

# United States Department of Agriculture Natural Resources Conservation Service

## Ecological Site Description

**Site Type:** Rangeland

**Site Name:** Wet Land

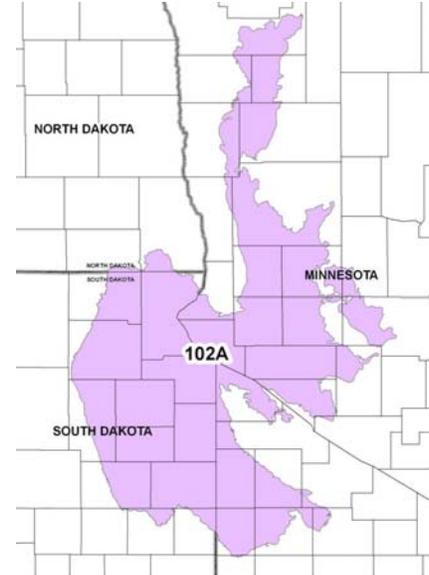
**Site ID:** R102AY002SD

**Major Land Resource Area (MLRA):** 102A – Rolling Till Prairie

### Physiographic Features

This site occurs on nearly level flood plains or drainageways.

**Landform:** flood plain, outwash plain    **Aspect:** N/A



	<u>Minimum</u>	<u>Maximum</u>
<b>Elevation (feet):</b>	1,000	2,000
<b>Slope (percent):</b>	0	1
<b>Water Table Depth (inches):</b>	0	22
<b>Flooding:</b>		
<b>Frequency:</b>	Occasional	Frequent
<b>Duration:</b>	Long	Very long
<b>Ponding:</b>		
<b>Depth (inches):</b>	None	None
<b>Frequency:</b>	None	None
<b>Duration:</b>	None	None
<b>Runoff Class:</b>	Negligible	Medium

### Climatic Features

MLRA 102A is considered to have a continental climate – cold winters and relatively hot summers, low to moderate humidity, light rainfall, and much sunshine. Extremes in temperature may also abound. The climate is the result of this MLRA's location near the geographic center of North America. There are few natural barriers on the Northern Great Plains and air masses move freely across the plains and account for rapid changes in temperature.

Annual precipitation typically ranges from 21 to 27 inches per year. The average annual temperature is about 43°F. January is the coldest month with average temperatures ranging from about 5°F (Mahnomen 1 W, Minnesota (MN)), to about 14°F (Tracy, MN). July is the warmest month with temperatures averaging from about 69°F (Mahnomen 1 W, MN), to about 73°F (Tracy, MN). 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 area's climate. Hourly winds are estimated to average about 11 miles per hour (mph) annually, ranging from about 13 mph during the spring to about 10 mph during the summer. Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 50 mph.

Growth of cool season plants begins in early to mid March, slowing or ceasing in late June. Warm-season plants begin growth about mid-May and continue to early or mid-September. Greenup of cool-season plants may occur in September and October when adequate soil moisture is present.

	<u>Minimum</u>	<u>Maximum</u>
<b>Frost-free period (days):</b>	121	152
<b>Freeze-free period (days):</b>	145	174
<b>Mean Annual Precipitation (inches):</b>	21	27

**Average Monthly Precipitation (inches) and Temperature (°F):**

	Precip. Min.	Precip. Max	Temp. Min.	Temp. Max.
January	0.50	0.78	-5.9	23.1
February	0.50	0.76	1.1	27.8
March	0.86	1.46	15.0	39.4
April	2.00	2.52	30.5	56.5
May	2.93	3.14	42.5	70.0
June	3.67	4.14	52.0	79.4
July	3.17	3.66	56.3	84.7
August	2.64	3.60	54.2	82.3
September	1.98	2.83	44.6	73.6
October	1.52	2.14	34.1	60.8
November	0.74	1.23	18.4	41.9
December	0.45	0.76	2.8	27.9

Climate Stations		Period	
Station ID	Location or Name	From	To
SD0281	Arlington 1 W, SD	1928	2009
MN0667	Benson, MN	1952	2009
SD1739	Clark, SD	1893	2009
MN5012	Mahnomen 1 W, MN	1927	1998
MN8323	Tracy, MN	1912	2009
SD8980	Waubay National Wildlife Refuge, SD	1952	2009

For local climate stations that may be more representative, refer to <http://www.wcc.nrcs.usda.gov>.

## Riparian and Wetland Features

<b>Wetland Description:</b>	<u>System</u>	<u>Subsystem</u>	<u>Class</u>	<u>Subclass</u>
Cowardin, et al., 1979	Palustrine	N/A	Persistent Emergent Wetland	Semi-permanent or seasonally flooded or saturated

## Representative Soil Features

These are very deep, poorly to very poorly drained, medium to fine textured soils. Salinity and sodicity are none to slight. Water tables on this site range from the surface to about 22 inches below the surface during most of the growing season. This site occurs mainly along drainageways. Slope ranges from zero to one percent. 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. The high water table and slow permeability strongly influences the soil-water-plant relationship.

Access Web Soil Survey (<http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>) for specific local soils information.

