USDA Natural Resources
Conservation Service

Ecological site R058DY004SD
Wet Meadow

Accessed: 05/03/2024

General information

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

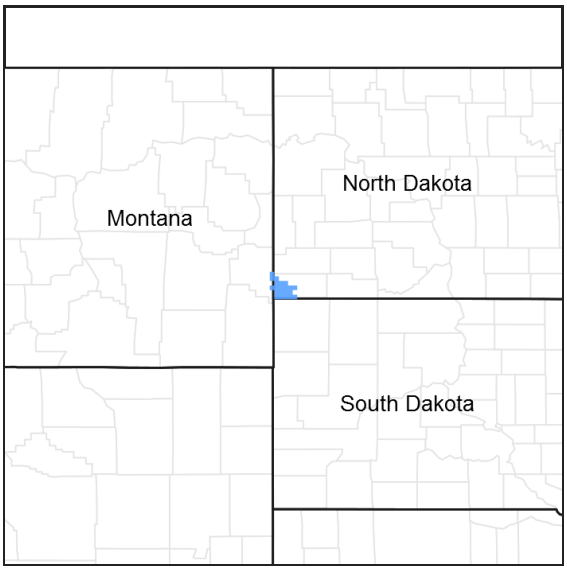


Figure 1. Mapped extent

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

Classification relationships

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

Associated sites

R058DY002SD	**Wet Land**
R058DY007SD	**Saline Lowland**

Similar sites

R058DY002SD	**Wet Land** Wet Land [less prairie cordgrass; less upland grasses]

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Spartina pectinata* (2) *Calamagrostis stricta ssp. inexpansa*

Physiographic features

This site occurs on nearly level sedimentary floodplains.

Table 2. Representative physiographic features

Landforms	(1) Depression (2) Flood plain
Flooding duration	Long (7 to 30 days)
Flooding frequency	None to frequent
Ponding duration	Long (7 to 30 days) to very long (more than 30 days)
Ponding frequency	Occasional to frequent
Elevation	701–1,219 m
Slope	0–2%
Ponding depth	0–15 cm
Water table depth	0–203 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 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

The palustrine, emergent wetland type had a persistent sub-class designation.

Soil features

The common features of soils in this site are the silt loam to silty clay-textured subsoil and slopes of zero to two

percent. The soils in this site are poorly drained and formed in alluvium. The silt loam to silty clay surface layer is 5 to 15 inches thick. The soils have a slow to very slow infiltration rate. This site should show no evidence of rills, wind scoured areas, or pedestalled plants. The soil surface is stable and intact. Subsurface soil layers are nonrestrictive to water movement and root penetration.

These soils are not susceptible to water erosion. Ponded water conditions and slow permeability strongly influences the soil-water-plant relationship.

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

Table 4. Representative soil features

Surface texture	(1) Silt loam (2) Loam (3) Silty clay loam
Family particle size	(1) Clayey
Drainage class	Poorly drained
Permeability class	Slow to moderate
Soil depth	203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	12.7–20.32 cm
Calcium carbonate equivalent (0-101.6cm)	0–15%
Electrical conductivity (0-101.6cm)	0–4 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
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)	0–10%

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.

