USDA Natural Resources
Conservation Service

Ecological site R053BY019ND
Wet Meadow

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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.

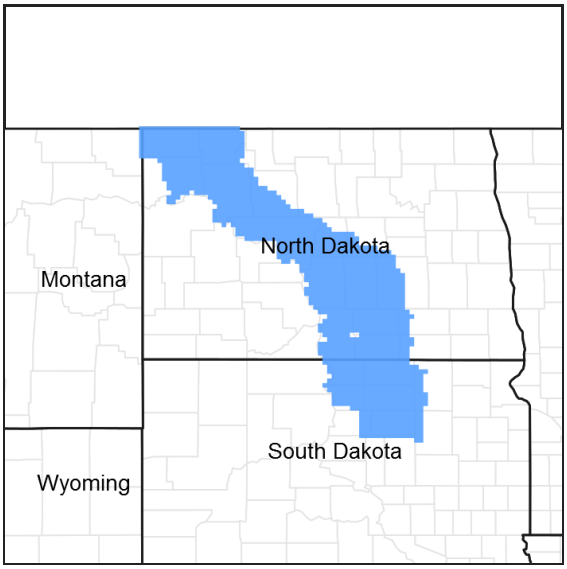


Figure 1. Mapped extent

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: 42a – Missouri Coteau; 42b – Collapsed Glacial Outwash; 42c – Missouri Coteau Slope; 42d – Northern Missouri Coteau; 42f – Southern Missouri Coteau Slope; 42g – Ponca Plains; and 42h – Southern River Breaks.

Associated sites

R053BY018ND	**Linear Meadow**
R053BY005ND	**Loamy Overflow**
R053BY006ND	**Saline Lowland**
R053BY012ND	**Subirrigated**

Similar sites

R053BY025ND	**Shallow Marsh** [This site also ponds, and has a water table similar to the Wet Meadow site for portions of the year. However, this site will normally dry out each year sufficiently that agricultural operations such as haying are feasible in most years. This site typically occurs in larger, isolated concave positions. Indicator species: dominated by whitetop and sedges, with lesser amounts of prairie cordgrass, bulrush and spikerush. This site has more whitetop and less prairie cordgrass, and higher production.]
R053BY018ND	**Linear Meadow** [Very poorly drained soils with noticeable redoximorphic features within 6 inches or just below the organic soil layer, found in depressions and along streams where water ponds at or above the surface for more the 7 days. Found down slope of Wet Meadow site and can be in micro low positions within the listed associated sites. Indicator species are slough sedge, whitetop, prairie cordgrass, cattail, smartweed and no shrub. This site has more production, far more slough sedge and far less prairie cordgrass.]

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 level to nearly level, or concave closed basins and depressions in low lying positions.

Table 2. Representative physiographic features

Landforms	(1) Lake plain (2) Outwash plain (3) Till plain
Flooding duration	Long (7 to 30 days)
Flooding frequency	None to frequent
Ponding duration	Long (7 to 30 days)
Ponding frequency	None to frequent
Elevation	1,600–2,000 ft
Slope	0–3%
Ponding depth	0–6 in
Water table depth	0–24 in
Aspect	Aspect is not a significant factor

Climatic features

MLRA 53B is considered to have a continental climate – cold winters and hot summers, low humidity, light rainfall, and much sunshine. Extremes in temperature are characteristic. The climate is the result of this MLRA’s location in the geographic center of North America. There are few natural barriers on the northern Great Plains. The air masses move unobstructed across the plains and account for rapid changes in temperature.

Annual precipitation ranges from 15 to 20 inches per year. The normal average annual temperature is about 41° F. January is the coldest month with average temperatures ranging from about 4° F (Powers Lake, ND) to about 10° F (Pollock, SD). July is the warmest month with temperatures averaging from about 67° F (Powers Lake, ND) to about 72° F (Pollock, SD). The range of normal average monthly temperatures between the coldest and warmest months is about 62° F. This large annual range attests to the continental nature of this MLRA's climate. Winds average about 11 miles per hour annually, ranging from about 13 miles per hour during the spring to about 10 miles per hour during the summer. Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 50 miles per hour.

