					
9	Shrubs			157–377	
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	0–157	–
	snowberry	SYMPH	<i>Symphoricarpos</i>	31–157	–
	American plum	PRAM	<i>Prunus americana</i>	31–94	–
	rose	ROSA5	<i>Rosa</i>	31–94	–
	silver buffaloberry	SHAR	<i>Shepherdia argentea</i>	0–94	–
	chokecherry	PRVI	<i>Prunus virginiana</i>	0–63	–
	currant	RIBES	<i>Ribes</i>	0–63	–
	Saskatoon serviceberry	AMAL2	<i>Amelanchier alnifolia</i>	0–31	–
	silver sagebrush	ARCA13	<i>Artemisia cana</i>	0–31	–
Tree					
10	Trees			0–63	
	Tree	2TREE	<i>Tree</i>	0–63	–
	green ash	FRPE	<i>Fraxinus pennsylvanica</i>	0–63	–
	plains cottonwood	PODEM	<i>Populus deltoides ssp. monilifera</i>	0–63	–
	American elm	ULAM	<i>Ulmus americana</i>	0–63	–

Table 10. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Tall Warm-Season Grasses			49–247	
	big bluestem	ANGE	<i>Andropogon gerardii</i>	49–247	–
	switchgrass	PAVI2	<i>Panicum virgatum</i>	0–74	–
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	0–49	–
2	Wheatgrasses			370–740	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	247–616	–
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	0–74	–
3	Cool-Season Bunch Grasses			49–296	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	25–197	–
	green needlegrass	NAVI4	<i>Nassella viridula</i>	25–197	–
	Canada wildrye	ELCA4	<i>Elymus canadensis</i>	0–25	–
4	Warm-Season Bunchgrasses			49–247	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	49–247	–

	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	0–74	–
5	Other Native Grasses			25–123	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–123	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	25–74	–
	composite dropseed	SPCOC2	<i>Sporobolus compositus var. compositus</i>	0–49	–
6	Grass-Likes			49–123	
	sedge	CAREX	<i>Carex</i>	49–123	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–74	–
7	Non-Native Grasses			49–247	
	cheatgrass	BRTE	<i>Bromus tectorum</i>	25–247	–
	bluegrass	POA	<i>Poa</i>	25–247	–
Forb					
8	Forbs			123–247	
	Forb, native	2FN	<i>Forb, native</i>	25–123	–
	western yarrow	ACMIO	<i>Achillea millefolium var. occidentalis</i>	25–74	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	25–74	–
	scurfpea	PSORA2	<i>Psoraleidium</i>	25–74	–
	goldenrod	SOLID	<i>Solidago</i>	25–74	–
	white prairie aster	SYFA	<i>Symphotrichum falcatum</i>	25–74	–
	Forb, introduced	2FI	<i>Forb, introduced</i>	0–74	–
	American licorice	GLLE3	<i>Glycyrrhiza lepidota</i>	0–49	–
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	0–49	–
	purple prairie clover	DAPU5	<i>Dalea purpurea</i>	0–25	–
	Maximilian sunflower	HEMA2	<i>Helianthus maximiliani</i>	0–25	–
	cinquefoil	POTEN	<i>Potentilla</i>	0–25	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	0–25	–
	American vetch	VIAM	<i>Vicia americana</i>	0–25	–
Shrub/Vine					
9	Shrubs			123–493	
	snowberry	SYMPH	<i>Symphoricarpos</i>	49–247	–
	American plum	PRAM	<i>Prunus americana</i>	25–197	–
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	0–123	–
	rose	ROSA5	<i>Rosa</i>	25–123	–
	silver buffaloberry	SHAR	<i>Shepherdia argentea</i>	0–123	–
	chokecherry	PRVI	<i>Prunus virginiana</i>	0–99	–
	currant	RIBES	<i>Ribes</i>	0–74	–
	silver sagebrush	ARCA13	<i>Artemisia cana</i>	0–74	–
	Saskatoon serviceberry	AMAL2	<i>Amelanchier alnifolia</i>	0–49	–
Tree					
10	Trees			0–49	
	Tree	2TREE	<i>Tree</i>	0–49	–
	green ash	FRPE	<i>Fraxinus pennsylvanica</i>	0–49	–

	plains cottonwood	PODEM	<i>Populus deltoides</i> ssp. <i>monilifera</i>	0-49	-
	American elm	ULAM	<i>Ulmus americana</i>	0-49	-