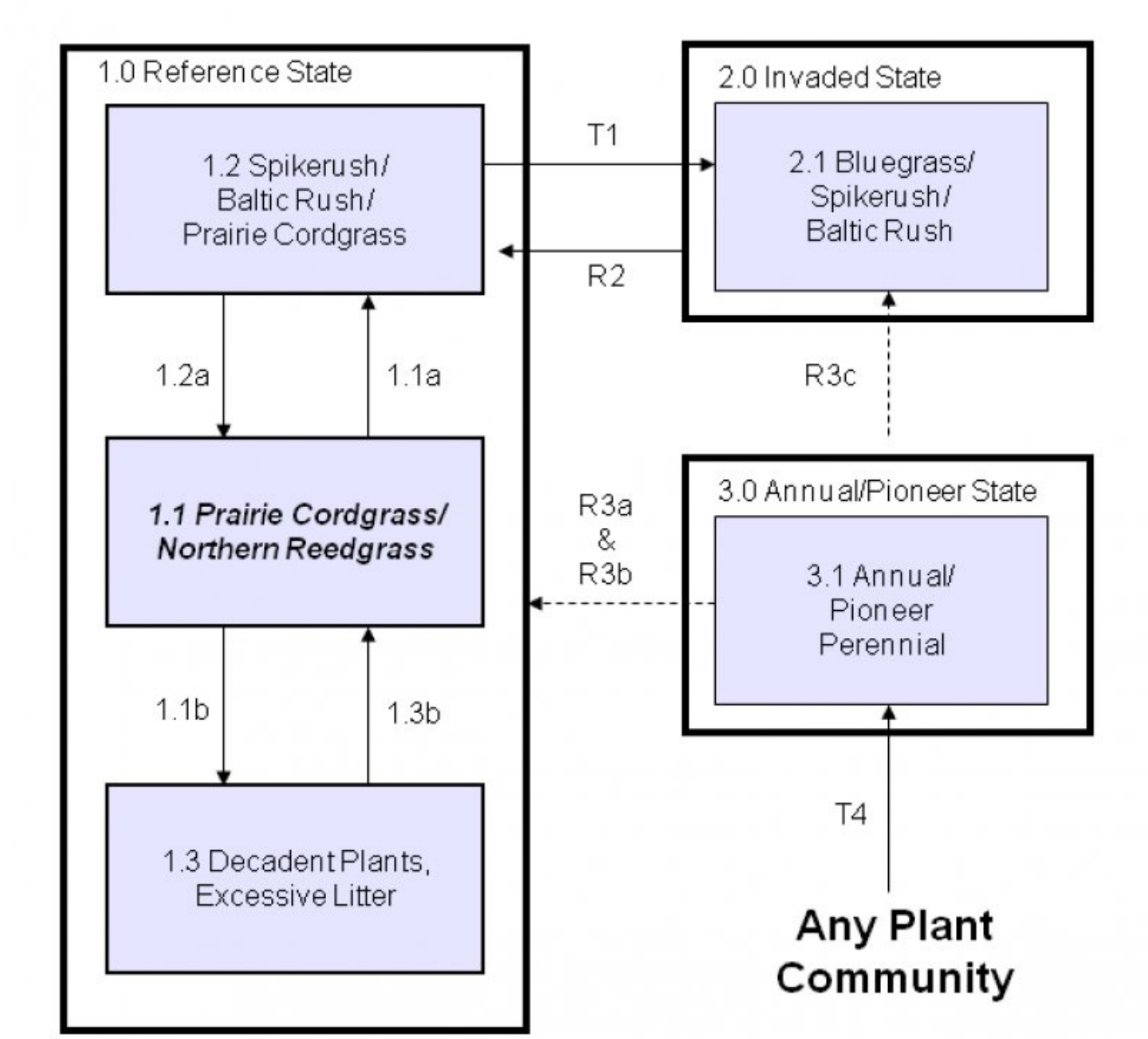
Ecological changes occur on this site primarily because of continuous grazing without adequate recovery opportunities between grazing events, and over rest or nonuse and lack of fire. Continuous grazing will cause species such as spikerush, Baltic rush, and native bluegrass to increase. Introduced species such as Kentucky bluegrass will begin to invade and dominate. Grasses such as prairie cordgrass and northern reedgrass will decrease in frequency and production and can eventually be removed from the site. Nonuse (extended rest over years) or lack of fire will cause litter levels and plant decadence/mortality to increase.

The plant community upon which interpretations are primarily based is the Prairie Cordgrass/Northern Reedgrass 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.

Following the state and transition diagram are narratives for each of the described states and community phases. These may not represent every possibility, but they are the most prevalent and repeatable states/community phases. The plant composition tables shown below have been developed from the best available knowledge at the time of this revision. As more data are collected, some of these community phases and/or states may be revised or removed, and new ones may be added. The main purpose for including the descriptions here is to capture the current knowledge and experience at the time of this revision.

