USDA Natural Resources Conservation Service

# Ecological site R102DY001SD
# Shallow Marsh

Last updated: 8/14/2024
Accessed: 05/13/2025

## 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.

## MLRA notes

Major Land Resource Area (MLRA): 102D–Prairie Coteau

This area makes up about 7,867 square miles (20,375 square kilometers), consisting mostly of nearly level to undulating till plains with potholes and moraines. Elevation ranges from 1,150 to 2,130 feet (350 to 650 meters). The average annual precipitation is 22 to 29 inches (559 to 734 millimeters). The average annual temperature is 42 to 45 degrees F (6 to 7 degrees C). The dominant soil order in this MLRA is Mollisols. The soils in this area dominantly have a frigid temperature regime, and an aquic or udic moisture regime. They are generally very deep and loamy. Soils range from well drained to very poorly drained. Parent materials are dominantly fine-loamy till to clayey material, with smaller amounts of outwash, glaciofluvial deposits, eolian deposits, alluvium, and, to a lesser extent, loess and organic materials.

## Classification relationships

*Fenneman (1916) Physiographic Regions*
Division - Interior Plains
East:
Province - Central Lowland
Section - Western Lake / Dissected Till Plains (12b/12e)

*USFS (2007) Ecoregions*
Domain - Humid Temperate
Division - Prairie
Province - Prairie Parkland (Temperate)
Section - North-Central Glaciated Plains (251B)

*EPA Ecoregions (Omernik 1997)*
I - Great Plains (9)
II - Temperate Prairies (9.2)
III - Aspen Parkland/Northern Glaciated Plains (9.2.1)

## Ecological site concept

The Shallow Marsh ecological site typically occurs in a basin or closed depression, and receives water directly from precipitation, surface overland flow, and groundwater discharge. Soils are formed in local alluvium and are very poorly drained, which have a water table within 1 foot of the soil surface. Permeability is very slow due to the clayey subsoil and the site will pond water until early summer in most years. Ponded water conditions and very slow permeability strongly influences the soil-water-plant relationship. Vegetation in the Reference State is typically dominated by cool-season grass and grass-like species including Scolochloa festucacea (Common rivergrass), Carex atherodes (slough sedge), *Carex pellita* (woolly sedge), *Glyceria grandis* (American mannagrass), Spartina pectinata (prairie cordgrass), and Eleocharis species (spikerush). Forb species may include Polygonum species

(smartweeds), *Rumex aquaticus* (western dock), and *Symphyotrichum lanceolatum* (white panicle aster). Nonnative species such as *Elymus repens* (quackgrass), *Alopecurus arundinaceus* (creeping meadow foxtail), and *Poa pratensis* (Kentucky bluegrass) may invade the site due to change in disturbance regime.

## Associated sites

| | |
|---|---|
| R102DY004SD | **Wet Meadow**<br>These sites occur in a basin or closed depression. Soils are poorly drained and the site ponds water for 4 to 8 weeks in the spring of the year or after a heavy rain. |
| R102DY020SD | **Loamy Overflow**<br>These sites occur in upland swales. Soils are moderately well drained which have water flow into and over/through the site. |
| R102DY002SD | **Linear Meadow**<br>These sites occur in drainageways. Soils are poorly and very poorly drained which have a water table within 0 to 2 feet of the soil surface that persists longer than the wettest part of the growing season typically until the month of August. |
| R102DY003SD | **Subirrigated**<br>These sites occur in drainageways. Soils are somewhat poorly drained which have a water table within 2 to 5 feet of the soil surface that persists longer than the wettest part of the growing season typically until the month of August. |

## Similar sites

| | |
|---|---|
| R102DY004SD | **Wet Meadow**<br>Wet Meadow is similar in landscape position, but the site ponds water only for 4 to 8 weeks in the spring of the year or after a heavy rain. A Wet Meadow site will have more prairie cordgrass and lower production than a Shallow Marsh. |

**Table 1. Dominant plant species**

| | |
|---|---|
| Tree | Not specified |
| Shrub | Not specified |
| Herbaceous | (1) *Scolochloa festucacea*<br>(2) *Carex atherodes* |

## Physiographic features

This site occurs on potholes and depressions on uplands. Depressions frequently occur on till plains and moraines.