Table 11. Community 1.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Tall Warm-Season Grasses			36-179	
	big bluestem	ANGE	<i>Andropogon gerardii</i>	36-179	-
	switchgrass	PAVI2	<i>Panicum virgatum</i>	0-54	-
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	0-36	-
2	Wheatgrasses			269-538	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	269-538	-
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	0-36	-
3	Cool-Season Bunch Grasses			0-90	
	green needlegrass	NAVI4	<i>Nassella viridula</i>	0-90	-
	needle and thread	HECOC8	<i>Hesperostipa comata</i> ssp. <i>comata</i>	0-54	-
4	Warm-Season Bunchgrasses			90-269	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	90-269	-
5	Other Native Grasses			18-72	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0-54	-
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0-36	-
	composite dropseed	SPCOC2	<i>Sporobolus compositus</i> var. <i>compositus</i>	0-18	-
6	Grass-Likes			36-143	
	sedge	CAREX	<i>Carex</i>	36-143	-
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0-54	-
7	Non-Native Grasses			179-448	
	bluegrass	POA	<i>Poa</i>	90-359	-
	cheatgrass	BRTE	<i>Bromus tectorum</i>	36-179	-
Forb					
8	Forbs			90-179	
	Forb, introduced	2FI	<i>Forb, introduced</i>	18-90	-
	Forb, native	2FN	<i>Forb, native</i>	18-90	-
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	18-90	-
	goldenrod	SOLID	<i>Solidago</i>	18-72	-
	white prairie aster	SYFA	<i>Symphotrichum falcatum</i>	18-54	-
	western yarrow	ACMIO	<i>Achillea millefolium</i> var. <i>occidentalis</i>	18-54	-
	American licorice	GLLE3	<i>Glycyrrhiza lepidota</i>	0-54	-
	scurfpea	PSORA2	<i>Psoraleidium</i>	18-54	-
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	0-36	-
	purple prairie clover	DAPU5	<i>Dalea purpurea</i>	0-18	-
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	0-18	-

	cinquefoil	POTEN	<i>Potentilla</i>	0–18	–
Shrub/Vine					
9	Shrubs			90–179	
	American plum	PRAM	<i>Prunus americana</i>	18–90	–
	snowberry	SYMPH	<i>Symphoricarpos</i>	18–90	–
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	0–54	–
	rose	ROSA5	<i>Rosa</i>	18–54	–
	silver buffaloberry	SHAR	<i>Shepherdia argentea</i>	0–36	–
	chokecherry	PRVI	<i>Prunus virginiana</i>	0–36	–
	currant	RIBES	<i>Ribes</i>	0–18	–
	Saskatoon serviceberry	AMAL2	<i>Amelanchier alnifolia</i>	0–18	–
	silver sagebrush	ARCA13	<i>Artemisia cana</i>	0–18	–
Tree					
10	Trees			0–36	
	Tree	2TREE	<i>Tree</i>	0–36	–
	green ash	FRPE	<i>Fraxinus pennsylvanica</i>	0–36	–
	plains cottonwood	PODEM	<i>Populus deltoides ssp. monilifera</i>	0–36	–
	American elm	ULAM	<i>Ulmus americana</i>	0–36	–

Table 12. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Tall Warm-Season Grasses			0–67	
	big bluestem	ANGE	<i>Andropogon gerardii</i>	0–67	–
2	Wheatgrasses			27–202	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	27–202	–
4	Warm-Season Bunchgrasses			202–336	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	202–336	–
5	Other Native Grasses			0–54	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–40	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–27	–
6	Grass-Likes			27–135	
	sedge	CAREX	<i>Carex</i>	27–135	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–40	–
7	Non-Native Grasses			336–538	
	bluegrass	POA	<i>Poa</i>	269–471	–
	cheatgrass	BRTE	<i>Bromus tectorum</i>	27–135	–
Forb					
8	Forbs			67–135	
	Forb, introduced	2FI	<i>Forb, introduced</i>	13–67	–
	Forb, native	2FN	<i>Forb, native</i>	13–67	–
	western yarrow	ACMIO	<i>Achillea millefolium var. occidentalis</i>	13–67	–

	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	13–67	–
	goldenrod	SOLID	<i>Solidago</i>	13–67	–
	scurfpea	PSORA2	<i>Psoraleidium</i>	0–40	–
	American licorice	GLLE3	<i>Glycyrrhiza lepidota</i>	0–27	–
	white prairie aster	SYFA	<i>Symphyotrichum falcatum</i>	13–27	–
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	0–13	–
Shrub/Vine					
9	Shrubs			27–135	
	American plum	PRAM	<i>Prunus americana</i>	13–67	–
	snowberry	SYMPH	<i>Symphoricarpos</i>	13–67	–
	rose	ROSA5	<i>Rosa</i>	13–40	–
	silver buffaloberry	SHAR	<i>Shepherdia argentea</i>	0–27	–
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	0–27	–
	chokecherry	PRVI	<i>Prunus virginiana</i>	0–13	–
Tree					
10	Trees			0–27	
	Tree	2TREE	<i>Tree</i>	0–27	–
	green ash	FRPE	<i>Fraxinus pennsylvanica</i>	0–27	–
	plains cottonwood	PODEM	<i>Populus deltoides ssp. monilifera</i>	0–27	–
	American elm	ULAM	<i>Ulmus americana</i>	0–27	–

