Ecological site R058DY017SD
Shallow Clayey

Accessed: 04/17/2024

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.

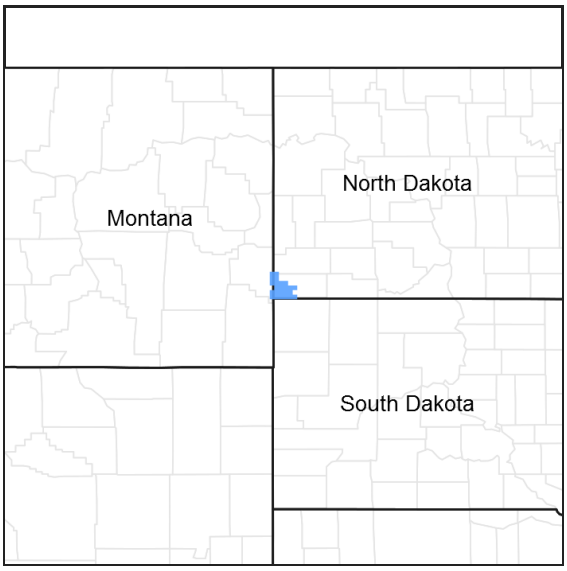


Figure 1. Mapped extent

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

R058DY011SD	**Clayey**
R058DY012SD	**Thin Loamy**
R058DY013SD	**Claypan**

Similar sites

R058DY011SD	**Clayey** Clayey [less warm-season grasses; more production]

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified

Herbaceous	(1) *Pascopyrum smithii* (2) *Nassella viridula*

Physiographic features

This site occurs on moderate to steeply sloping uplands.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Ridge
Flooding frequency	None
Ponding frequency	None
Elevation	2,300–4,000 ft
Slope	8–40%
Water table depth	80 in
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 strong storms may bring brief periods of high winds with gusts to more than 50 mph.

Table 3. Representative climatic features

Frost-free period (average)	123 days
Freeze-free period (average)	140 days
Precipitation total (average)	16 in

Influencing water features

No significant water features influence this site.

Soil features

The features common to soils in this site are the clay to silty clay textured surface layers and slopes of 8 to 40 percent. The soils in this site are well-drained and formed in residuum weathered from clayey shale. The surface layer is three to four inches thick. The texture of the subsurface layers range from silty clay loam to clay. 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 vegetative barriers. The soil surface is stable and intact.

These soils are susceptible mainly to water erosion. The hazard of water erosion increases on slopes greater than

about 15 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) Clay (2) Silty clay
Family particle size	(1) Clayey
Drainage class	Well drained
Permeability class	Very slow
Soil depth	10–20 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	3 in
Calcium carbonate equivalent (0-40in)	0–15%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