State and transition model



State 1
Reference

The State narrative is under development

Community 1.1
Prairie Cordgrass/Northern Reedgrass

This is the interpretive plant community and is considered to be climax. This plant community evolved with grazing by large herbivores and is well suited for grazing by domestic livestock. It can be found on grazed areas, where grazed plants receive adequate periods of rest during the growing season in order to recover. Historically, fires occurred infrequently. The potential vegetation is about 55 percent grasses, 40 percent grass-likes, and 5 percent forbs by air-dry weight. Prairie cordgrass is the dominant tall warm-season grass occupying this plant community. Northern reedgrass is the dominant tall cool-season species. A variety of sedges and rushes occur throughout this community, as well as, switchgrass and fowl bluegrass. Key forbs include Maximillian sunflower, Canada goldenrod, and cinquefoil. This plant community is diverse, stable, and productive, and is well adapted to the Northern Great Plains. The high water table supplies much of the moisture for plant growth. 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 the variability of both the fluctuations of water table and reoccurring flooding. This is a sustainable plant community in terms of soil stability, watershed function, and biologic integrity.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	4349	4842	5318
Forb	135	202	286
Total	**4484**	**5044**	**5604**

Figure 5. Plant community growth curve (percent production by month). SD5808, Northern Rolling High Plains, lowland cool-season/warm-season codominant. Cool-season, Warm-season codominant, Lowland.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	4	11	19	23	20	12	6	5	0	0

Community 1.2
Spikerush/Baltic Rush/Prairie Cordgrass

This plant community will slowly develop from the adverse effects of continuous grazing, without adequate recovery periods between each grazing event during the growing season. Recognition of this plant community will enable the land user to implement key management decisions before a significant ecological threshold is crossed. Prairie cordgrass has been reduced in this plant community, but still persists in fair amounts. Kentucky bluegrass and western wheatgrass are the dominant species. Spikerush and Baltic rush, as well as, other grass-likes have increased. Northern reedgrass has been significantly reduced. Switchgrass may be removed at this stage. Creeping meadow foxtail can typically invade along drainageways if an upstream seed source is present. Forb species would include asters, goldenrod and cinquefoil as well as a possible invasion of Canada thistle. Plant production and frequency have been reduced. The water cycle, nutrient cycle and energy flow are slightly reduced but continue to adequately function.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	3189	3628	4024
Forb	174	295	460
Total	**3363**	**3923**	**4484**

Figure 7. Plant community growth curve (percent production by month). SD5808, Northern Rolling High Plains, lowland cool-season/warm-season codominant. Cool-season, Warm-season codominant, Lowland.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	4	11	19	23	20	12	6	5	0	0

Community 1.3
Decadent Plants/Excessive Litter

This plant community develops after an extended period (10 to 20 years or more) of non-use or exclusion of fire. Eventually litter levels become high enough to reduce native grass vigor, diversity, and density. Years of accumulated litter will tend to make this community wetter. Baltic rush and bulrush will increase. Hydrophytic forbs will also increase. Bluegrasses such as fowl bluegrass and Kentucky bluegrass, as well as, creeping meadow foxtail can flourish in this environment and will become a major component of this plant community. This plant community is resistant to change without prescribed grazing and fire. The combination of both grazing and fire is most effective in moving this plant community towards the Prairie Cordgrass/Northern Reedgrass Plant Community. Soil erosion and runoff is low. Once this plant community is reached, time and external resources will be needed to see any immediate recovery.

Table 7. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	3256	3766	4265
Forb	106	157	219
Total	**3362**	**3923**	**4484**

Figure 9. Plant community growth curve (percent production by month). SD5806, Northern Rolling High Plains, lowland cool-season dominant. Cool-season dominant, lowland.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	6	15	20	26	17	9	4	3	0	0

Pathway 1.1a
Community 1.1 to 1.2

Continuous grazing without adequate recovery periods between grazing events will shift this plant community to the Spikerush/Baltic Rush/Prairie Cordgrass Plant Community.

Pathway 1.1b
Community 1.1 to 1.3

Nonuse and no fire will move this plant community to the Decadent Plants, Excessive Litter Plant Community.

Pathway 1.2a
Community 1.2 to 1.1

Prescribed grazing that includes adequate recovery opportunities will shift this plant community back to the Prairie Cordgrass/Northern Reedgrass Plant Community.

Pathway 1.3a
Community 1.3 to 1.1

Prescribed grazing or prescribed burning followed by prescribed grazing will move this plant community toward the Prairie Cordgrass/Northern Reedgrass Plant Community. This would require long-term management with prescribed grazing and/or prescribed burning under controlled conditions.

