

Ecological site R053BY025ND Shallow Marsh

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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.

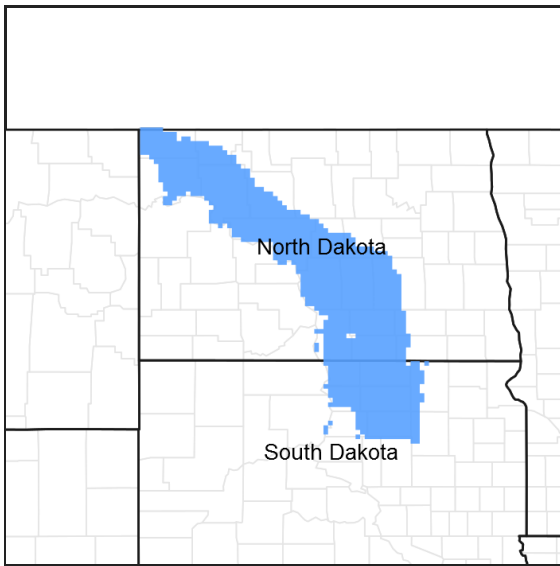


Figure 1. Mapped extent

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

R053BY005ND	Loamy Overflow
R053BY006ND	Saline Lowland
R053BY012ND	Subirrigated
R053BY018ND	Linear Meadow

Similar sites

R053BY018ND	Linear Meadow [Very poorly drained soils, redoximorphic features within 6 inches or just below organic soil layer, found in depressions or along streams where water ponds for more than a week. Found down slope of Wet Meadow site and can be in micro low positions within the listed associated sites. Similar species, but less slough sedge, less whitetop and more prairie cordgrass, and higher production.]
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R053BY019ND	<p>Wet Meadow [Poorly drained soils adjacent to streams or in depressions, with water table at or within 1.5 feet of the surface, no evidence of salts, redoximorphic features within 6 inches or just below the organic soil layer. Found downslope of Subirrigated or Loamy Overflow sites; can be located within associated sites. More prairie cordgrass, no whitetop or slough sedge, less production.]</p>
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Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Scolochloa festucacea</i> (2) <i>Carex atherodes</i>

Physiographic features

This site occurs on level to nearly level, or concave low lying positions.

Table 2. Representative physiographic features

Landforms	(1) Depression (2) Drainageway (3) Swale
Flooding frequency	None
Ponding duration	Brief (2 to 7 days) to long (7 to 30 days)
Ponding frequency	Occasional to frequent
Elevation	488–610 m
Slope	0–1%
Ponding depth	0–30 cm
Water table depth	0–15 cm
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)	508 mm

Influencing water features

Sub-class:

Permanently or Semipermanently or Seasonally Flooded or Saturated

Soil features

The common features of soils in this site are the silt clay loam to silty clay-textured subsoil and slopes of 0 to 1 percent. The soils in this site are poorly to very poorly drained and formed in glacial drift. The silt clay loam surface layer is 6 to 22 inches thick. The soils have a slow infiltration rate. 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.

These soils are not susceptible to water erosion. Pondered 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) Silty clay loam
Family particle size	(1) Loamy
Drainage class	Poorly drained
Permeability class	Slow
Soil depth	203 cm
Surface fragment cover <=3"	0-5%
Surface fragment cover >3"	0-5%
Available water capacity (0-101.6cm)	15.24-17.78 cm
Calcium carbonate equivalent (0-101.6cm)	0-20%
Electrical conductivity (0-101.6cm)	0-2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0-1
Soil reaction (1:1 water) (0-101.6cm)	6.1-8.4
Subsurface fragment volume <=3" (Depth not specified)	0-10%
Subsurface fragment volume >3" (Depth not specified)	0-5%