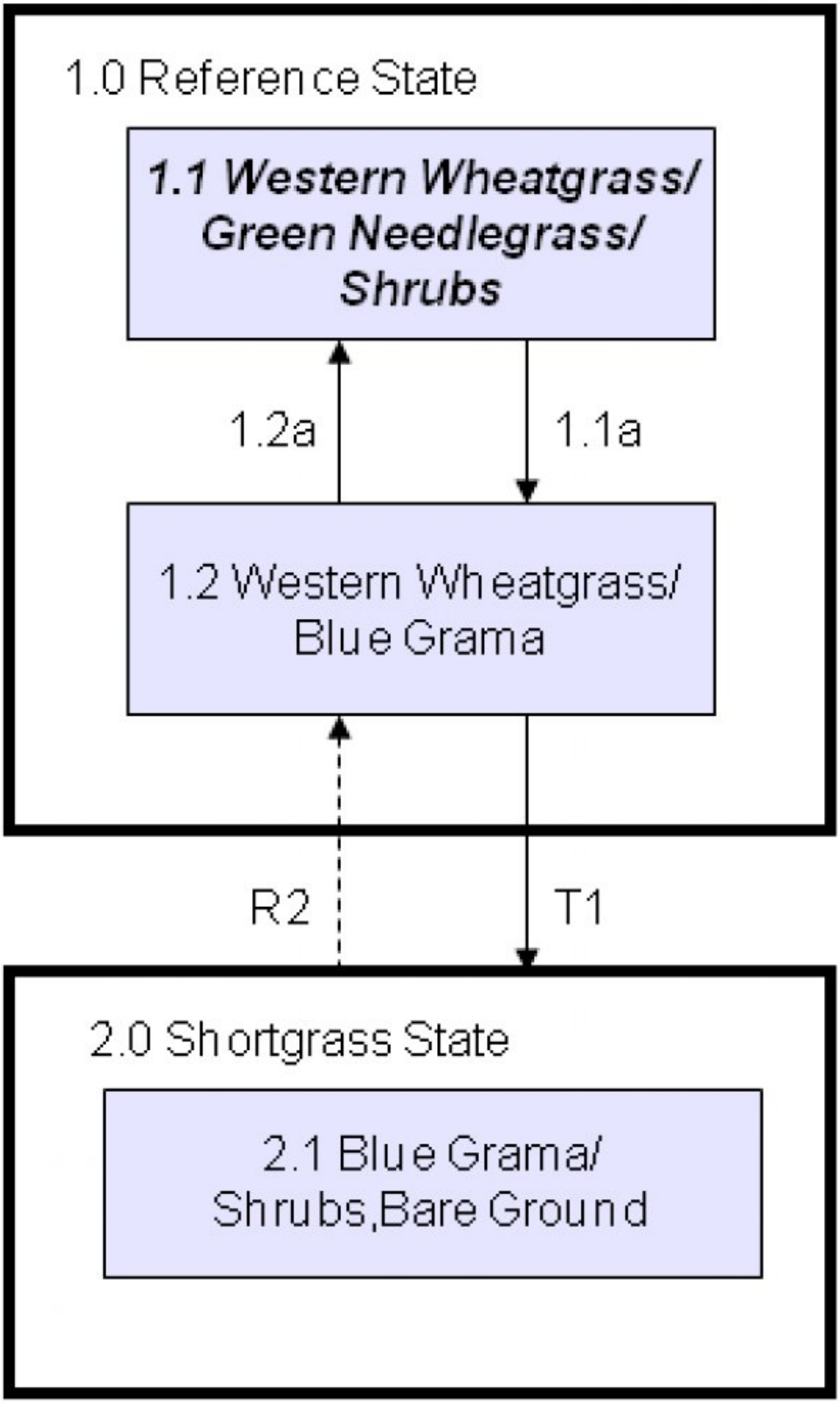
This site developed under Northern Great Plains climatic conditions, natural influences of large herbivores, occasional fire, and other biotic and abiotic factors that typically influence soil/site development. Changes will occur in the plant communities due to short-term weather variations, impacts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

As this site deteriorates, species such as blue grama and big sagebrush will increase. Cool-season grasses such as green needlegrass, little bluestem, bluebunch wheatgrass, and rhizomatous wheatgrasses will decrease in frequency and production.

The plant community upon which interpretations are primarily based is the Western Wheatgrass/Green Needlegrass/Shrubs Plant Community. This plant community has been determined by studying rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily grazed to lightly grazed areas, seasonal use pastures, and historical accounts also have been used. Plant communities, states, transitional pathways, and thresholds have been determined through similar studies and experience.

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


1.0 Reference State
1.1 Western Wheatgrass/ Green Needlegrass/ Shrubs
1.2a
1.1a
1.2 Western Wheatgrass/ Blue Grama
R2
T1
2.0 Shortgrass State
2.1 Blue Grama/ Shrubs,Bare Ground

State 1
Reference

The State narrative is under development.