State 2
Invaded

The State narrative is under development.

Community 2.1
Bluegrass/Spikerush/Baltic Rush

This plant community developed with heavy continuous grazing without adequate recovery periods between grazing events. Various bluegrasses, Spikerush, and Baltic rush dominate the community. Kentucky bluegrass will invade on drier portions of the community. Prairie cordgrass will tend to persist in trace amounts, greatly reduced in vigor. Goldenrod, dogbane, and cinquefoil have increased. A significant amount of production and diversity has been lost when compared to the Prairie Cordgrass/Northern Reedgrass Plant Community. Loss or reduction of native cool- and warm-season grasses, and the forb component have negatively impacted energy flow and nutrient cycling. It will take an extended period of time to restore this plant community back to climax with improved management. Renovation in most cases would not be practical, as well as, very costly.

Table 8. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	2001	2451	2864
Forb	241	351	499
Total	**2242**	**2802**	**3363**

Figure 11. Plant community growth curve (percent production by month). SD5806, Northern Rolling High Plains, lowland cool-season dominant. Cool-season dominant, lowland.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	6	15	20	26	17	9	4	3	0	0

State 3
Annual/Pioneer

The State narrative is under development.

Community 3.1
Annual/Pioneer Perennial Plant Community

This plant community develops under severe disturbance and/or excessive defoliation. This can result from heavy livestock or wildlife concentration, and cropping abandonment (go-back land). The dominant vegetation includes pioneer annual grasses, forbs, invaders, and early successional biennial and perennial species. Grasses may include inland saltgrass, foxtail barley, barnyardgrass, quackgrass, fowl bluegrass, Kentucky bluegrass, Baltic rush, sedges and western wheatgrass. The dominant forbs include curlycup gumweed, Canada thistle and other early successional species. Plant species from adjacent ecological sites may become minor components of this plant community. The community also is susceptible to invasion of other non-native species due to severe soil disturbances and relatively high percent of bare ground. This plant community is resistant to change, as long as soil disturbance or severe vegetation defoliation persists, thus holding back secondary plant succession. Soil erosion is potentially high. Reduced surface cover, low plant density, low plant vigor, loss of root biomass, and soil compaction, all contribute to decreased water infiltration, increased runoff, and accelerated erosion rates. Significant economic inputs, management and time would be required to move this plant community toward a higher successional stage and a more productive plant community. Secondary succession is highly variable, depending upon availability and diversity of a viable seed bank of higher successional species within the existing plant community and neighboring plant communities. This plant community can be renovated to improve the production capability, but management changes would be needed to maintain the new plant community. The total annual production ranges from 500 to 1500 lbs./ac. (air-dry weight) depending upon growing conditions.

Transition T1
State 1 to 2

Heavy continuous grazing without adequate recovery periods between grazing events will move this plant community across an ecological threshold toward the Bluegrass/Spikerush/Baltic Rush Plant Community.

Transition T4
State 1 to 3

Excessive defoliation (i.e., areas of heavy animal concentration,) will convert the plant community to the Annual/Pioneer Perennial Plant Community. Cropped go-back land with continuous grazing will convert this plant community to the Annual/Pioneer Perennial Plant Community.

Transition T4
State 1 to 3

Excessive defoliation (i.e., areas of heavy animal concentration,) will convert the plant community to the Annual/Pioneer Perennial Plant Community. Cropped go-back land with continuous grazing will convert this plant community to the Annual/Pioneer Perennial Plant Community.

Transition T4
State 1 to 3

Excessive defoliation (i.e., areas of heavy animal concentration,) will convert the plant community to the Annual/Pioneer Perennial Plant Community. Cropped go-back land with continuous grazing will convert this plant community to the Annual/Pioneer Perennial Plant Community.

Restoration pathway R2
State 2 to 1

Long-term prescribed grazing with adequate recovery periods following each grazing event and proper stocking, over long periods of time, will move this plant community toward the Spikerush/Baltic Rush/Prairie Cordgrass Plant Community. This plant community may eventually return to climax or associated successional communities assuming an adequate seed/vegetative source is available. This process may take greater than 20 years.