Ecological dynamics

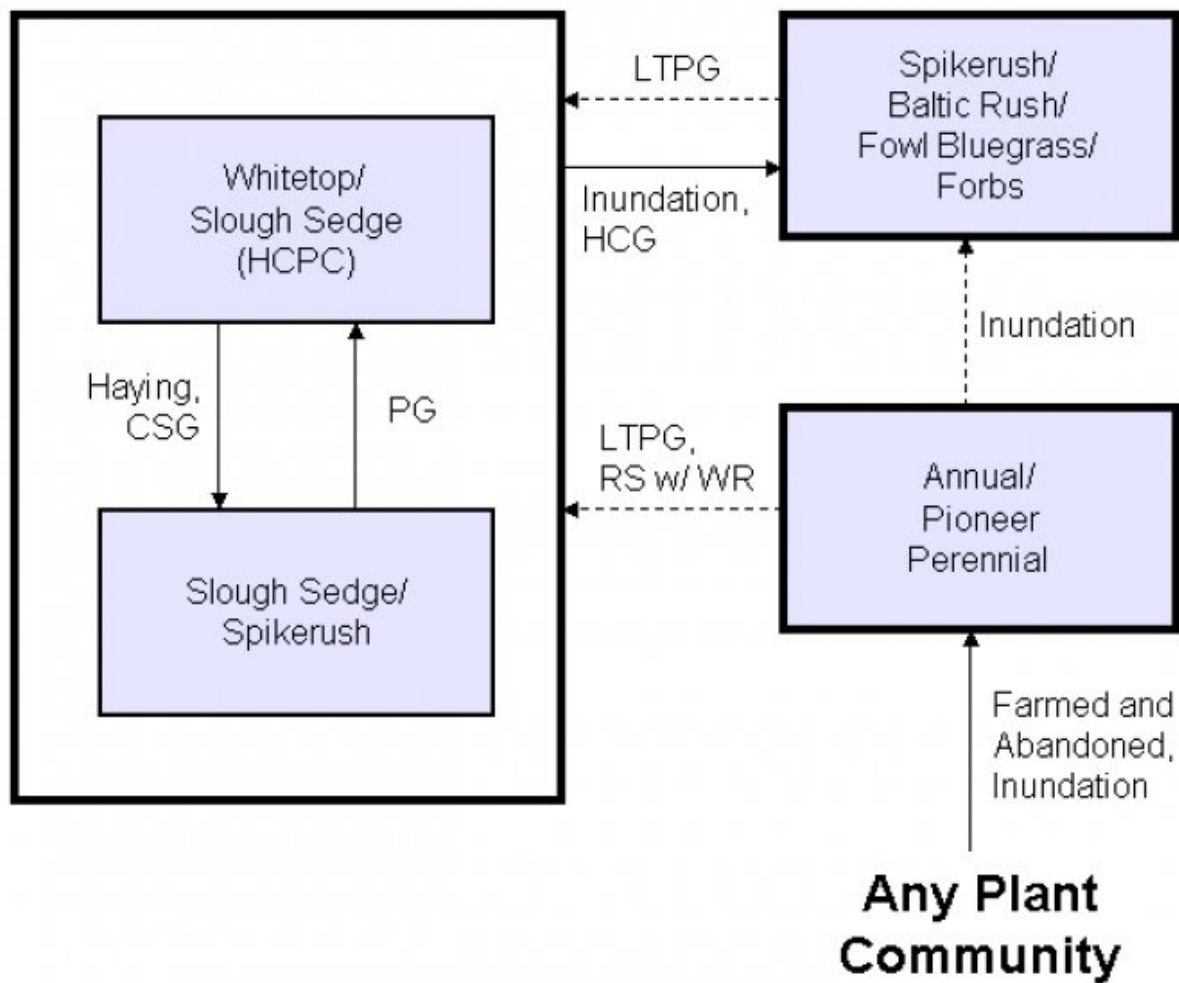
The site developed under Northern Great Plains climatic conditions, and included natural influence of large herbivores, occasional fire and yearly flooding events. Changes will occur in the plant communities due to management actions and/or climatic conditions. Due to the nature of the soils, the site is considered highly variable but very stable. Under continued adverse impacts, a slow decline in vegetative vigor and composition will occur. Under favorable vegetative management treatments the site can rapidly recover to the Historic Climax Plant Community (HCPC). High variability of ponding levels and duration is the major cause of the fluctuating plant community. However, management can greatly influence the plant community dynamics during extended drought periods.

The plant community upon which interpretations are primarily based is the Historic Climax Plant Community under normal precipitation periods. 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.

Continuous grazing without adequate recovery opportunities between grazing events over several years will cause this site to depart from the HCPC. Species such as reed canarygrass, spikerush and Baltic rush will increase in frequency and density. Non-use (rest) and lack of fire will cause litter levels and plant decadence/mortality to increase. Cattails are greatly influenced by the fluctuating water regime.