Community 1.1
Western Wheatgrass/Green Needlegrass/Shrubs

Interpretations are primarily based on the Western Wheatgrass/Green Needlegrass/Shrubs Plant Community. This is also considered climax. Potential vegetation is about 80 to 90 percent grasses or grass-like plants, 5 to 10 percent forbs, and 5 to 10 percent shrubs. Major grasses include western wheatgrass, green needlegrass, and blue grama. Other grasses and grass-likes occurring on this plant community include little bluestem, plains muhly, and sideoats grama. Forbs commonly occurring include cudweed sagewort, white prairie aster, dotted gayfeather, purple prairie clover, and scurfpea. Shrubs commonly occurring include big sagebrush and rose. This plant community is well adapted to the Northern Great Plains climatic conditions. Individual species can vary greatly in production depending on growing conditions (timing and amount of precipitation and temperature). Community dynamics, nutrient cycle, water cycle, and energy flow are functioning properly. Plant litter is properly distributed with very little movement offsite and natural plant mortality is very low. The diversity in plant species allows for high drought tolerance. Runoff from adjacent sites and moderate or high available water capacity provides a favorable soil-water-plant relationship.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	590	1020	1540
Shrub/Vine	55	90	130
Forb	55	90	130
Total	**700**	**1200**	**1800**

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

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

Community 1.2
Western Wheatgrass/Blue Grama

This plant community develops under continuous season-long grazing by large herbivores. The potential vegetation is about 75 to 90 percent grass and grass-like species, 5 to 10 percent forbs, and 5 to 15 percent shrubs. The major grass and grass-like species include western wheatgrass, blue grama, buffalograss, and sedge. Other grasses occurring on this plant community include green needlegrass, sideoats grama, little bluestem, and needleandthread. Forbs commonly occurring include cudweed sagewort, goldenrod, western yarrow, white prairie aster, and scurfpea. Shrubs commonly found include big sagebrush, fringed sagewort, and silver sagebrush. When compared to the Western Wheatgrass/Green Needlegrass/Shrubs Plant Community, blue grama and sedges have increased. Green needlegrass, little bluestem, and sideoats grama have decreased. Production of cool-season grasses has also been reduced. Nonnative species such as cheatgrass, salsify, Kentucky bluegrass, and sweetclover will likely invade this plant community. This plant community is stable and protected from excessive erosion. The dominant herbaceous species are very adapted to grazing; however, the midgrass species and the more palatable forbs will decrease in the community through continuous seasonal grazing. This plant community tends to be resilient if disturbance is not long-term.

Table 6. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	520	742	1055
Shrub/Vine	40	90	150
Forb	40	68	95
Total	**600**	**900**	**1300**

Figure 7. Plant community growth curve (percent production by month). SD5803, Northern Rolling High Plains, cool-season/warm-season co-dominant.. Cool-season, warm-season co-dominant, uplands..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	10	20	28	21	10	5	3	0	0

Pathway 1.1a
Community 1.1 to 1.2

Continuous season-long grazing will convert the plant community to the Western Wheatgrass/Blue Grama Plant Community.

Pathway 1.2a
Community 1.2 to 1.1

Prescribed grazing will move this plant community to the Western Wheatgrass/Green Needlegrass/Shrubs Plant Community.

Conservation practices

Prescribed Grazing

State 2
Shortgrass

The State narrative is under development.

Community 2.1
Blue Grama/Shrubs, Bare Ground

This plant community develops under heavy continuous grazing, or with continuous seasonal grazing with concentrated use in the early part of the growing season (as in calving/lambing pastures). It is made up of approximately 65 to 85 percent grasses and grass-likes (primarily short, warm-season grasses), 5 to 10 percent forbs, and 10 to 25 percent shrubs. The dominant grasses or grass-likes include blue grama, buffalograss, and sedge. Other grasses may include western wheatgrass, prairie Junegrass, bluegrass, and annual brome. The dominant forbs include scurfpea, white prairie aster, western yarrow, and scarlet globemallow. The dominant shrubs are fringed sagewort, big sagebrush, silver sagebrush, and plains pricklypear. Compared to the Western Wheatgrass/Green Needlegrass/Shrubs Plant Community, short grasses have increased, and the cool-season midgrasses have diminished greatly. Some forbs and cactus have either increased and/or invaded the site. Plant diversity is low. This plant community is very stable. Generally, this plant community will require significant management inputs and time to move it away from this plant community. Onsite soil erosion is low. Infiltration is low and runoff is high. Typically, the runoff is very clean but offsite areas can be significantly impacted due to the increased runoff.