Transition T4
State 2 to 3

Excessive defoliation (i.e., areas of heavy animal concentration,) will convert the plant community to the Annual/Pioneer Perennial Plant Community. Cropped go-back land with continuous grazing will convert this plant community to the Annual/Pioneer Perennial Plant Community.

Restoration pathway R3a
State 3 to 1

Under long-term prescribed grazing and/or removal of disturbance, including adequate rest periods, this plant community will move through the successional stages, and may eventually lead to a plant community resembling the Prairie Cordgrass/Northern Reedgrass Plant Community. Depending on the slope, aspect, and size, and if adequate perennial plants exist, this change can occur more rapidly. This process will likely take a long period of time (20+ years).

Restoration pathway R3b
State 3 to 1

Range seeding after removal of disturbance with deferment and prescribed grazing can convert this to a plant community resembling the Prairie Cordgrass/Northern Reedgrass Plant Community.

Restoration pathway R3c
State 3 to 2

Heavy, continuous grazing after removal of disturbance will direct this plant community towards the Bluegrass/Spikerush/Baltic Rush Plant Community.

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	**Grasses**			2270–2774	
	prairie cordgrass	SPPE	*Spartina pectinata*	1009–1513	–
	northern reedgrass	CASTI3	*Calamagrostis stricta ssp. inexpansa*	504–757	–
	American mannagrass	GLGR	*Glyceria grandis*	252–504	–
	American sloughgrass	BESY	*Beckmannia syzigachne*	252–504	–
	western wheatgrass	PASM	*Pascopyrum smithii*	101–252	–
	switchgrass	PAVI2	*Panicum virgatum*	151–252	–
	fowl bluegrass	POPA2	*Poa palustris*	50–101	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	50–101	–
	Grass, perennial	2GP	*Grass, perennial*	50–101	–
	rough bentgrass	AGSC5	*Agrostis scabra*	50–101	–
2	**Grass-Likes**			1009–2018	
	shortbeak sedge	CABR10	*Carex brevior*	252–504	–
	Sartwell's sedge	CASA8	*Carex sartwellii*	252–504	–
	woolly sedge	CAPE42	*Carex pellita*	202–404	–
	clustered field sedge	CAPR5	*Carex praegracilis*	252–404	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	50–252	–
	spikerush	ELEOC	*Eleocharis*	151–252	–
	flatsedge	CYPER	*Cyperus*	50–101	–
Forb					
3	**Forbs**			151–252	
	Maximilian sunflower	HEMA2	*Helianthus maximiliani*	50–101	–
	Rydberg's sunflower	HENUR	*Helianthus nuttallii ssp. rydbergii*	50–101	–
	mint	MENTH	*Mentha*	50–101	–
	dogbane	APOCY	*Apocynum*	50–101	–
	Canada goldenrod	SOCA6	*Solidago canadensis*	50–101	–
	Forb, native	2FN	*Forb, native*	0–50	–
	Flodman's thistle	CIFL	*Cirsium flodmanii*	0–50	–
	showy prairie gentian	EUEXR	*Eustoma exaltatum ssp. russellianum*	0–50	–
	cinquefoil	POTEN	*Potentilla*	0–50	–
	western dock	RUAQ	*Rumex aquaticus*	0–50	–
	blue-eyed grass	SISYR	*Sisyrinchium*	0–50	–