**Parent Material Kind:** alluvium  
**Parent Material Origin:**  
**Surface Texture:** silty clay, silty clay loam, clay  
**Surface Texture Modifier:** none  
**Subsurface Texture Group:** clayey  
**Surface Fragments ≤3” (% Cover):** 0-2  
**Surface Fragments >3” (%Cover):** 0  
**Subsurface Fragments ≤3” (% Volume):** 0-2  
**Subsurface Fragments >3” (% Volume):** 0

	<u>Minimum</u>	<u>Maximum</u>
<b>Drainage Class:</b>	poorly	poorly
<b>Permeability Class:</b>	very slow	slow
<b>Depth (inches):</b>	80	80
<b>Electrical Conductivity (mmhos/cm)*:</b>	0	4
<b>Sodium Absorption Ratio*:</b>	0	3
<b>Soil Reaction (1:1 Water)*:</b>	5.6	8.4
<b>Soil Reaction (0.1M CaCl<sub>2</sub>)*:</b>	NA	NA
<b>Available Water Capacity (inches)*:</b>	6	8
<b>Calcium Carbonate Equivalent (percent)*:</b>	0	20

\*These attributes represent from 0-40 inches or to the first restrictive layer.

## Plant Communities

### Ecological Dynamics of the Site:

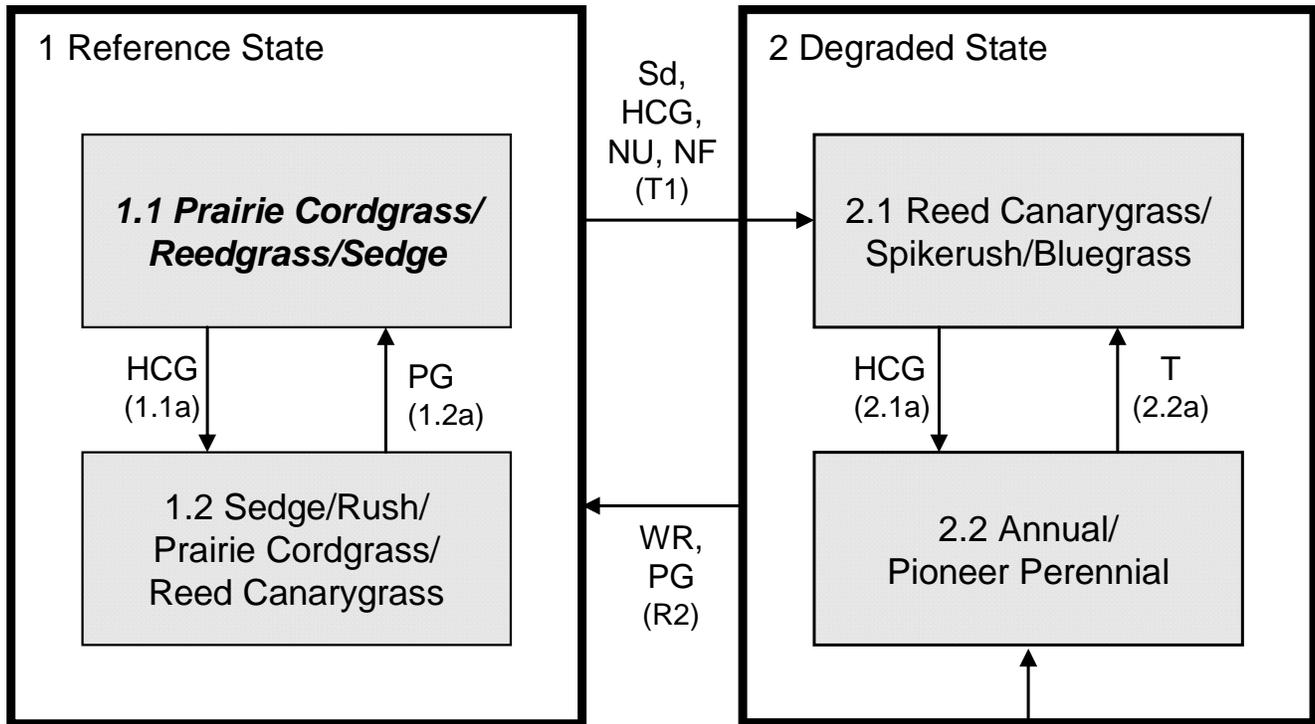
This site developed under Northern Great Plains climatic conditions, light to severe grazing by bison and other large herbivores, sporadic natural or man-caused wildfire (often of light intensities), fluctuating water tables and flooding events, and other biotic and abiotic factors that typically influence 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 that will occur, severe disturbances, such as periods of well below average precipitation, can cause significant shifts in plant communities and/or species composition that may not be described within this document.

Heavy continuous grazing without adequate recovery periods following each grazing occurrence over several years causes this site to depart from the interpretive plant community. Species such as sedge and rush will initially increase. Prairie cordgrass, northern reedgrass, bluejoint reedgrass, and narrow reedgrass will decrease in frequency and production. Heavy continuous grazing causes reed canarygrass to increase and eventually dominate the site. Extended periods of nonuse and no fire will result in a plant community having high litter levels, which also favors an increase in reed canarygrass, spikerush and bluegrass.

Interpretations are primarily based on the 1.1 Prairie Cordgrass/Reedgrass/Sedge Plant Community Phase. It 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. Plant community phases, states, transitional pathways, and thresholds have been determined through similar studies and experience.