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



CSG – Continuous seasonal grazing; **HCG** – Heavy continuous grazing; **HCPC** – Historic Climax Plant Community; **Inundation** – Long-term inundation; **LTPG** – Long-term prescribed grazing; **PG** – Prescribed grazing with adequate recovery opportunity; **RS** – Range seeding with prescribed grazing; **WR** – Wetland restoration.

**State 1
Whitetop/Slough Sedge (HCPC)**

**Community 1.1
Whitetop/Slough Sedge (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, infrequent wild fires and periodic flooding events and is suited for grazing by domestic livestock. This plant community can be found on areas that are grazed and where the 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% grasses, 30% grass-likes, and 15% forbs. The major grasses and grass-likes include whitetop, slough sedge, woolly sedge, American mannagrass, prairie cordgrass, Sartwell’s sedge, Nebraska sedge and spikerush. Key forbs include smartweeds, western dock and white panicle aster. The plant community is well adapted to the Northern Great Plains climatic conditions. It is a critical plant community, providing water and habitat for the surrounding area. The diversity in plant species provides a variety of habitats for wildlife. It is resistant to drought due to a dependable water supply. This is a sustainable plant community (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	4371	4663	4932
Shrub/Vine	1345	1793	2242
Forb	336	717	1121
Total	6052	7173	8295

Figure 5. 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 2
Slough Sedge/Spikerush**

**Community 2.1
Slough Sedge/Spikerush**

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. When compared to the Historical Climax Plant Community, whitetop, prairie cordgrass, American mannagrass and reedgrasses have decreased. The grass-like species, such as slough sedge, spikerush, woolly sedge, Sartwell’s sedge, Nebraska sedge and rushes have increased, and tend to dominate this plant community. The abundant production and proximity to water make this plant community important for livestock and wildlife such as birds, mule deer, and antelope. The plant community is stable and protected from excessive erosion. The biotic integrity of this plant community is usually intact. The watershed is usually functioning.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	3026	3391	3811
Grass/Grasslike	1737	2158	2466
Forb	280	616	1009
Total	5043	6165	7286

Figure 7. 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 3 Spikerush/Baltic Rush/Fowl Bluegrass/Forbs

Community 3.1 Spikerush/Baltic Rush/Fowl Bluegrass/Forbs

This plant community developed with heavy continuous grazing without adequate recovery periods between grazing events and/or inundation during periods of extended above-average precipitation. Spikerush, Baltic rush, bulrush and other less desirable grass-likes, along with grasses such as fowl bluegrass and American sloughgrass dominate the community. Quackgrass, creeping meadow foxtail, Kentucky bluegrass and other non-native species can invade on drier portions of the community. Whitetop, slough sedge, other sedges, prairie cordgrass, and reedgrasses will be virtually eliminated the plant community. Smartweeds, dock and cinquefoil have increased. Areas of bare ground can be present throughout the site. A significant amount of production and diversity has been lost when compared to the HCPC. Loss or reduction of native grasses, grass-likes and forbs has negatively impacted energy flow and nutrient cycling. It will take a long time to restore this plant community back to the HCPC with improved management or return of more normal precipitation patterns.

Table 7. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	1345	1614	2018
Grass/Grasslike	785	1345	1569
Forb	336	628	1121
Total	2466	3587	4708