Table 10. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Grasses**			1373–1765	
	prairie cordgrass	SPPE	*Spartina pectinata*	392–588	–
	quackgrass	ELRE4	*Elymus repens*	0–392	–
	bluegrass	POA	*Poa*	196–392	–
	fowl bluegrass	POPA2	*Poa palustris*	196–392	–
	creeping meadow foxtail	ALAR	*Alopecurus arundinaceus*	0–392	–
	American sloughgrass	BESY	*Beckmannia syzigachne*	196–392	–
	western wheatgrass	PASM	*Pascopyrum smithii*	118–275	–
	foxtail barley	HOJU	*Hordeum jubatum*	78–196	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	118–196	–
	rough bentgrass	AGSC5	*Agrostis scabra*	118–196	–
	Grass, annual	2GA	*Grass, annual*	39–196	–
	American mannagrass	GLGR	*Glyceria grandis*	0–118	–
	switchgrass	PAVI2	*Panicum virgatum*	78–118	–
	Grass, perennial	2GP	*Grass, perennial*	39–78	–
	northern reedgrass	CASTI3	*Calamagrostis stricta ssp. inexpansa*	0–78	–
2	**Grass-Likes**			1373–1765	
	spikerush	ELEOC	*Eleocharis*	392–785	–
	shortbeak sedge	CABR10	*Carex brevior*	392–588	–
	clustered field sedge	CAPR5	*Carex praegracilis*	196–392	–
	flatsedge	CYPER	*Cyperus*	196–392	–
	Sartwell's sedge	CASA8	*Carex sartwellii*	39–196	–
	woolly sedge	CAPE42	*Carex pellita*	78–196	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	39–196	–
Forb					
3	**Forbs**			196–392	
	cinquefoil	POTEN	*Potentilla*	118–196	–
	dogbane	APOCY	*Apocynum*	118–196	–
	curly dock	RUCR	*Rumex crispus*	118–196	–
	blue-eyed grass	SISYR	*Sisyrinchium*	118–196	–
	Canada goldenrod	SOCA6	*Solidago canadensis*	118–196	–
	common dandelion	TAOF	*Taraxacum officinale*	118–196	–
	Flodman's thistle	CIFL	*Cirsium flodmanii*	78–118	–
	Forb, introduced	2FI	*Forb, introduced*	39–78	–
	Forb, native	2FN	*Forb, native*	39–78	–
	western dock	RUAQ	*Rumex aquaticus*	39–78	–
	mint	MENTH	*Mentha*	0–39	–

Table 11. Community 1.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Grasses**			2158–2550	
	creeping meadow foxtail	ALAR	*Alopecurus arundinaceus*	0–1177	–
	quackgrass	ELRE4	*Elymus repens*	0–1177	–
	western wheatgrass	PASM	*Pascopyrum smithii*	196–392	–
	switchgrass	PAVI2	*Panicum virgatum*	196–392	–
	bluegrass	POA	*Poa*	196–392	–
	fowl bluegrass	POPA2	*Poa palustris*	196–392	–
	prairie cordgrass	SPPE	*Spartina pectinata*	196–392	–
	American mannagrass	GLGR	*Glyceria grandis*	39–196	–
	northern reedgrass	CASTI3	*Calamagrostis stricta ssp. inexpansa*	39–196	–
	Grass, annual	2GA	*Grass, annual*	78–196	–
	Grass, perennial	2GP	*Grass, perennial*	39–196	–
	rough bentgrass	AGSC5	*Agrostis scabra*	78–118	–
	American sloughgrass	BESY	*Beckmannia syzigachne*	0–78	–
	foxtail barley	HOJU	*Hordeum jubatum*	39–78	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	0–78	–
2	**Grass-Likes**			785–1177	
	woolly sedge	CAPE42	*Carex pellita*	196–392	–
	clustered field sedge	CAPR5	*Carex praegracilis*	196–392	–
	Sartwell's sedge	CASA8	*Carex sartwellii*	196–392	–
	spikerush	ELEOC	*Eleocharis*	196–392	–
	flatsedge	CYPER	*Cyperus*	118–196	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	39–196	–
	shortbeak sedge	CABR10	*Carex brevior*	39–196	–
Forb					
3	**Forbs**			118–196	
	mint	MENTH	*Mentha*	78–118	–
	curly dock	RUCR	*Rumex crispus*	78–118	–
	blue-eyed grass	SISYR	*Sisyrinchium*	0–78	–
	Canada goldenrod	SOCA6	*Solidago canadensis*	39–78	–
	common dandelion	TAOF	*Taraxacum officinale*	0–78	–
	Forb, introduced	2FI	*Forb, introduced*	39–78	–
	Forb, native	2FN	*Forb, native*	39–78	–
	dogbane	APOCY	*Apocynum*	0–78	–
	Flodman's thistle	CIFL	*Cirsium flodmanii*	39–78	–
	showy prairie gentian	EUEXR	*Eustoma exaltatum ssp. russellianum*	39–78	–
	Maximilian sunflower	HEMA2	*Helianthus maximiliani*	39–78	–
	Rydberg's sunflower	HENUR	*Helianthus nuttallii ssp. rydbergii*	39–78	–

	cinquefoil	POTEN	*Potentilla*	39–78	–
	western dock	RUAQ	*Rumex aquaticus*	39–78	–