The following is a diagram that illustrates the common plant community phases that can occur on the site and the transition pathways between communities. These are the most common plant community phases based on current knowledge and experience, and changes may be made as more data is collected. Narratives following the diagram contain more detail pertaining to the ecological processes.

### Plant Communities and Transitional Pathways



Refer to narrative for details on pathways: **CA** – Cropped and abandoned; **HCG** – Heavy continuous grazing; **NU, NF** – Non-use, no fire; **PG** – Prescribed grazing with adequate recovery periods; **Sd** – Sedimentation; **T** – Time w/wo disturbances; **WR** – Wetland restoration.

CA (T3)  
**Any Plant Community**

**Plant Community Composition and Group Annual Production**

			1.1 Prairie Cordgrass/Reedgrass/Sedge		
COMMON/GROUP NAME	SCIENTIFIC NAME	SYMBOL	Group	lbs./acre	% Comp
<b>GRASSES &amp; GRASS-LIKES</b>				4800 - 5760	75 - 90
<b>TALL WARM-SEASON GRASSES</b>			1	1280 - 2880	20 - 45
prairie cordgrass	Spartina pectinata	SPPE	1	1280 - 2560	20 - 40
switchgrass	Panicum virgatum	PAVI2	1	0 - 320	0 - 5
green muhly	Muhlenbergia glomerata	MUGL3	1	0 - 320	0 - 5
<b>COOL-SEASON GRASSES</b>			2	640 - 1920	10 - 30
northern reedgrass	Calamagrostis stricta ssp. inexpansa	CAST13	2	128 - 1280	2 - 20
bluejoint reedgrass	Calamagrostis canadensis	CACA4	2	128 - 960	2 - 15
narrow reedgrass	Calamagrostis stricta ssp. stricta	CASTS5	2	128 - 512	2 - 8
reed canarygrass	Phalaris arundinacea	PHAR3	2	64 - 320	1 - 5
fowl mannagrass	Glyceria striata	GLST	2	64 - 192	1 - 3
Canada wildrye	Elymus canadensis	ELCA4	2	64 - 192	1 - 3
fowl bluegrass	Poa palustris	POPA2	2	64 - 192	1 - 3
other grasses		2GRAM	2	0 - 320	0 - 5
<b>GRASS-LIKES</b>			3	320 - 1600	5 - 25
woolly sedge	Carex pellita	CAPE42	3	64 - 640	1 - 10
fox sedge	Carex vulpinoidea	CAVU2	3	64 - 640	1 - 10
awlfuit sedge	Carex stipata	CAST5	3	0 - 512	0 - 8
bottlebrush sedge	Carex hystericina	CAHY4	3	0 - 512	0 - 8
smoothcone sedge	Carex laeviconica	CALA12	3	0 - 512	0 - 8
green bulrush	Scirpus atrovirens	SCAT2	3	0 - 320	0 - 5
river bulrush	Schoenoplectus fluviatilis	SCFL11	3	0 - 320	0 - 5
rush	Juncus spp.	JUNCU	3	64 - 192	1 - 3
spikerush	Eleocharis spp.	ELEOC	3	64 - 192	1 - 3
flatsedge	Cyperus spp.	CYPER	3	0 - 192	0 - 3
other grass-likes		2GL	3	0 - 320	0 - 5
<b>FORBS</b>			4	320 - 1280	5 - 20
American licorice	Glycyrrhiza lepidota	GLLE3	4	64 - 192	1 - 3
broadfruit burreed	Sparganium eurycarpum	SPEU	4	64 - 192	1 - 3
broadleaf cattail	Typha latifolia	TYLA	4	0 - 192	0 - 3
common boneset	Eupatorium perfoliatum	EUPE3	4	64 - 128	1 - 2
common waterparsnip	Sium suave	SISU2	4	64 - 128	1 - 2
curlytop knotweed	Polygonum lapathifolium	POLA4	4	64 - 128	1 - 2
goldenrod	Solidago spp.	SOLID	4	64 - 192	1 - 3
heartleaf Alexanders	Zizia aptera	ZIAP	4	64 - 128	1 - 2
Illinois bundleflower	Desmanthus illinoensis	DEIL	4	0 - 64	0 - 1
Indianhemp	Apocynum cannabinum	APCA	4	64 - 128	1 - 2
Macoun's buttercup	Ranunculus macounii	RAMA2	4	0 - 64	0 - 1
marsh fleabane	Senecio congestus	SECO2	4	0 - 128	0 - 2
marsh skullcap	Scutellaria galericulata	SCGA	4	0 - 128	0 - 2
Maximilian sunflower	Helianthus maximiliani	HEMA2	4	64 - 128	1 - 2
meadow anemone	Anemone canadensis	ANCA8	4	64 - 128	1 - 2
milkweed	Asclepias spp.	ASCLE	4	64 - 192	1 - 3
New England aster	Symphotrichum novae-angliae	SYNO2	4	64 - 192	1 - 3
nodding beggartick	Bidens cernua	BICE	4	0 - 64	0 - 1
northern water plantain	Alisma triviale	ALTR7	4	0 - 128	0 - 2
prairie ironweed	Vernonia fasciculata	VEFA2	4	0 - 128	0 - 2
rough bugleweed	Lycopus asper	LYAS	4	0 - 64	0 - 1
silverweed cinquefoil	Argentina anserina	ARAN7	4	64 - 128	1 - 2
spotted water hemlock	Cicuta maculata	CIMA2	4	0 - 64	0 - 1
water smartweed	Polygonum amphibium	POAM8	4	0 - 128	0 - 2
western dock	Rumex aquaticus	RUAQ	4	0 - 64	0 - 1
white panicle aster	Symphotrichum lanceolatum	SYLA6	4	64 - 128	1 - 2
wild mint	Mentha arvensis	MEAR4	4	0 - 128	0 - 2
wild strawberry	Fragaria virginiana	FRVI	4	0 - 64	0 - 1
native forbs		2FN	4	64 - 320	1 - 5
<b>SHRUBS</b>			5	64 - 320	1 - 5
false indigo	Amorpha fruticosa	AMFR	5	64 - 320	1 - 5
willow	Salix spp.	SALIX	5	0 - 192	0 - 3
other shrubs		2SHRUB	5	0 - 192	0 - 3