Table 7. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	270	450	670
Shrub/Vine	55	105	165
Forb	25	45	65
Total	**350**	**600**	**900**

Figure 9. Plant community growth curve (percent production by month). SD5804, Northern Rolling High Plains, warm-season dominant, cool-season sub-dominant.. Warm-season dominant, cool-season sub-dominant, uplands..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	7	18	24	25	15	7	1	0	0

Transition T1
State 1 to 2

Heavy continuous grazing will shift this plant community to the Blue Grama/Shrubs, Bare Ground Plant Community.

Restoration pathway R2
State 2 to 1

Long-term prescribed grazing and favorable climatic conditions, which allows for adequate plant recovery periods, will move this plant community towards the Western Wheatgrass/Blue Grama Plant Community.

Conservation practices

Prescribed Grazing

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Wheatgrass**			300–480	
	western wheatgrass	PASM	*Pascopyrum smithii*	300–480	–
	thickspike wheatgrass	ELLAL	*Elymus lanceolatus ssp. lanceolatus*	24–180	–
2	**Cool-Season Bunch Grasses**			120–300	
	green needlegrass	NAVI4	*Nassella viridula*	120–300	–
	bluebunch wheatgrass	PSSP6	*Pseudoroegneria spicata*	0–60	–
	needle and thread	HECOC8	*Hesperostipa comata ssp. comata*	12–60	–
3	**Short-Warm Season Grasses**			60–180	
	blue grama	BOGR2	*Bouteloua gracilis*	60–180	–
	buffalograss	BODA2	*Bouteloua dactyloides*	0–60	–
	saltgrass	DISP	*Distichlis spicata*	0–24	–
4	**Warm-Season Grasses**			12–120	
	sideoats grama	BOCU	*Bouteloua curtipendula*	0–120	–
	plains muhly	MUCU3	*Muhlenbergia cuspidata*	12–120	–

	little bluestem	SCSC	*Schizachyrium scoparium*	0–120	–
	Grass, perennial	2GP	*Grass, perennial*	0–60	–
5	**Cool-Season Grasses**			12–60	
	Graminoid (grass or grass-like)	2GRAM	*Graminoid (grass or grass-like)*	0–60	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	12–60	–
	Sandberg bluegrass	POSE	*Poa secunda*	0–36	–
6	**Grass-Likes**			12–60	
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	0–60	–
	needleleaf sedge	CADU6	*Carex duriuscula*	12–60	–
Forb					
8	**Forbs**			60–120	
	Forb, native	2FN	*Forb, native*	12–48	–
	white sagebrush	ARLU	*Artemisia ludoviciana*	12–36	–
	white prairie aster	SYFA	*Symphyotrichum falcatum*	12–36	–
	prairie thermopsis	THRH	*Thermopsis rhombifolia*	12–24	–
	American vetch	VIAM	*Vicia americana*	12–24	–
	leafy wildparsley	MUDI	*Musineon divaricatum*	12–24	–
	purple prairie clover	DAPU5	*Dalea purpurea*	12–24	–
	scarlet beeblossom	GACO5	*Gaura coccinea*	12–24	–
	blazing star	LIATR	*Liatris*	12–24	–
	desertparsley	LOMAT	*Lomatium*	12–24	–
	scurfpea	PSORA2	*Psoralidium*	12–24	–
	upright prairie coneflower	RACO3	*Ratibida columnifera*	12–24	–
	Missouri goldenrod	SOMI2	*Solidago missouriensis*	12–24	–
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	12–24	–
	American bird's-foot trefoil	LOUNU	*Lotus unifoliolatus var. unifoliolatus*	0–12	–
	rush skeletonplant	LYJU	*Lygodesmia juncea*	0–12	–
	blacksamson echinacea	ECAN2	*Echinacea angustifolia*	0–12	–
	buckwheat	ERIOG	*Eriogonum*	0–12	–
	milkvetch	ASTRA	*Astragalus*	0–12	–
	wavyleaf thistle	CIUN	*Cirsium undulatum*	0–12	–
	western yarrow	ACMIO	*Achillea millefolium var. occidentalis*	0–12	–
	textile onion	ALTE	*Allium textile*	0–12	–
	pussytoes	ANTEN	*Antennaria*	0–12	–
	purple locoweed	OXLA3	*Oxytropis lambertii*	0–12	–
	spiny phlox	PHHO	*Phlox hoodii*	0–12	–
	Nuttall's violet	VINU2	*Viola nuttallii*	0–12	–
Shrub/Vine					
9	**Shrubs**			60–120	
	big sagebrush	ARTR2	*Artemisia tridentata*	12–96	–
	Gardner's saltbush	ATGA	*Atriplex gardneri*	12–60	–
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–60	–