Table 12. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Grasses**			1121–1401	
	creeping meadow foxtail	ALAR	*Alopecurus arundinaceus*	0–981	–
	quackgrass	ELRE4	*Elymus repens*	0–981	–
	bluegrass	POA	*Poa*	420–560	–
	fowl bluegrass	POPA2	*Poa palustris*	280–420	–
	American sloughgrass	BESY	*Beckmannia syzigachne*	280–420	–
	Grass, annual	2GA	*Grass, annual*	140–280	–
	foxtail barley	HOJU	*Hordeum jubatum*	140–280	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	140–280	–
	rough bentgrass	AGSC5	*Agrostis scabra*	140–280	–
	western wheatgrass	PASM	*Pascopyrum smithii*	56–140	–
	prairie cordgrass	SPPE	*Spartina pectinata*	0–140	–
	Grass, perennial	2GP	*Grass, perennial*	0–56	–
	American mannagrass	GLGR	*Glyceria grandis*	0–28	–
	switchgrass	PAVI2	*Panicum virgatum*	0–28	–
2	**Grass-Likes**			701–981	
	spikerush	ELEOC	*Eleocharis*	280–701	–
	shortbeak sedge	CABR10	*Carex brevior*	280–420	–
	clustered field sedge	CAPR5	*Carex praegracilis*	140–280	–
	flatsedge	CYPER	*Cyperus*	140–280	–
	Sartwell's sedge	CASA8	*Carex sartwellii*	28–56	–
	woolly sedge	CAPE42	*Carex pellita*	28–56	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	28–56	–
Forb					
3	**Forbs**			280–420	
	Canada goldenrod	SOCA6	*Solidago canadensis*	140–280	–
	curly dock	RUCR	*Rumex crispus*	140–280	–
	cinquefoil	POTEN	*Potentilla*	140–224	–
	blue-eyed grass	SISYR	*Sisyrinchium*	112–168	–
	dogbane	APOCY	*Apocynum*	84–140	–
	common dandelion	TAOF	*Taraxacum officinale*	84–112	–
	Flodman's thistle	CIFL	*Cirsium flodmanii*	56–84	–
	Forb, introduced	2FI	*Forb, introduced*	56–84	–
	Forb, native	2FN	*Forb, native*	56–84	–
	mint	MENTH	*Mentha*	0–28	–
	western dock	RUAQ	*Rumex aquaticus*	0–28	–

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 Wet Meadow ESs provides upland/wetland complex cover with an associated forb 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, Loamy Terrace, Sandy Terrace, and Clayey ESs.

The Wet Meadow ES has remained relatively intact but may be subject to haying under drier conditions. This site has sufficient hydrology to support hydrophytic vegetation and wildlife species associated with saturated soil conditions. This site receives subsurface water from adjacent upland sites. The site provides important wetland habitat for birds, small rodents, bats, mammalian predators, reptiles, amphibians, and insects. These sites also provide forage sites for greater sage-grouse broods.

Prairie Cordgrass/Northern Reedgrass: The predominance of hydrophytic vegetation, including a high diversity of sedges and other grass-like species, favors shorebirds (e.g. plovers, sandpipers, and snipe) and wetland associated songbirds. This plant community provides habitat for salamanders, various frog and toad species, and various snake species. Invertebrates are an important component of the food web. Raptors such as northern harrier, short-eared owl, Swainson’s hawk, and American kestrel will use this site. Prey populations are limited to small mammals such as water shrew and meadow vole and invertebrates. When associated with ESs dominated by big sagebrush, greater sage-grouse will use the site for brood rearing/foraging habitat.