Annual Production lbs./acre	LOW	RV	HIGH
<b>GRASSES &amp; GRASS-LIKES</b>	5070	5408	5750
<b>FORBS</b>	270	800	1280
<b>SHRUBS</b>	60	192	370
<b>TOTAL</b>	5400	6400	7400

This list of plants and their relative proportions are based on near normal years. Fluctuations in species composition and relative production may change from year to year dependent upon precipitation or other climatic factors. RV = Representative value.

### Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SYMBOL	1.1 Prairie Cordgrass/Reedgrass/ Sedge			1.2 Sedge/Rush/Prairie Cordgrass/ Reed Canarygrass			2.1 Reed Canarygrass/ Spikerush/Bluegrass		
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp
<b>GRASSES &amp; GRASS-LIKES</b>			4800 - 5760	75 - 90		4640 - 5220	80 - 90		3680 - 4140	80 - 90
<b>TALL WARM-SEASON GRASSES</b>		1	1280 - 2880	20 - 45	1	290 - 1450	5 - 25	1	0 - 230	0 - 5
prairie cordgrass	SPPE	1	1280 - 2560	20 - 40	1	290 - 1450	5 - 25	1	0 - 230	0 - 5
switchgrass	PAV12	1	0 - 320	0 - 5	1	0 - 116	0 - 2			
green muhly	MUGL3	1	0 - 320	0 - 5						
<b>COOL-SEASON GRASSES</b>		2	640 - 1920	10 - 30	2	290 - 1450	5 - 25	2	920 - 2070	20 - 45
northern reedgrass	CAST13	2	128 - 1280	2 - 20	2	0 - 290	0 - 5			
bluejoint reedgrass	CACA4	2	128 - 960	2 - 15	2	0 - 232	0 - 4			
narrow reedgrass	CAST5	2	128 - 512	2 - 8	2	0 - 174	0 - 3			
reed canarygrass	PHAR3	2	64 - 320	1 - 5	2	116 - 696	2 - 12	2	690 - 1840	15 - 40
fowl mannagrass	GLST	2	64 - 192	1 - 3	2	0 - 116	0 - 2			
Canada wildrye	ELCA4	2	64 - 192	1 - 3	2	0 - 58	0 - 1			
fowl bluegrass	POPA2	2	64 - 192	1 - 3	2	58 - 464	1 - 8	2	92 - 460	2 - 10
other grasses	2GRAM	2	0 - 320	0 - 5	2	0 - 290	0 - 5	2	0 - 230	0 - 5
<b>GRASS-LIKES</b>		3	320 - 1600	5 - 25	3	870 - 2610	15 - 45	3	690 - 2070	15 - 45
woolly sedge	CAPE42	3	64 - 640	1 - 10	3	58 - 870	1 - 15	3	0 - 230	0 - 5
fox sedge	CAVU2	3	64 - 640	1 - 10	3	58 - 870	1 - 15	3	0 - 230	0 - 5
awfruit sedge	CAST5	3	0 - 512	0 - 8	3	58 - 580	1 - 10	3	0 - 230	0 - 5
bottlebrush sedge	CAHY4	3	0 - 512	0 - 8	3	58 - 580	1 - 10	3	0 - 230	0 - 5
smoothcone sedge	CALA12	3	0 - 512	0 - 8	3	58 - 580	1 - 10	3	0 - 138	0 - 3
green bulrush	SCAT2	3	0 - 320	0 - 5	3	0 - 232	0 - 4	3	0 - 46	0 - 1
river bulrush	SCFL11	3	0 - 320	0 - 5	3	0 - 232	0 - 4	3	0 - 46	0 - 1
rush	JUNCU	3	64 - 192	1 - 3	3	116 - 870	2 - 15	3	230 - 920	5 - 20
spikerush	ELEOC	3	64 - 192	1 - 3	3	116 - 464	2 - 8	3	460 - 1150	10 - 25
flatsedge	CYPER	3	0 - 192	0 - 3	3	0 - 406	0 - 7	3	0 - 92	0 - 2
other grass-like	2GL	3	0 - 192	0 - 3	3	0 - 174	0 - 3	3	0 - 46	0 - 1
<b>FORBS</b>		4	320 - 1280	5 - 20	4	290 - 870	5 - 15	4	230 - 920	5 - 20
American licorice	GLLE3	4	64 - 192	1 - 3	4	58 - 174	1 - 3	4	0 - 92	0 - 2
broadfruit burreed	SPEU	4	64 - 192	1 - 3	4	0 - 290	0 - 5	4	0 - 46	0 - 1
broadleaf cattail	TYLA	4	0 - 192	0 - 3	4	0 - 232	0 - 4	4	46 - 276	1 - 6
common boneset	EUPE3	4	64 - 128	1 - 2						
common waterparsnip	SISU2	4	64 - 128	1 - 2	4	0 - 58	0 - 1			
curlytop knotweed	POLA4	4	64 - 128	1 - 2	4	0 - 58	0 - 1			
goldenrod	SOLID	4	64 - 192	1 - 3	4	58 - 348	1 - 6	4	46 - 368	1 - 8
heartleaf Alexanders	ZIAP	4	64 - 128	1 - 2	4	0 - 58	0 - 1			