	winterfat	KRLA2	*Krascheninnikovia lanata*	12–36	–
	rose	ROSA5	*Rosa*	12–36	–
	skunkbush sumac	RHTR	*Rhus trilobata*	0–24	–
	silver sagebrush	ARCA13	*Artemisia cana*	12–24	–
	prairie sagewort	ARFR4	*Artemisia frigida*	12–24	–
	soapweed yucca	YUGL	*Yucca glauca*	0–12	–
	plains pricklypear	OPPO	*Opuntia polyacantha*	0–12	–
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	0–12	–

Table 9. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Wheatgrass**			90–225	
	western wheatgrass	PASM	*Pascopyrum smithii*	90–225	–
	thickspike wheatgrass	ELLAL	*Elymus lanceolatus ssp. lanceolatus*	0–45	–
2	**Cool-Season Bunch Grasses**			18–90	
	green needlegrass	NAVI4	*Nassella viridula*	9–72	–
	needle and thread	HECOC8	*Hesperostipa comata ssp. comata*	0–36	–
	bluebunch wheatgrass	PSSP6	*Pseudoroegneria spicata*	0–18	–
3	**Short-Warm Season Grasses**			180–315	
	blue grama	BOGR2	*Bouteloua gracilis*	135–270	–
	buffalograss	BODA2	*Bouteloua dactyloides*	18–90	–
	saltgrass	DISP	*Distichlis spicata*	0–36	–
4	**Warm-Season Grasses**			0–72	
	Grass, perennial	2GP	*Grass, perennial*	0–45	–
	sideoats grama	BOCU	*Bouteloua curtipendula*	0–45	–
	little bluestem	SCSC	*Schizachyrium scoparium*	0–45	–
	plains muhly	MUCU3	*Muhlenbergia cuspidata*	0–27	–
5	**Cool-Season Grasses**			9–45	
	prairie Junegrass	KOMA	*Koeleria macrantha*	9–45	–
	Graminoid (grass or grass-like)	2GRAM	*Graminoid (grass or grass-like)*	0–36	–
	Sandberg bluegrass	POSE	*Poa secunda*	0–27	–
6	**Grass-Likes**			45–135	
	needleleaf sedge	CADU6	*Carex duriuscula*	27–90	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	0–72	–
7	**Non-Native Grasses**			0–45	
	cheatgrass	BRTE	*Bromus tectorum*	0–45	–
	bluegrass	POA	*Poa*	0–45	–
Forb					
8	**Forbs**			45–90	
	white sagebrush	ARLU	*Artemisia ludoviciana*	9–45	–