Growth of native cool-season plants begins in late March and continues to early to mid July. Native warm-season plants begin growth in mid May and continue to the end of August. Green up of cool-season plants can occur in September and October when adequate soil moisture is present.

Table 3. Representative climatic features

Frost-free period (average)	135 days
Freeze-free period (average)	156 days
Precipitation total (average)	20 in

Influencing water features

Soil features

These are very deep, poorly drained, coarse to fine textured soils. Saturated hydraulic conductivity is rapid to slow and available water capacity is low to high. Salinity and sodicity are none to slight. Water tables on this site range from 1/2 foot above to 2 feet below the surface several weeks during the growing season. The site normally receives additional water from surface runoff and/or underground seepage. This site occurs in flats and depressions on lake plains, outwash plains and till plains. Slope ranges from 0 to 3 percent. This site should show no evidence of rills, wind scoured areas or pedestalled plants. The soil surface is stable and intact. Sub-surface soil layers are non-restrictive to water movement and root penetration. Ponded water conditions and slow permeability strongly influences the soil-water-plant relationship.

Major soil series correlated to this ecological site can be found in Section II of the Natural Resources Conservation Service Field Office Technical Guide or the following web sites:
http://www.nrcs.usda.gov/technical/efotg/

Table 4. Representative soil features

Surface texture	(1) Silt loam (2) Loam (3) Silty clay loam
Family particle size	(1) Loamy
Drainage class	Poorly drained
Permeability class	Slow to rapid
Soil depth	80 in
Surface fragment cover <=3"	0–10%
Surface fragment cover >3"	0–5%
Available water capacity (0-40in)	4–8 in
Calcium carbonate equivalent (0-40in)	0–45%
Electrical conductivity (0-40in)	0–16 mmhos/cm
Sodium adsorption ratio (0-40in)	0–5
Soil reaction (1:1 water) (0-40in)	5.6–9
Subsurface fragment volume <=3" (Depth not specified)	0–15%