Illinois bundleflower	DEIL	4	0 - 64	0 - 1						
Indianhemp	APCA	4	64 - 128	1 - 2	4	58 - 174	1 - 3	4	0 - 92	0 - 2
Macoun's buttercup	RAMA2	4	0 - 64	0 - 1	4	0 - 58	0 - 1			
marsh fleabane	SECO2	4	0 - 128	0 - 2						
marsh skullcap	SCGA	4	0 - 128	0 - 2	4	0 - 58	0 - 1			
Maximilian sunflower	HEMA2	4	64 - 128	1 - 2	4	0 - 58	0 - 1			
meadow anemone	ANCA8	4	64 - 128	1 - 2	4	0 - 58	0 - 1			
milkweed	ASCLE	4	64 - 192	1 - 3	4	0 - 116	0 - 2	4	0 - 46	0 - 1
New England aster	SYNO2	4	64 - 192	1 - 3	4	58 - 290	1 - 5	4	46 - 276	1 - 6
nodding beggartick	BICE	4	0 - 64	0 - 1	4	0 - 58	0 - 1			
northern water plantain	ALTR7	4	0 - 128	0 - 2						
prairie ironweed	VEFA2	4	0 - 128	0 - 2	4	0 - 58	0 - 1			
rough bugleweed	LYAS	4	0 - 64	0 - 1						
silverweed cinquefoil	ARAN7	4	64 - 128	1 - 2	4	0 - 58	0 - 1			
spotted water hemlock	CIMA2	4	0 - 64	0 - 1	4	0 - 116	0 - 2	4	0 - 46	0 - 1
water smartweed	POAM8	4	0 - 128	0 - 2	4	0 - 116	0 - 2	4	0 - 46	0 - 1
western dock	RUAQ	4	0 - 64	0 - 1						
white panicle aster	SYLA6	4	64 - 128	1 - 2	4	58 - 174	1 - 3	4	46 - 184	1 - 4
wild mint	MEAR4	4	0 - 128	0 - 2	4	0 - 58	0 - 1			
wild strawberry	FRV1	4	0 - 64	0 - 1						
native forbs	2FN	4	64 - 320	1 - 5	4	0 - 174	0 - 3	4	0 - 92	0 - 2
introduced forbs	2FI	4			4	58 - 232	1 - 4	4	46 - 552	1 - 12
<b>SHRUBS</b>		6	64 - 320	1 - 5	6	58 - 290	1 - 5	6	0 - 138	0 - 3
false indigo	AMFR	6	64 - 320	1 - 5	6	58 - 290	1 - 5	6	0 - 138	0 - 3
meadow willow	SAP5	6	0 - 192	0 - 3	6	0 - 58	0 - 1			
other shrubs	2SHRUB	6	0 - 192	0 - 3	6	0 - 116	0 - 2	6	0 - 46	0 - 1
<b>Annual Production lbs./acre</b>			LOW RV HIGH		LOW RV HIGH		LOW RV HIGH		LOW RV HIGH	
<b>GRASSES &amp; GRASS-LIKES</b>			5070 - 5408 - 5750		4500 - 5046 - 5505		3400 - 3956 - 4485			
<b>FORBS</b>			270 - 800 - 1280		245 - 580 - 960		200 - 575 - 960			
<b>SHRUBS</b>			60 - 192 - 370		55 - 174 - 335		0 - 69 - 155			
<b>TOTAL</b>			5400 - 6400 - 7400		4800 - 5800 - 6800		3600 - 4600 - 5600			

This list of plants and their relative proportions are based on near normal years. Fluctuations in species composition and relative production may change from year to year dependent upon precipitation or other climatic factors. RV = Representative value. Refer to PLANTS database for scientific names and codes: <http://plants.usda.gov>

## Plant Community and Vegetation State Narratives

### Reference State (State 1)

This state represents the natural range of variability that dominates the dynamics of this ecological site (ES). This state is typically codominated by cool-season grass and grass-like species, and warm-season grasses. Before European settlement, the primary disturbance mechanisms for this site in the reference condition included sporadic fire and grazing by large herding ungulates. Timing of fires and grazing coupled with weather events dictated the dynamics that occurred within the natural range of variability. Today the primary disturbance is from a lack of fire and concentrated livestock grazing. Grasses that are desirable for livestock and wildlife can decline and a corresponding increase in less desirable grasses will occur.