Spikerush/Baltic Rush/Prairie Cordgrass and Bluegrass/Spikerush/Baltic Rush: Resulting from continuous grazing without adequate recovery periods or continuous seasonal grazing this site becomes dominated by shorter grass-like hydrophytes with increased forb diversity. The predominance of hydrophytic vegetation, still favors shorebirds (e.g. plovers, sandpipers, and snipe) and wetland associated songbirds. Insect pollinators become more abundant at this site. This plant community provides habitat for salamanders, various frog and toad species, and various snake species. Invertebrates are an important component of the food web. Raptors such as northern harrier, short-eared owl, Swainson’s hawk, and American kestrel will use this site. Prey populations are limited to small mammals such as water shrew and meadow vole and invertebrates. Invertebrate and vertebrate prey species are more vulnerable to predation due to the shorter stature of this plant community. When associated with ESs dominated by big sagebrush, greater sage-grouse will use the site for brood rearing/foraging habitat.

Decadent Plants, Excessive Litter: Resulting from nonuse and/or no fire this site becomes dominated by decadent plants and excessive amounts of plant litter. Increased amounts of decadent plant material result in limited foraging and nesting habitat for shorebirds and wetland associated songbirds. Insect pollinators continue to use this site. This plant community continues to provide habitat for salamanders, various frog and toad species, and various snake species. Invertebrates are an important component of the food web. Raptors such as northern harrier, short-

eared owl, Swainson's hawk, and American kestrel will use this site. Prey populations are limited to small mammals such as water shrew and meadow vole and invertebrates. Invertebrate and vertebrate prey species are less vulnerable to predation due to the amount of decadent plant material and litter buildup. Excessive litter buildup will limit use by greater sage-grouse for brood rearing/foraging habitat.

Annual/Pioneer Plant Community: This plant community develops under severe disturbance and/or excessive defoliation. This can result from heavy livestock concentration or cropping abandonment (go-back land). The dominant vegetation includes pioneer annual grasses, forbs, invaders, and early successional biennial and perennial species. Plant species from adjacent ESs may become minor components of this plant community. The community is susceptible to invasion of foxtail barley, quackgrass, and other nonnative species due to severe soil disturbances and relatively high percent of bare ground. Wildlife use improves with lower levels of foxtail barley and quackgrass invasion. Significant concentrations of these two species will significantly limit wildlife use. Wildlife use may remain relatively unchanged if the annual/pioneer plants are not invasive because of the relative high seed and flower production.

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 Annual, Pioneer Perennial Plant Community is of limited value for livestock production.

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

Hydrological functions

Water is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic groups B and 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: Stan Boltz, RMS, NRCS;

Dave Dewald, Wildlife Biologist, NRCS; Jody Forman, RMS, NRCS; Dennis Froemke, RMS, NRCS; Cheryl Nielsen, RMS, NRCS; Jeff Printz, RMS, NRCS; Mike Stirling, RMS, NRCS; and Darrell Vanderbusch, Soil Scientist, NRCS.

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, Baton Rouge, LA 70874-4490 USA
USDA, NRCS, Various Published Soil Surveys

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
Contact for lead author	stanley.boltz@sd.usda.gov, 605-352-1236
Date	05/07/2010
Approved by	Stan Boltz
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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2. **Presence of water flow patterns:** None.

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

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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 5 percent is typical. During periods of above average precipitation and run-on, this site may be ponded for longer than normal durations, and typical vegetation may be temporarily reduced, creating areas of bare ground for relatively short periods of time.

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

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

7. **Amount of litter movement (describe size and distance expected to travel):** Litter falls in place.

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):** The dark surface horizons should be 12 to 30 inches thick with mollic (dark) colors when moist. Structure typically is medium to fine granular in the upper horizon.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Deep rooted species (tall rhizomatous cool- and warm-season grasses and grass-likes) with fine and coarse roots positively influences infiltration. Infiltration is somewhat limited naturally due to poor drainage and relatively low permeability.

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 grasses = Grass-likes >

    Sub-dominant: Mid/tall cool-season grasses >

    Other: Forbs

    Additional: Due to differing root structure and distribution, Kentucky bluegrass and smooth bromegrass do not fit into reference plant community F/S groups. Other F/S groups may occur in minor amounts.

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Little evidence of decadence or mortality.

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 4,000 to 5,000 pounds per acre (air-dry weight), with the reference value being 4,500 pounds per 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 may be prevalent during dry cycles, but will typically not dominate the site. Most invasive species will occupy the perimeter of this site.

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