Animal community

Animal Community – Wildlife Interpretations

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

Historically, the Northern mixed-grass prairie was a disturbance-driven ecosystem with fire, herbivory and climate functioning as the primary disturbance factors either singly or in combination. Following European settlement, livestock grazing, cropland conversion, elimination of fire, energy development and other anthropogenic factors influenced species composition and abundance. Introduced and invasive species further impacted plant and animal communities. The bison was a historical 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 Loamy Overflow Ecological Site (ES) provides upland grassland cover with an associated forb, shrub, and tree component. It was typically part of an expansive grassland landscape that included combinations of Shallow Loamy, Shallow Clayey, Thin Loamy, Thin Claypan, Sandy, Sandy Claypan, Loamy, Sandy Terrace and Clayey ESs.

This ES supports a riparian plant community and remains essentially intact. The floodplain plant community may be composed of mature cottonwood and various age classes of elm, green ash, and boxelder; with a shrub component of wild plum, western snowberry, silver buffaloberry, wild rose, etc. The presence or absence of this tree/shrub component is an important factor influencing wildlife species composition.

Occasional to frequent flooding deposits silt on the site which may allow for potential sprouting of plains cottonwood. This site is subject to invasion of grass species such as annual bromegrasses and Kentucky bluegrass. Woody species such as Eastern red cedar, Rocky Mountain juniper, Tamarisk, and Russian olive may invade this site.

This site provides important habitat for grassland, woodland and shrub nesting birds, small rodents, bats, mammalian predators, and a variety of reptiles, amphibians, and insects. Within the MLRA, this site provides the suitable habitat for numerous riparian associated species. This site provides foraging and brood rearing habitat for upland game birds such as greater sage-grouse and sharp-tailed grouse. However, due to the presence of invasive grass and/or woody species ground nesting birds' reproduction is reduced.

Big Bluestem/Western Wheatgrass/Green Needlegrass: The predominance of grasses plus high diversity of forbs and shrubs in this community favors grazers and mixed-feeders, such as white-tailed deer. Plant communities associated with woody habitat provide habitat for songbirds such as brown thrasher, redheaded woodpecker, warbling vireo, yellow warbler, gray catbird, Say's phoebe, loggerhead shrike, Lazuli bunting, yellow breasted chat, and black-headed grosbeak; and raptors such as red-tailed hawk, Swainson's hawk, American kestrel, and great-horned owl. Insects, such as pollinators, play a large role in maintaining the forb community and provide a forage base for birds and other species. Diverse prey populations are available for grassland raptors and mammalian predators, especially bobcat.

The diversity of grasses, forbs, and shrubs provide high nutrition levels for small and large herbivores including voles, mice, thirteen-lined ground squirrel, Eastern cottontail rabbit, white-tailed jackrabbit, and deer. This ES provides excellent fawning habitat for white-tailed deer. The relatively high stature of this plant community provides suitable thermal, protective, and escape cover for small and large mammals. This plant community provides habitat for various amphibian and reptile species such as frogs, toads, salamanders, bull and garter snakes. Introduced bird species such as European starling, ring-necked pheasant, and gray partridge will use this site.

Mixed Shrub/Western Wheatgrass and Western Wheatgrass/Kentucky Bluegrass: Resulting from heavy continuous seasonal grazing, nonuse, or reduction in fire frequency, shrubs and western wheatgrass will dominate. Shrub diversity and density has increased. The tree component remains largely unchanged. Livestock damage to trees is often noticeable. The increase in the shrub component results in increased habitat for yellow warbler, gray catbird, loggerhead shrike, Bell's vireo, brown thrasher, Lazuli bunting, and yellow breasted chat. When present, the tall tree component continues to provide habitat for red-tailed hawk, American kestrel, redheaded woodpecker, warbling vireo, black-headed grosbeak, and Say's phoebe. This plant community provides habitat for various amphibian and reptile species such as frogs, toads, salamanders, bull, and garter snakes.