Subsurface fragment volume >3" (Depth not specified)	0–5%

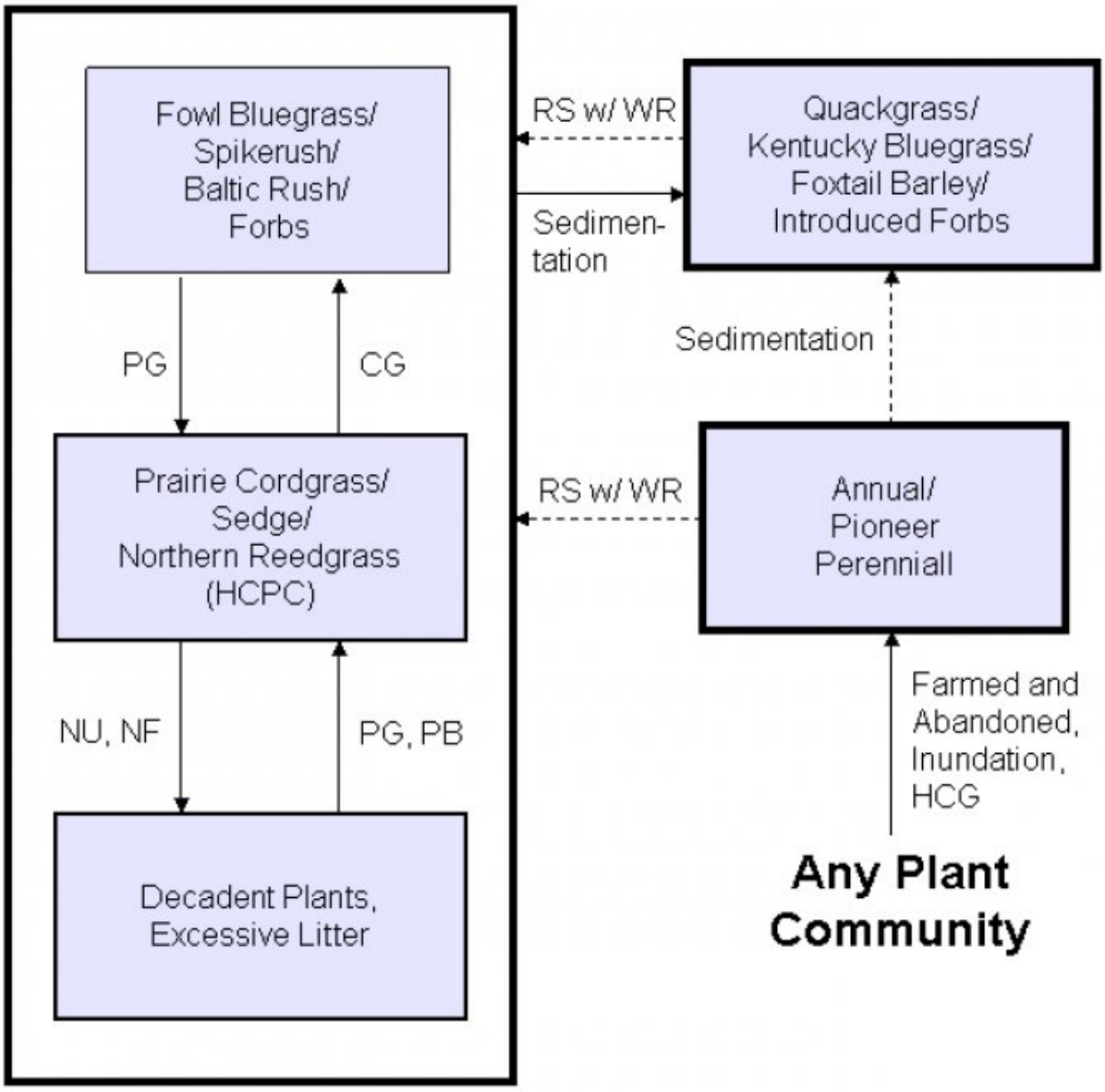
Ecological dynamics

The site developed under Northern Great Plains climatic conditions, and included natural influence of large herbivores and occasional fire. Changes will occur in the plant communities due to climatic conditions and/or management actions. Due to the nature of the soils, the site is considered quite stable. Under continued adverse impacts, a slow decline in vegetative vigor and composition will occur. Under favorable vegetative management treatments the site can quickly return to the Historic Climax Plant Community (HCPC).

The plant community upon which interpretations are primarily based is the Historic Climax Plant Community. The HCPC has been determined by study of rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily grazed to lightly grazed areas, seasonal use pastures, and historical accounts also have been used. Subclimax plant communities, states, transitional pathways, and thresholds have been determined through similar studies and experience.
Ecological changes occur on this site primarily because of continuous grazing without adequate recovery opportunities between grazing events, and over rest or non-use 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. Non-use (extended rest over years) or lack of fire will cause litter levels and plant decadence/mortality to 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 will be discussed in more detail in the plant community descriptions following the diagram.

State and transition model



CG – Continuous grazing without adequate recovery periods; **HCG** – Heavy continuous grazing; **HCPC** – Historic Climax Plant Community; **NU, NF** – Non-use, no fire; **PB** – Prescribed burning; **PG** – Prescribed grazing with adequate recovery opportunity; **RS** – Range seeding with prescribed grazing; **WR** – Wetland restoration.