### 1.1 Prairie Cordgrass/Reedgrass/Sedge Plant Community Phase

This community evolved with grazing by large herbivores, occasional prairie fires and relatively frequent flooding and can be found on areas that are properly managed with grazing and/or prescribed burning, and sometimes on areas receiving occasional short periods of rest. The potential vegetation is about 65 percent grasses, 20 percent grass-like species, 10 percent forbs, and 5 percent shrubs by air-dry weight. Prairie cordgrass is the dominant tall warm-season grass occupying this plant community. Reedgrasses are the dominant tall cool-season species. A variety of sedges and rushes occur throughout this community as well as fowl mannagrass, switchgrass, reed canarygrass, plains bluegrass, and fowl bluegrass. Key forbs include broadfruit burreed, giant goldenrod, New England aster, Maximilian sunflower, white panicle aster, and cinquefoil.

This plant community phase 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.

The following growth curve is an estimate of the monthly percentages of total annual growth of the dominant species expected during a normal year:

Growth curve number: SD0208

Growth curve name: Rolling Till Prairie, lowland cool-season/warm-season codominant.

Growth curve description: 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

Transitions or pathways leading to other plant communities are as follows:

- 1.1a – Heavy continuous grazing which includes herbivory at moderate to heavy levels at the same time of year each year without adequate recovery periods, or during periods of below normal precipitation when grazing frequency and intensity increases on these sites due to limited forage availability on adjacent upland sites will shift this community to the *1.2 Sedge/Rush/Prairie Cordgrass/Reed Canarygrass Plant Community Phase*.

## 1.2 Sedge/Rush/Prairie Cordgrass/Reed Canarygrass Plant Community Phase

This community develops with periods of heavy continuous grazing with lack of adequate recovery periods during the growing season following periods of below normal precipitation. Lack of litter and reduced plant heights result in higher soil temperatures and reduced water infiltration rates.

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. Sedge, rush, and other grass-like species are dominant. The grass-like species have increased while the reedgrass species have been significantly reduced. Switchgrass may be removed at this stage. Reed canarygrass may begin to increase significantly. 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 function adequately.

The following growth curve is an estimate of the monthly percentages of total annual growth of the dominant species expected during a normal year:

Growth curve number: SD0207

Growth curve name: Rolling Till Prairie, cool-season dominant, warm-season subdominant.

Growth curve description: Cool-season dominant, warm-season subdominant, lowland.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	5	13	20	25	18	11	5	3	0	0

Transitions or pathways leading to other plant communities are as follows:

- 1.2a – Prescribed grazing (alternating season of use and providing adequate recovery periods) or periodic light to moderate grazing possibly including periodic rest will convert this plant community to the *1.1 Prairie Cordgrass/Reedgrass/Sedge Plant Community Phase*. This pathway could also occur with a return to more normal precipitation levels and frequencies.

### Transition from Reference State (State 1) to the Degraded State (State 2)

- T1 – Sedimentation beyond normal levels due to increased flooding or nonuse and no fire for extended periods of time (typically for 10 or more years) causing litter levels to become high enough to reduce native grass vigor, diversity, and density, or heavy continuous grazing will likely lead this state over a threshold resulting in the *2.1 Reed Canarygrass/Spikerush/Bluegrass Plant Community Phase* within the *Degraded State (State 2)*.

### Degraded State (State2)

This state is characterized by the degradation of the biotic integrity of the site due to excessive disturbance resulting in dominance by highly competitive species such as reed canarygrass and possibly the invasion of nonnative species. Loss of diversity and reduction of plant vigor and production have negatively impacted energy flow and nutrient cycling. Infiltration is reduced and native plant mortality is increased. As the disturbance level increases, native plant density decreases even more, giving way to annual species and invasive perennial species, as well as, an increase in bare ground.

## 2.1 Reed Canarygrass/Spikerush/Bluegrass Plant Community Phase

This plant community phase develops either with increased sedimentation, heavy continuous grazing, or with a long-term lack of grazing and/or fire. In each case, native plant vigor is reduced allowing the increase of competitive species and eventually the introduction of nonnative species. Spikerush and

other grass-like species, as well as, bluegrasses will increase. The more competitive forbs will also increase. Reed canarygrass often will increase to the point of dominance while prairie cordgrass will diminish significantly. Other invasive plants such as creeping meadow foxtail or Canada thistle may become prevalent if a seed source is present or nearby.

Nutrient cycling will be greatly diminished and the energy flow will shift significantly and be reduced as well. Infiltration will be reduced somewhat compared to the Reference State. This plant community is somewhat resistant to change. The combination of both grazing and fire is most effective in moving this plant community towards the Reference State.

The following growth curve is an estimate of the monthly percentages of total annual growth of the dominant species expected during a normal year:

Growth curve number: SD0206

Growth curve name: Rolling Till Prairie, lowland cool-season dominant.

Growth curve description: 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

Transitions or pathways leading to other plant communities are as follows:

- 2.1a – Heavy continuous grazing which includes herbivory at moderate to heavy levels at the same time of year each year without adequate recovery periods, or during periods of below normal precipitation when grazing frequency and intensity increases on these sites due to limited forage availability on adjacent upland sites will shift this community to the *2.2 Annual/Pioneer Perennial Plant Community Phase*.