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

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Cool-Season Tall Grasses			1435–2152	
	common rivergrass	SCFE	<i>Scolochloa festucacea</i>	1076–2152	–
	American mannagrass	GLGR	<i>Glyceria grandis</i>	359–717	–
2	Warm-Season Tall Grasses			359–717	
	prairie cordgrass	SPPE	<i>Spartina pectinata</i>	359–717	–
3	Reedgrasses			0–359	
	bluejoint	CACA4	<i>Calamagrostis canadensis</i>	0–359	–
	plains reedgrass	CAMO	<i>Calamagrostis montanensis</i>	0–359	–
	northern reedgrass	CASTI3	<i>Calamagrostis stricta</i> ssp. <i>inexpansa</i>	0–359	–
	slimstem reedgrass	CASTS5	<i>Calamagrostis stricta</i> ssp. <i>stricta</i>	0–359	–
4	Other Native Grasses			359–717	
	Grass, perennial	2GP	<i>Grass, perennial</i>	359–717	–
	American sloughgrass	BESY	<i>Beckmannia syzigachne</i>	359–717	–
6	Grass-Likes			1435–2152	
	wheat sedge	CAAT2	<i>Carex atherodes</i>	1076–2152	–
	Nebraska sedge	CANE2	<i>Carex nebrascensis</i>	0–717	–
	woolly sedge	CAPE42	<i>Carex pellita</i>	0–717	–
	Sartwell's sedge	CASA8	<i>Carex sartwellii</i>	0–717	–
	spikerush	ELEOC	<i>Eleocharis</i>	359–717	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–717	–
	chairmaker's bulrush	SCAM6	<i>Schoenoplectus americanus</i>	143–574	–
	rush	JUNCU	<i>Juncus</i>	0–359	–
	flatsedge	CYPER	<i>Cyperus</i>	0–359	–
Forb					
7	Forbs			359–1076	
	knotweed	POLYG4	<i>Polygonum</i>	143–717	–
	northern water plantain	ALTR7	<i>Alisma triviale</i>	143–574	–
	white panicle aster	SYLA6	<i>Symphotrichum lanceolatum</i>	143–574	–
	broadleaf cattail	TYLA	<i>Typha latifolia</i>	0–359	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–359	–
	western dock	RUAQ	<i>Rumex aquaticus</i>	0–359	–
	hemlock waterparsnip	SISU2	<i>Sium suave</i>	0–215	–
	cinquefoil	POTEN	<i>Potentilla</i>	0–215	–
	Macoun's buttercup	RAMA2	<i>Ranunculus macounii</i>	72–215	–
	Forb, annual	2FA	<i>Forb, annual</i>	0–215	–
	dogbane	APOCY	<i>Apocynum</i>	0–215	–
	bur-reed	SPARG	<i>Sparganium</i>	0–215	–
	Canadian anemone	ANCA8	<i>Anemone canadensis</i>	0–143	–
	blue-eyed grass	SISYR	<i>Sisyrinchium</i>	0–143	–

Table 9. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Cool-Season Tall Grasses			0–493	
	common rivergrass	SCFE	<i>Scolochloa festucacea</i>	0–308	–
	American mannagrass	GLGR	<i>Glyceria grandis</i>	0–185	–
2	Warm-Season Tall Grasses			0–308	
	prairie cordgrass	SPPE	<i>Spartina pectinata</i>	0–308	–
3	Reedgrasses			0–123	
	northern reedgrass	CASTI3	<i>Calamagrostis stricta</i> ssp. <i>inexpansa</i>	0–123	–
	slimstem reedgrass	CASTS5	<i>Calamagrostis stricta</i> ssp. <i>stricta</i>	0–123	–
4	Other Native Grasses			62–308	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–308	–
	American sloughgrass	BESY	<i>Beckmannia syzigachne</i>	0–308	–
	foxtail barley	HOJU	<i>Hordeum jubatum</i>	62–308	–
5	Non-Native Grasses			62–308	
	American sloughgrass	BESY	<i>Beckmannia syzigachne</i>	0–308	–
	foxtail barley	HOJU	<i>Hordeum jubatum</i>	62–308	–
6	Grass-Likes			3082–3699	
	wheat sedge	CAAT2	<i>Carex atherodes</i>	1233–2466	–
	spikerush	ELEOC	<i>Eleocharis</i>	925–1849	–
	woolly sedge	CAPE42	<i>Carex pellita</i>	308–925	–
	Sartwell's sedge	CASA8	<i>Carex sartwellii</i>	0–616	–
	flatsedge	CYPER	<i>Cyperus</i>	0–616	–
	Nebraska sedge	CANE2	<i>Carex nebrascensis</i>	0–616	–
	rush	JUNCU	<i>Juncus</i>	0–616	–
	chairmaker's bulrush	SCAM6	<i>Schoenoplectus americanus</i>	123–616	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–616	–
Forb					
7	Forbs			308–925	
	knotweed	POLYG4	<i>Polygonum</i>	123–616	–
	curly dock	RUCR	<i>Rumex crispus</i>	62–493	–
	broadleaf cattail	TYLA	<i>Typha latifolia</i>	0–493	–
	white panicle aster	SYLA6	<i>Symphotrichum lanceolatum</i>	62–308	–
	hemlock waterparsnip	SISU2	<i>Sium suave</i>	0–308	–
	dogbane	APOCY	<i>Apocynum</i>	62–308	–
	western dock	RUAQ	<i>Rumex aquaticus</i>	0–308	–
	Forb, annual	2FA	<i>Forb, annual</i>	0–308	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–308	–
	northern water plantain	ALTR7	<i>Alisma triviale</i>	0–308	–
	Canadian anemone	ANCA8	<i>Anemone canadensis</i>	0–123	–
	cinquefoil	POTEN	<i>Potentilla</i>	0–123	–