Resulting from continuous season-long grazing the plant community will become dominated by western wheatgrass and Kentucky bluegrass. The tree, forb, and shrub diversity remains relatively unchanged. The shift from to western wheatgrass and Kentucky bluegrass does not result in a significant change to the wildlife community. Small mammals such as voles and mice may increase due to the presence of Kentucky bluegrass and increased litter. Predators utilizing this plant community include the coyote, red fox, long-tailed weasel, raccoon, and bobcat.

Kentucky Bluegrass/Blue Grama: Resulting from long-term, continuous season-long grazing Kentucky bluegrass and blue grama will dominate this site. Tree and shrub diversity and abundance have greatly decreased. The reduction of the shrub component results in reduced habitat for brown thrasher, yellow warbler, gray catbird, loggerhead shrike, Lazuli bunting, and yellow breasted chat. Loss of tree vigor and canopy reduces habitat quality for warbling vireo and black-headed grosbeak. Increased soil temperature reduces habitat quality for most amphibians.

Ecological processes on this site have been impacted by decreased litter interfering with nutrient and water cycles decreasing forb and graminoid diversity. Runoff increases due to bare ground and decreased litter, resulting in sediment loading and warmer water to adjacent streams.

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 Kentucky Bluegrass/Blue Grama 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 low to moderate depending on slope and ground cover. In many cases, areas with greater than 75 percent ground cover have the greatest potential for high infiltration and lower runoff. An exception would be where shortgrasses form a strong sod and dominate the site. Normally, areas where ground cover is less than 50 percent have the greatest potential to have reduced infiltration and higher runoff (refer to Section 4, NRCS National Engineering Handbook for runoff quantities and hydrologic curves).

Recreational uses

This site provides hunting opportunities for upland game species. The wide varieties of plants which bloom from spring until fall have an esthetic value that appeals to visitors.

Wood products

No appreciable wood products are typically present on this site.

Other products

Seed harvest of native plant species can provide additional income on this site.

Inventory data references

Information presented here has been derived from NRCS clipping data and other inventory data. Field observations and experience were also used. Those involved in developing this site description include: Ryan Beer, Range Management Specialist (RMS), NRCS; Chuck Berdan, Biologist (BIO), Bureau of Land Management (BLM); Stan Boltz, RMS, NRCS; Dave Dewald, Wildlife BIO, NRCS; Jody Forman, RMS, NRCS; Dennis Froemke, RMS, NRCS; Tom Juntti, BIO, United States Forest Service (USFS); Cheryl Nielsen, RMS, NRCS; Jeff Printz, RMS, NRCS; Mike Stirling, RMS, NRCS; Dan Svingen, BIO, USFS; Darrell Vanderbusch, Soil Scientist, NRCS; Cindy Zachmeier, BIO, NRCS; and Tim Zachmeier, BIO, BLM.

Other references

High Plains Regional Climate Center, University of Nebraska, 830728 Chase Hall, Lincoln, NE 68583-0728.
(<http://www.hprcc.unl.edu/>)

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

USDA, NRCS. National Range and Pasture Handbook, September 1997

USDA, NRCS. National Soil Information System, Information Technology Center, 2150 Centre Avenue, Building A, Fort Collins, CO 80526. (<http://nasis.nrcs.usda.gov>)

USDA, NRCS. 2001. The PLANTS Database, Version 3.1 (<http://plants.usda.gov>). National Plant Data Center,

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
Contact for lead author	stanley.boltz@sd.usda.gov, 605-352-1236
Date	05/06/2010
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:** Typically none or barely visible. Evidence of water flow may be present after high overland flow events or flooding from adjacent streams, but vegetation normally remains intact.

- 3. Number and height of erosional pedestals or terracettes:** None.

- 4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 0 to 5 percent is typical.

- 5. Number of gullies and erosion associated with gullies:** None typical, however limited headcutting may form after high runoff or flooding events. Existing gullies should be stabilized with good vegetative cover.

- 6. Extent of wind scoured, blowouts and/or depositional areas:** None typical, but limited deposition may occur after major runoff or flooding events.

- 7. Amount of litter movement (describe size and distance expected to travel):** Litter of small and medium size classes will move after average to high rainfall events. Litter does not travel far, typically being trapped in small bunches by the

extensive vegetative cover. Litter movement may be fairly extensive after major runoff or flooding events.

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 5 to 20 inches thick with mollic (dark) colors when moist. Structure typically is medium to fine granular 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: Tall warm-season rhizomatous >

Sub-dominant: Mid cool-season rhizomatous > Mid/tall cool-season bunchgrasses > Shrubs >

Other: Forbs > Mid/short warm-season bunchgrasses = Grass-likes > Trees

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 1,900-3,800 lbs./acre (air-dry weight). Reference value production is 2,800 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, Kentucky bluegrass, snowberry, and smooth brome grass.

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.
-