	Forb, introduced	2FI	*Forb, introduced*	0–45	–
	Forb, native	2FN	*Forb, native*	9–27	–
	western yarrow	ACMIO	*Achillea millefolium var. occidentalis*	9–27	–
	scurfpea	PSORA2	*Psoralidium*	9–27	–
	Missouri goldenrod	SOMI2	*Solidago missouriensis*	9–27	–
	white prairie aster	SYFA	*Symphyotrichum falcatum*	9–27	–
	prairie thermopsis	THRH	*Thermopsis rhombifolia*	0–18	–
	pussytoes	ANTEN	*Antennaria*	0–18	–
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	9–18	–
	upright prairie coneflower	RACO3	*Ratibida columnifera*	0–9	–
	textile onion	ALTE	*Allium textile*	0–9	–
	milkvetch	ASTRA	*Astragalus*	0–9	–
	wavyleaf thistle	CIUN	*Cirsium undulatum*	0–9	–
	purple prairie clover	DAPU5	*Dalea purpurea*	0–9	–
	buckwheat	ERIOG	*Eriogonum*	0–9	–
	scarlet beeblossom	GACO5	*Gaura coccinea*	0–9	–
	blazing star	LIATR	*Liatris*	0–9	–
	desertparsley	LOMAT	*Lomatium*	0–9	–
	rush skeletonplant	LYJU	*Lygodesmia juncea*	0–9	–
	leafy wildparsley	MUDI	*Musineon divaricatum*	0–9	–
	purple locoweed	OXLA3	*Oxytropis lambertii*	0–9	–
	spiny phlox	PHHO	*Phlox hoodii*	0–9	–
	American vetch	VIAM	*Vicia americana*	0–9	–
Shrub/Vine					
9	**Shrubs**			45–135	
	big sagebrush	ARTR2	*Artemisia tridentata*	9–90	–
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–45	–
	prairie sagewort	ARFR4	*Artemisia frigida*	9–45	–
	silver sagebrush	ARCA13	*Artemisia cana*	9–36	–
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	0–27	–
	plains pricklypear	OPPO	*Opuntia polyacantha*	0–27	–
	soapweed yucca	YUGL	*Yucca glauca*	0–27	–
	skunkbush sumac	RHTR	*Rhus trilobata*	0–18	–
	rose	ROSA5	*Rosa*	9–18	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	0–9	–

Table 10. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Wheatgrass**			6–48	
	western wheatgrass	PASM	*Pascopyrum smithii*	6–48	–
2	**Cool-Season Bunch Grasses**			0–12	
	needle and thread	HECOC8	*Hesperostipa comata ssp.*	0–12	–

			comata		
3	**Short-Warm Season Grasses**			150–270	
	blue grama	BOGR2	*Bouteloua gracilis*	150–270	–
	buffalograss	BODA2	*Bouteloua dactyloides*	12–60	–
	saltgrass	DISP	*Distichlis spicata*	0–30	–
4	**Warm-Season Grasses**			0–30	
	Grass, perennial	2GP	*Grass, perennial*	0–30	–
5	**Cool-Season Grasses**			6–30	
	Graminoid (grass or grass-like)	2GRAM	*Graminoid (grass or grass-like)*	0–30	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	6–30	–
	Sandberg bluegrass	POSE	*Poa secunda*	0–24	–
6	**Grass-Likes**			30–120	
	needleleaf sedge	CADU6	*Carex duriuscula*	6–90	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	0–60	–
7	**Non-Native Grasses**			12–60	
	cheatgrass	BRTE	*Bromus tectorum*	6–48	–
	bluegrass	POA	*Poa*	0–48	–
Forb					
8	**Forbs**			30–60	
	white sagebrush	ARLU	*Artemisia ludoviciana*	6–48	–
	Forb, introduced	2FI	*Forb, introduced*	0–30	–
	scurfpea	PSORA2	*Psoralidium*	6–24	–
	white prairie aster	SYFA	*Symphyotrichum falcatum*	6–24	–
	western yarrow	ACMIO	*Achillea millefolium var. occidentalis*	6–18	–
	pussytoes	ANTEN	*Antennaria*	0–12	–
	Forb, native	2FN	*Forb, native*	6–12	–
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	6–12	–
	milkvetch	ASTRA	*Astragalus*	0–6	–
	wavyleaf thistle	CIUN	*Cirsium undulatum*	0–6	–
	buckwheat	ERIOG	*Eriogonum*	0–6	–
	rush skeletonplant	LYJU	*Lygodesmia juncea*	0–6	–
	leafy wildparsley	MUDI	*Musineon divaricatum*	0–6	–
	purple locoweed	OXLA3	*Oxytropis lambertii*	0–6	–
	spiny phlox	PHHO	*Phlox hoodii*	0–6	–
Shrub/Vine					
9	**Shrubs**			60–150	
	silver sagebrush	ARCA13	*Artemisia cana*	0–60	–
	prairie sagewort	ARFR4	*Artemisia frigida*	6–60	–
	big sagebrush	ARTR2	*Artemisia tridentata*	6–60	–
	plains pricklypear	OPPO	*Opuntia polyacantha*	6–36	–
	soapweed yucca	YUGL	*Yucca glauca*	0–36	–
	rose	ROSA5	*Rosa*	6–30	–
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	0–30	–