## 2.2 Annual/Pioneer Perennial Plant Community Phase

This plant community develops under severe disturbance, typically abandonment after cropping. The dominant vegetation includes pioneer annual or perennial 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, and sedges. The dominant forbs may include cocklebur, Canada thistle, and other early successional species. The community is susceptible to invasion of nonnative 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.

Significant economic inputs, management, and time would be required to move this plant community toward a higher successional stage. Secondary succession is highly variable, depending upon availability and diversity of a viable reproductive source of higher successional species. This plant community may 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 1,500 lbs./ac. (air-dry weight) depending upon growing conditions. No growth curve has been assigned to this plant community phase due to the highly variable nature of the plant community.

Transitions or pathways leading to other plant communities are as follows:

- 2.2a – This community pathway occurs with the passage of time as successional processes take place and perennial plants gradually begin to establish on the site again. This pathway will lead to the *2.1 Reed Canarygrass/Spikerush/Bluegrass Plant Community Phase*.

## Restoration Pathway from Degraded State (State 2) to the Reference State (State 1)

- R2 – Wetland restoration coupled with prescribed grazing may lead this plant community phase over a threshold to the *Reference State (State 1)*. Wetland restoration techniques may be effective, but will likely be costly, and the results may not be satisfactory.

## Ecological Site Interpretations

### Animal Community – Wildlife Interpretations

-- Under Development --

**Prairie Cordgrass/Reedgrass/Sedge Plant Community Phase (1.1):**

**Sedge/Rush/Prairie Cordgrass/Reed Canarygrass Plant Community Phase (1.2):**

**Reed Canarygrass/Spikerush/Bluegrass Plant Community Phase (2.1):**

**Annual/Pioneer Perennial Plant Community Phase (2.2):**

### Animal Preferences (Quarterly – 1,2,3,4†)

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
<b>Grasses and Grass-likes</b>							
awlfruit sedge	U P D U	U P D U	U P D U	U P D U	U P D U	U P D U	U P D U
bluejoint reedgrass	U P D U	N D U N	U P D U	N D U N	N D U N	U P D U	U P D U
bottlebrush sedge	U P D U	U P D U	U P D U	U P D U	U P D U	U P D U	U P D U
Canada wildrye	U D U U	N U N N	U D U U	N U N N	N U N N	U D U U	U D U U
flatsedge	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
fowl bluegrass	N U U N	N U U N	N U U N	N U U N	N U U N	N U U N	N U U N
fowl mannagrass	U D D U	U D U U	U D D U	N N N N	N N N N	U D D U	U D D U
fox sedge	U P D U	U P D U	U P D U	U P D U	U P D U	U P D U	U P D U
green bulrush	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	U U U U
green muhly	U D D U	N U N N	U D D U	N U N N	N U N N	U D D U	U D D U
narrow reedgrass	U P U D	N D U N	U P U D	N D U N	N D U N	U P U D	U P U D
northern reedgrass	U P U D	N D N U	U P U D	N D N U	N D N U	U P U D	U P U D
prairie cordgrass	U D D U	N N N N	U D D U	N N N N	N N N N	U D D U	U D D U
reed canarygrass	U D U U	N N N N	U D U U	N N N N	N N N N	U D U U	U D U U
river bulrush	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	U U U U
rush	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
smoothcone sedge	U P D U	U P D U	U P D U	U P D U	U P D U	U P D U	U P D U
spikerush	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U
switchgrass	U D D U	U D U U	U D D U	N N N N	N N N N	U D D U	U D D U
woolly sedge	U P D U	U P D U	U P D U	U P D U	U P D U	U P D U	U P D U
<b>Forbs</b>							
American licorice	U U D U	N U U N	U U D U	N U U N	N U U N	U U D U	N U U N
broadfruit burreed	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N
broadleaf cattail	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U
common boneset	U U D U	N U U N	U U D U	N U U N	N U U N	U U D U	N U U N
common waterparsnip	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N
curlytop knotweed	U D U U	U D D U	U D U U	U D D U	U D D U	U D U U	U D D U
goldenrod	U U D U	N U U N	U U D U	N U U N	N U U N	U U D U	N U U N
heartleaf Alexanders	U D P U	U D P U	U D P U	U D P U	U D P U	U D P U	U D P U
Illinois bundleflower	U D U U	U D D U	U D U U	U D D U	U D D U	U D U U	U D D U
Indianhemp	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T
Macoun's buttercup	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N
marsh fleabane	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N
marsh skullcap	U U U U	U U D U	U U U U	U U D U	U U D U	U U U U	U U U U
Maximilian sunflower	U D P U	U D P U	U D P U	U D P U	U D P U	U D P U	U D P U
meadow anemone	U U U U	U U D U	U U U U	U U D U	U U D U	U U U U	U U U U
milkweed	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N
New England aster	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N
nodding beggartick	U D U U	U P P U	U D U U	U P P U	U P P U	U D U U	U P P U
northern water plantain	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N
prairie ironweed	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N
rough bugleweed	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N
silverweed cinquefoil	N U U N	N U U N	N U U N	N U U N	N U U N	N U U N	N U U N
spotted water hemlock	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T
water smartweed	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N
western dock	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
white panicle aster	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
wild mint	U D U U	U P P U	U D U U	U P P U	U P P U	U D U U	U P P U
wild strawberry	U D U U	N U U N	U D U U	N U U N	N U U N	U D U U	N U U N
<b>Shrubs</b>							
false indigo	N U U N	N U U N	N U U N	N U U N	N U U N	N U U N	N U U N
willow	P U D P	P U D P	P U D P	P U D P	U U U U	P U D P	P U D P

**N** = not used; **U** = undesirable; **D** = desirable; **P** = preferred; **T** = toxic

† Quarters: 1 – Jan., Feb., Mar.; 2 – Apr., May, Jun.; 3 – Jul., Aug., Sep.; 4 – Oct., Nov., Dec.