State 1
Prairie Cordgrass/Sedge/Northern Reedgrass (HCPC)

Community 1.1
Prairie Cordgrass/Sedge/Northern Reedgrass (HCPC)

This is the interpretive plant community and is considered to be the Historic Climax Plant Community (HCPC). 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 50% grasses, 40% grass-likes, and 10% 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 off-site 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 (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	2615	2880	3100
Shrub/Vine	800	1350	1900
Forb	85	270	500
Total	**3500**	**4500**	**5500**

Figure 5. Plant community growth curve (percent production by month). ND5308, Missouri Coteau, lowland cool-season/warm-season co-dominant.. Cool-season, warm-season co-dominant, lowland..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	3	35	35	15	5	5	2	0	0

State 2
Fowl Bluegrass/Spikerush/Baltic Rush/Forbs

Community 2.1
Fowl Bluegrass/Spikerush/Baltic Rush/Forbs

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 (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1230	1838	2425
Shrub/Vine	1100	1400	1700
Forb	170	262	375
Total	**2500**	**3500**	**4500**

Figure 7. Plant community growth curve (percent production by month). ND5307, Missouri Coteau, cool-season dominant, warm-season sub-dominant.. Cool-season dominant, warm-season sub-dominant, lowland..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	2	7	36	35	10	3	6	1	0	0

State 3
Decadent Plants, Excessive Litter

Community 3.1
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 HCPC. Soil erosion is low. Runoff is similar to the HCPC. 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 (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1835	2502	3120
Shrub/Vine	600	875	1200
Forb	65	123	180
Total	**2500**	**3500**	**4500**

Figure 9. Plant community growth curve (percent production by month). ND5306, Missouri Coteau, lowland cool-season dominant.. Cool-season dominant, lowland..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	10	37	35	5	2	8	0	0	0

State 4
Quackgrass/Kentucky Bluegrass/Foxtail Barley/Introduced Forbs

Community 4.1
Quackgrass/Kentucky Bluegrass/Foxtail Barley/Introduced Forbs

This plant community develops with sedimentation following ponding. Various bluegrasses, spikerush and Baltic rush dominate. Kentucky bluegrass invades on drier portions of the community. Prairie cordgrass persists in trace amounts, reduced in vigor. Goldenrod, dogbane and cinquefoil increase. A significant amount of production and diversity has been lost when compared to the HCPC. 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 the HCPC with improved management. Renovation is typically not practical.

Table 8. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	930	1500	2050
Shrub/Vine	550	750	950
Forb	120	250	400
Total	**1600**	**2500**	**3400**

Figure 11. Plant community growth curve (percent production by month). ND5306, Missouri Coteau, lowland cool-season dominant.. Cool-season dominant, lowland..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	10	37	35	5	2	8	0	0	0

Additional community tables

Table 9. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Grasses**			1575–2250	
	prairie cordgrass	SPPE	*Spartina pectinata*	900–1350	–
	northern reedgrass	CASTI3	*Calamagrostis stricta ssp. inexpansa*	450–675	–
	Grass, perennial	2GP	*Grass, perennial*	0–225	–
	western wheatgrass	PASM	*Pascopyrum smithii*	90–225	–
	switchgrass	PAVI2	*Panicum virgatum*	45–225	–
	fowl bluegrass	POPA2	*Poa palustris*	45–225	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	0–90	–
	foxtail barley	HOJU	*Hordeum jubatum*	0–45	–
2	**Grass-Likes**			900–1800	
	shortbeak sedge	CABR10	*Carex brevior*	225–450	–
	woolly sedge	CAPE42	*Carex pellita*	225–450	–
	clustered field sedge	CAPR5	*Carex praegracilis*	225–450	–
	Sartwell's sedge	CASA8	*Carex sartwellii*	225–450	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	90–360	–
	spikerush	ELEOC	*Eleocharis*	90–225	–
	flatsedge	CYPER	*Cyperus*	45–90	–
Forb					
3	**Forbs**			90–450	
	Macoun's buttercup	RAMA2	*Ranunculus macounii*	45–90	–
	goldenrod	SOLID	*Solidago*	45–90	–
	dogbane	APOCY	*Apocynum*	45–90	–
	Rydberg's sunflower	HENUR	*Helianthus nuttallii ssp. rydbergii*	45–90	–
	mint	MENTH	*Mentha*	45–90	–
	cinquefoil	POTEN	*Potentilla*	0–45	–
	wood lily	LIPH	*Lilium philadelphicum*	0–45	–
	Flodman's thistle	CIFL	*Cirsium flodmanii*	0–45	–
	Forb, perennial	2FP	*Forb, perennial*	0–45	–
	Canadian anemone	ANCA8	*Anemone canadensis*	0–45	–
	white panicle aster	SYLA6	*Symphyotrichum lanceolatum*	0–45	–
	western dock	RUAQ	*Rumex aquaticus*	0–45	–
	blue-eyed grass	SISYR	*Sisyrinchium*	0–45	–