	rubber rabbitbrush	ERNAV6	*Ericameria nauseosa*	[illegible]	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–30	–
	skunkbush sumac	RHTR	*Rhus trilobata*	0–12	–

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, reductions of prairie dog colonies, and loss of fire as ecological drivers greatly influenced the character of the remaining native plant communities and altered wildlife habitats. Human development has reduced habitat quality for area-sensitive species.

Within MLRA 58D, the Shallow Clay 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 Shallow Loamy, Claypan, Thin Loamy, Thin Claypan, Sandy, Sandy Claypan, Loamy, and Clayey ESs. This site provided habitat for species requiring unfragmented grassland. Important habitat features and components found commonly or exclusively on this site may include greater sage-grouse and sharp-tailed grouse leks; upland nesting habitat for grassland birds, forbs and insects for brood habitat; and a forage source for small and large herbivores. Many grassland and shrub steppe nesting bird populations are declining. Extirpated species include free-ranging bison, grizzly bear, gray wolf, black-footed ferret, mountain plover, Rocky Mountain locust, and swift fox.

The majority of the Shallow Clay ES remains intact and provides increasingly important habitat for grassland and shrub steppe nesting birds, small rodents, coyotes, and a variety of reptiles, amphibians, and insects. Invasive species such as annual bromegrasses and crested wheatgrass have impacted the biological integrity of the site for some grassland birds such as greater sage-grouse. Changes in historic fire regime and domestic grazing have impacted the forb/shrub/grass percentages. Greater sage-grouse and Brewer’s sparrow benefit when big sagebrush increases.

Western Wheatgrass/Green Needlegrass/Shrubs: The predominance of grasses plus high diversity of forbs and shrubs in this community favors grazers and mixed-feeders, such as deer and pronghorn. Insects, such as pollinators, play a large role in maintaining the forb community and provide a forage base for grassland birds and other species. The complex plant structural diversity provides habitat for a wide array of migratory and resident birds. Brewer’s and grasshopper sparrow, lark bunting, western meadowlark, greater sage-grouse, and sharp-tailed grouse are common and benefit from the structure and composition this plant community provides. This site provides important breeding habitat for the loggerhead shrike. This site provides excellent nesting and brood rearing habitat for greater sage-grouse and sharp-tailed grouse. Diverse prey populations are available for grassland raptors such as northern harrier, 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 squirrels, white-tailed jackrabbit, and deer. This ES provides excellent wintering habitat for pronghorn. The moderate stature of this plant community provides suitable thermal, protective, and escape cover for small herbivores and grassland birds. Many wide-ranging predators utilize this plant community

including 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.