## Animal Community – Grazing Interpretations

The following table lists annual, suggested initial stocking rates with average growing conditions. These are conservative estimates that should be used only as guidelines in the initial stages of conservation planning. Often, the current plant composition does not entirely match any particular plant community (as described in this ES description). Because of this a resource inventory is necessary to document plant composition and production. More accurate carrying capacity estimates should eventually be calculated using the following stocking rate information along with animal preference data and actual stocking records, particularly when grazers other than cattle are involved. With consultation of the land manager, more intensive grazing management may result in improved harvest efficiencies and increased carrying capacity.

Plant Community	Average Annual Production (lbs./acre, air-dry)	Stocking Rate* (AUM/acre)
Prairie Cordgrass/Reedgrass/Sedge (1.1)	6,400	1.75
Sedge/Rush/Prairie Cordgrass/Reed Canarygrass (1.2)	5,800	1.59
Reed Canarygrass/Spikerush/Bluegrass (2.1)	4,600	1.26
Annual/Pioneer Perennial (2.2)	1,600	0.44

\*Based on 912 lbs./acre (air-dry weight) per Animal Unit Month (AUM), and on 25 percent harvest efficiency (refer to United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), National Range and Pasture Handbook).

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.

## Hydrology Functions

Water is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic groups C and D. Infiltration is typically slow to very slow and runoff potential for this site varies from negligible to medium 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 lower runoff. 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, hiking, photography, bird watching, and other opportunities. The wide varieties of plants that 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.

## Supporting Information

### Associated Sites

Subirrigated (R102AY003SD), Shallow Marsh (R102AY001SD), Wet Meadow (R102AY004SD)

### Similar Sites

(R102AY001SD) – Shallow Marsh [less prairie cordgrass whitetop dominant; higher production]

### Inventory Data References

Information presented here has been derived from NRCS clipping data and other inventory data. Field observations from range-trained personnel were also used. Those involved in developing this site include: Stan Boltz, Range Management Specialist, NRCS; and Bruce Kunze, Soil Scientist, NRCS.

### State Correlation

This site has been correlated in MN, North Dakota (ND), and South Dakota(SD) in MLRA 102A.

### Field Offices/Counties

Ada, MN/Norman	Forman, ND/Sargent	Olivia, MN/Renville
Alexandria, MN/Douglas	Glenwood, MN/Pope	Ortonville, MN/Big Stone
Benson, MN/Swift	Hayti, SD/Hamlin	Pipestone, MN/Pipestone
Breckenridge, MN/Wilkin	Ivanhoe, MN/Lincoln	Redwood Falls, MN/Redwood
Britton, SD/Marshall	Long Prairie, MN/Todd	Sisseton, SD/Roberts
Brookings, SD/Brookings	Madison, MN/Lac Qui Parle	Slayton, MN/Murray
Clark, SD/Clark	Madison, SD/Lake	Wahpeton, ND/Richland
Clarkfield, MN/Yellow Medicine	Mahnomen, MN/Mahnomen	Waite Park, MN/Stearns
Clear Lake, SD/Deuel	Marshall, MN/Lyon	Watertown, SD/Codington
De Smet, SD/Kingsbury	McIntosh, MN/Polk	Webster, SD/Day
Detroit Lakes, MN/Becker	Milbank, SD/Grant	Wheaton, MN/Traverse
Elbow Lake, MN/Grant	Montevideo, MN/Chippewa	Willmar, MN/Kandiyohi
Fergus Falls, MN/Otter Tail	Moorhead, MN/Clay	Windom, MN/Cottonwood
Flandreau, SD/Moody	Morris, MN/Stevens	

### Relationship to Other Established Classifications

Level IV Ecoregions of the Conterminous United States: 46e – Tewaukon Dead Ice Moraine, 46k – Prairie Coteau, 46l – Prairie Coteau Escarpment, 46m – Big Sioux Basin, 46o – Minnesota River Prairie, 47b – Des Moines Lobe, 48d – Lake Agassiz Plain, 51j – Alexandria Moraines and Detroit Lakes Outwash Plain.

### 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://soils.usda.gov/technical/nasis/>)

USDA, NRCS. 2001. The PLANTS Database, Version 3.1 (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

## Site Description Approval

\_\_\_\_\_  
MN, State Grazing Lands Specialist

\_\_\_\_\_  
Date

\_\_\_\_\_  
ND, State Range Management Specialist

\_\_\_\_\_  
Date

\_\_\_\_\_  
SD, State Range Management Specialist

\_\_\_\_\_  
Date