Table 10. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Grasses**			1225–1575	
	prairie cordgrass	SPPE	*Spartina pectinata*	175–525	–
	fowl bluegrass	POPA2	*Poa palustris*	175–350	–
	Kentucky bluegrass	POPR	*Poa pratensis*	70–350	–
	quackgrass	ELRE4	*Elymus repens*	0–350	–
	creeping meadow foxtail	ALAR	*Alopecurus arundinaceus*	0–350	–
	western wheatgrass	PASM	*Pascopyrum smithii*	70–245	–
	foxtail barley	HOJU	*Hordeum jubatum*	35–175	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	70–175	–
	Grass, annual	2GA	*Grass, annual*	35–175	–
	Grass, perennial	2GP	*Grass, perennial*	0–140	–
	switchgrass	PAVI2	*Panicum virgatum*	0–105	–
	northern reedgrass	CASTI3	*Calamagrostis stricta ssp. inexpansa*	0–70	–
2	**Grass-Likes**			1225–1575	
	spikerush	ELEOC	*Eleocharis*	350–700	–
	shortbeak sedge	CABR10	*Carex brevior*	175–525	–
	clustered field sedge	CAPR5	*Carex praegracilis*	175–350	–
	flatsedge	CYPER	*Cyperus*	175–350	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	35–245	–
	Sartwell's sedge	CASA8	*Carex sartwellii*	35–175	–
	woolly sedge	CAPE42	*Carex pellita*	70–175	–
Forb					
3	**Forbs**			175–350	
	curly dock	RUCR	*Rumex crispus*	35–245	–
	dogbane	APOCY	*Apocynum*	35–175	–
	Forb, annual	2FA	*Forb, annual*	0–140	–
	common dandelion	TAOF	*Taraxacum officinale*	35–140	–
	western dock	RUAQ	*Rumex aquaticus*	0–105	–
	Forb, perennial	2FP	*Forb, perennial*	0–105	–
	Flodman's thistle	CIFL	*Cirsium flodmanii*	0–105	–
	cinquefoil	POTEN	*Potentilla*	35–105	–
	blue-eyed grass	SISYR	*Sisyrinchium*	35–105	–
	goldenrod	SOLID	*Solidago*	35–105	–
	white panicle aster	SYLA6	*Symphyotrichum lanceolatum*	0–105	–
	Macoun's buttercup	RAMA2	*Ranunculus macounii*	0–70	–
	Canadian anemone	ANCA8	*Anemone canadensis*	0–35	–