	Macoun's buttercup	RAMA2	<i>Ranunculus macounii</i>	0–123	–
	bur-reed	SPARG	<i>Sparganium</i>	0–62	–

Table 10. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
4	Other Native Grasses			72–538	
	American sloughgrass	BESY	<i>Beckmannia syzigachne</i>	0–359	–
	foxtail barley	HOJU	<i>Hordeum jubatum</i>	0–359	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–179	–
5	Non-Native Grasses			0–359	
	barnyardgrass	ECCR	<i>Echinochloa crus-galli</i>	0–359	–
	quackgrass	ELRE4	<i>Elymus repens</i>	0–179	–
	Graminoid (grass or grass-like)	2GRAM	<i>Graminoid (grass or grass-like)</i>	0–179	–
	creeping meadow foxtail	ALAR	<i>Alopecurus arundinaceus</i>	0–179	–
6	Grass-Likes			1435–1793	
	spikerush	ELEOC	<i>Eleocharis</i>	359–1076	–
	wheat sedge	CAAT2	<i>Carex atherodes</i>	179–538	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–359	–
	rush	JUNCU	<i>Juncus</i>	0–359	–
	chairmaker's bulrush	SCAM6	<i>Schoenoplectus americanus</i>	36–287	–
	flatsedge	CYPER	<i>Cyperus</i>	0–287	–
	woolly sedge	CAPE42	<i>Carex pellita</i>	0–287	–
	Sartwell's sedge	CASA8	<i>Carex sartwellii</i>	0–179	–
	Nebraska sedge	CANE2	<i>Carex nebrascensis</i>	0–179	–
Forb					
7	Forbs			359–897	
	curly dock	RUCR	<i>Rumex crispus</i>	108–538	–
	knotweed	POLYG4	<i>Polygonum</i>	143–538	–
	dogbane	APOCY	<i>Apocynum</i>	36–287	–
	western dock	RUAQ	<i>Rumex aquaticus</i>	0–287	–
	white panicle aster	SYLA6	<i>Symphotrichum lanceolatum</i>	36–287	–
	Forb, annual	2FA	<i>Forb, annual</i>	0–179	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–179	–
	northern water plantain	ALTR7	<i>Alisma triviale</i>	0–143	–
	broadleaf cattail	TYLA	<i>Typha latifolia</i>	0–108	–
	hemlock waterparsnip	SISU2	<i>Sium suave</i>	0–108	–
	cinquefoil	POTEN	<i>Potentilla</i>	0–72	–
	Macoun's buttercup	RAMA2	<i>Ranunculus macounii</i>	0–36	–
	Canadian anemone	ANCA8	<i>Anemone canadensis</i>	0–36	–

Animal community

Wildlife Interpretations:
Under development.

Grazing Interpretations:

This site is 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 and waterfowl 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

None noted.

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.

Other references

High Plains Regional Climate Center, University of Nebraska, 830728 Chase Hall, Lincoln, NE 68583-0728.
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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.

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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%. Amount of bare ground may increase for a short time 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.

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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.
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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. Stability class of 6.
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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: Tall, cool-season grasses = grass-likes >
- Sub-dominant: Forbs >
- Other: Tall, warm-season rhizomatous grasses > mid, cool-season rhizomatous grasses
- Additional: Due to differing root structure and distribution, Kentucky bluegrass and smooth brome grass 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 = 6400 lbs./ac air dry with a range of 5400 to 7400 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 brome grass, reed canarygrass, redtop

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.
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