Western Wheatgrass/Blue Grama: Resulting from continuous season-long grazing western wheatgrass and blue grama will dominate. The forb diversity has decreased. Species such as horned lark, upland sandpiper, and white-tailed jackrabbit will increase due to the decline of big sagebrush. Density of species such as Brewer's sparrow, greater sage-grouse, as well as, desert cottontail will greatly decline. However, this plant community may provide areas suitable for lek site development.

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

Blue Grama/Shrubs, Bare Ground: This plant community develops as a result of heavy continuous grazing of the western wheatgrass and blue grama community. This grazing action favoring species such as big sage brush and leads to increased bare ground. The loss of taller understory grasses limits this vegetative community for big sage brush associated species such as greater sage-grouse, Brewer's sparrow, and desert cottontail. Prey populations are limited reducing availability for grassland raptors such as golden eagle, ferruginous hawk, and Swainson's hawk.

Impairment of the ecological processes impacts offsite aquatic habitats through excessive runoff, nutrient, and sediment loads. Increased amount of bare ground causes elevated surface temperatures resulting from reduced cover and litter will greatly reduce habitat for most amphibian species, grassland birds, and mammals.

Animal Community – Grazing Interpretations
As this site improves in condition through proper management (from the more shortgrass dominated plant communities to the interpretive plant community), the advantage for livestock production includes: higher forage production from cool-season grasses, improved early spring forage production, and higher water infiltration. The disadvantage for livestock include: reduction in cool-/warm-season grass mix which would provides better management flexibility, less plant diversity, and a potential increase in soil erosion. The Blue Grama/Shrubs, Bare Ground Plant Community is of limited value for livestock production.

Grazing by domestic livestock is one of the major income-producing industries in the area. Rangeland in this area may provide yearlong forage. During the dormant period, the forage for livestock will likely be lacking protein to meet livestock requirements, and added protein will allow ruminants to better utilize the energy stored in grazed plant materials. A forage quality test (either directly or through fecal sampling) should be used to determine the level of supplementation needed.

Hydrological functions

Water is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic group D. Infiltration and runoff potential for this site varies from moderate to high depending on soil hydrologic group, slope, and ground cover. In many cases, areas with greater than 75 percent ground cover have the greatest potential for high infiltration and lower runoff. An exception would be where shortgrasses form a strong sod and dominate the site. Normally, areas where ground cover is less than 50 percent have the greatest potential to have reduced infiltration and higher runoff (refer to Section 4, NRCS National Engineering Handbook for runoff quantities and hydrologic curves).

Recreational uses

This site provides hunting opportunities for upland game species. The wide 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.

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Contributors

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Travis Patient

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

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

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.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 0 to 15 percent is typical.

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5. **Number of gullies and erosion associated with gullies:** None should be present.

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6. **Extent of wind scoured, blowouts and/or depositional areas:** None.

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7. **Amount of litter movement (describe size and distance expected to travel):** Small size litter classes will generally move short distances, some medium size class litter will move very short distances. Litter debris dams are occasionally present.

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil aggregate stability ratings should typically be 5 to 6, normally 6. Surface organic matter adheres to the soil surface. Soil surface fragments will typically retain structure indefinitely when dipped in distilled water.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** A-horizon should be 2 to 4 inches thick with light to dark brownish gray colors. Structure should typically be fine granular at least in the upper A-horizon.

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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 – when dry, B horizons can be hard and appear to be compacted, but no platy structure will be present.

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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: Rhizomatous wheatgrass >> Mid/tall cool-season bunchgrasses >

    Sub-dominant: Short warm-season grasses >

    Other: Mid warm-season grasses = Forbs = Shrubs > Grass-likes

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):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Production ranges from 700-1,800 lbs./acre (air-dry weight). Reference value production is 1,200 lbs./acre (air-dry weight).

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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:** State and local noxious weeds

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17. **Perennial plant reproductive capability:** All species exhibit high vigor relative to climatic conditions. Do not rate based solely on seed production. Perennial grasses should have vigorous rhizomes or tillers.