Table 11. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Grasses**			1925–2275	
	quackgrass	ELRE4	*Elymus repens*	0–1050	–
	creeping meadow foxtail	ALAR	*Alopecurus arundinaceus*	0–875	–
	fowl bluegrass	POPA2	*Poa palustris*	70–525	–
	Kentucky bluegrass	POPR	*Poa pratensis*	70–525	–
	prairie cordgrass	SPPE	*Spartina pectinata*	70–350	–
	western wheatgrass	PASM	*Pascopyrum smithii*	70–350	–
	switchgrass	PAVI2	*Panicum virgatum*	70–350	–
	foxtail barley	HOJU	*Hordeum jubatum*	35–175	–
	northern reedgrass	CASTI3	*Calamagrostis stricta ssp. inexpansa*	35–175	–
	Grass, annual	2GA	*Grass, annual*	0–175	–
	Grass, perennial	2GP	*Grass, perennial*	0–175	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	0–70	–
2	**Grass-Likes**			700–1050	
	woolly sedge	CAPE42	*Carex pellita*	70–350	–
	clustered field sedge	CAPR5	*Carex praegracilis*	70–350	–
	Sartwell's sedge	CASA8	*Carex sartwellii*	70–350	–
	spikerush	ELEOC	*Eleocharis*	70–350	–
	flatsedge	CYPER	*Cyperus*	35–175	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	35–175	–
	shortbeak sedge	CABR10	*Carex brevior*	35–175	–
Forb					
3	**Forbs**			70–175	
	curly dock	RUCR	*Rumex crispus*	0–105	–
	Forb, annual	2FA	*Forb, annual*	0–105	–
	Forb, perennial	2FP	*Forb, perennial*	0–105	–
	cinquefoil	POTEN	*Potentilla*	35–70	–
	dogbane	APOCY	*Apocynum*	0–70	–
	Flodman's thistle	CIFL	*Cirsium flodmanii*	0–70	–
	blue-eyed grass	SISYR	*Sisyrinchium*	0–70	–
	goldenrod	SOLID	*Solidago*	0–70	–
	common dandelion	TAOF	*Taraxacum officinale*	0–70	–
	white panicle aster	SYLA6	*Symphyotrichum lanceolatum*	0–35	–
	Rydberg's sunflower	HENUR	*Helianthus nuttallii ssp. rydbergii*	0–35	–
	wood lily	LIPH	*Lilium philadelphicum*	0–35	–
	mint	MENTH	*Mentha*	0–35	–
	western dock	RUAQ	*Rumex aquaticus*	0–35	–
	Canadian anemone	ANCA8	*Anemone canadensis*	0–35	–

Table 12. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Grasses**			1000–1250	
	quackgrass	ELRE4	*Elymus repens*	0–875	–
	creeping meadow foxtail	ALAR	*Alopecurus arundinaceus*	0–875	–
	foxtail barley	HOJU	*Hordeum jubatum*	125–750	–
	Kentucky bluegrass	POPR	*Poa pratensis*	125–625	–
	fowl bluegrass	POPA2	*Poa palustris*	125–375	–
	Grass, annual	2GA	*Grass, annual*	0–250	–
	Grass, perennial	2GP	*Grass, perennial*	0–125	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	25–125	–
	western wheatgrass	PASM	*Pascopyrum smithii*	0–125	–
	prairie cordgrass	SPPE	*Spartina pectinata*	0–125	–
2	**Grass-Likes**			625–875	
	spikerush	ELEOC	*Eleocharis*	125–625	–
	flatsedge	CYPER	*Cyperus*	50–250	–
	shortbeak sedge	CABR10	*Carex brevior*	25–250	–
	clustered field sedge	CAPR5	*Carex praegracilis*	50–250	–
	Sartwell's sedge	CASA8	*Carex sartwellii*	25–50	–
	woolly sedge	CAPE42	*Carex pellita*	0–50	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	0–50	–
Forb					
3	**Forbs**			125–375	
	curly dock	RUCR	*Rumex crispus*	50–250	–
	cinquefoil	POTEN	*Potentilla*	25–125	–
	Forb, annual	2FA	*Forb, annual*	0–125	–
	Forb, perennial	2FP	*Forb, perennial*	0–125	–
	dogbane	APOCY	*Apocynum*	25–125	–
	white panicle aster	SYLA6	*Symphyotrichum lanceolatum*	0–125	–
	common dandelion	TAOF	*Taraxacum officinale*	25–100	–
	Flodman's thistle	CIFL	*Cirsium flodmanii*	25–75	–
	western dock	RUAQ	*Rumex aquaticus*	0–75	–
	blue-eyed grass	SISYR	*Sisyrinchium*	0–75	–
	goldenrod	SOLID	*Solidago*	25–50	–
	wood lily	LIPH	*Lilium philadelphicum*	0–25	–
	Canadian anemone	ANCA8	*Anemone canadensis*	0–25	–

Animal community

Wildlife Interpretations:
Under development.

Grazing Interpretations:
This site is well adapted to managed grazing by domestic livestock. The predominance of herbaceous plants across all plant community phases best lends these sites to grazing by cattle but other domestic grazers with differing diet preferences may also be a consideration depending upon management objectives. Often, the current plant

community does not entirely match any particular plant community (as described in the ecological site description). Because of this, a resource inventory is necessary to document plant composition and production. Proper interpretation of this inventory data will permit the establishment of a safe, initial stocking rate for the type and class of animals and level of grazing management. More accurate stocking rate estimates should eventually be calculated using actual stocking rate information and monitoring data.

Hydrological functions

Water ponding is the principal factor limiting herbage production on this site. The site is dominated by soils in hydrologic groups C and D. Infiltration is slow and runoff potential for this site is negligible. In many cases, areas with greater than 75% ground cover have the greatest potential for high infiltration and lower runoff. An exception would be where short grasses form a dense sod and dominate the site. Areas where ground cover is less than 50% have the greatest potential to have reduced infiltration and higher runoff (refer to Section 4, NRCS National Engineering Handbook for runoff quantities and hydrologic curves).

Recreational uses

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

Wood products

No appreciable wood products are present on the 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 and other inventory data. Also, field knowledge of range-trained personnel was used. All descriptions were peer reviewed and/or field-tested by various private, state and federal agency specialists. Those involved in developing this site description include: Stan Boltz, NRCS Range Management Specialist; Michael D. Brand, State Land Dept., Director Surface Management; David Dewald, NRCS State Biologist; Paul Drayton, NRCS District Conservationist; Jody Forman, NRCS Range Management Specialist; Dennis Froemke, NRCS Range Management Specialist; Jeff Printz, NRCS State Range Management Specialist; Josh Saunders, NRCS Range Management Specialist; Kevin Sedivec, Extension Rangeland Management Specialist; Darrell Vanderbusch, NRCS Resource Soil Scientist; and Lee Voigt, NRCS Range Management Specialist.

Data Source	Number of Records	Sample Period	State	County
SCS-RANGE-417	2	1970 – 1971	SD	Edmunds

Other references

High Plains Regional Climate Center, University of Nebraska, 830728 Chase Hall, Lincoln, NE 68583-0728. (http://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.
USDI Fish and Wildlife Service. 1971. Classification of Natural Ponds and Lakes in the Glaciated Prairie Region. Resource Publication 92.

Contributors

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Approval

Suzanne Mayne-Kinney, 1/11/2024

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)	Jeff Printz, Stan Boltz, Lee Voigt, Jody Forman
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Date	04/13/2012
Approved by	Suzanne Mayne-Kinney
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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

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):** Bare ground is 0 to 5% but may be higher immediately following periods of inundation.

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):** None.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of**

values): Soil surface fragments will typically retain structure indefinitely when dipped in distilled water. Stability averages 6.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Use soil series description for depth, color and structure of A horizon/surface layer.

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

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

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

    Dominant: Grass-likes > tall, warm-season rhizomatous grasses >

    Sub-dominant: Mid and tall, cool-season rhizomatous grasses >

    Other: Mid, cool-season annual grass > forbs

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

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** None.

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14. **Average percent litter cover (%) and depth (in):** Plant litter is in contact with soil surface.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Representative value = 4500 lbs./ac air dry with a range of 4000 to 5000 lbs./ac air dry depending upon growing conditions.

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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, Kentucky bluegrass, smooth bromegrass, Russian olive

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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.