**Table 2. Representative physiographic features**

| | |
|---|---|
| Landforms | (1) Pothole<br>(2) Depression<br>(3) Till plain > Closed depression<br>(4) Moraine > Closed depression |
| Runoff class | Negligible |
| Flooding frequency | None |
| Ponding duration | Very long (more than 30 days) |
| Ponding frequency | Occasional to frequent |
| Elevation | 302–610 m |
| Slope | 0–2% |
| Water table depth | 0–46 cm |
| Aspect | Aspect is not a significant factor |

## Climatic features

The average annual precipitation is 22 to 28 inches. Half or more of the precipitation falls during the growing season. Rainfall typically occurs during high-intensity, convective thunderstorms in summer. In the western part of the MLRA, rainfall is less abundant and not always adequate for full maturation of crops. Precipitation in winter is typically snow. The average annual temperature is 42 to 45 degrees F. The freeze-free period averages 143 days and ranges from 131 to 152 days.

**Table 3. Representative climatic features**

| | |
|---|---|
| Frost-free period (characteristic range) | 113-130 days |
| Freeze-free period (characteristic range) | 135-151 days |
| Precipitation total (characteristic range) | 610-686 mm |
| Frost-free period (actual range) | 104-131 days |
| Freeze-free period (actual range) | 130-152 days |
| Precipitation total (actual range) | 559-711 mm |
| Frost-free period (average) | 121 days |
| Freeze-free period (average) | 143 days |
| Precipitation total (average) | 660 mm |

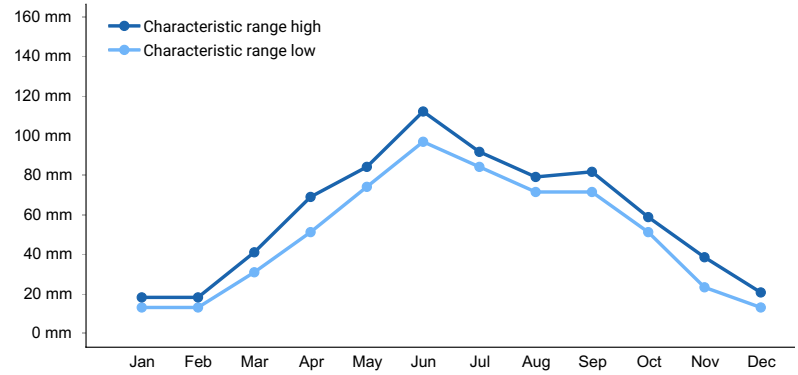



**Figure 1. Monthly precipitation range**

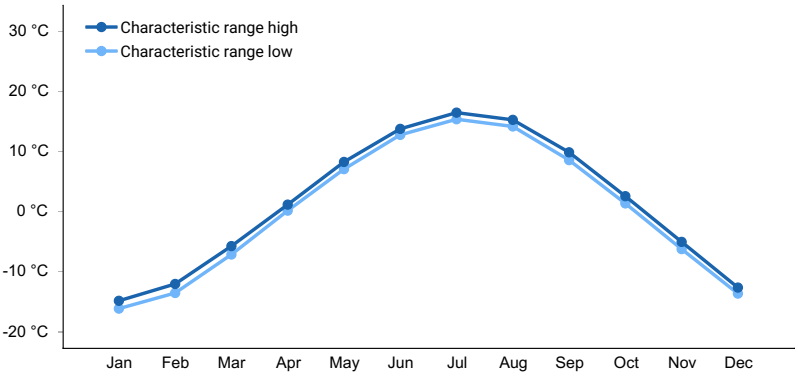



**Figure 2. Monthly minimum temperature range**

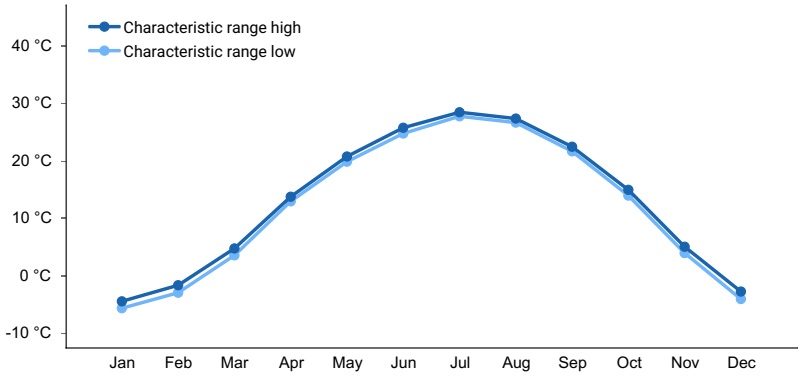



**Figure 3. Monthly maximum temperature range**

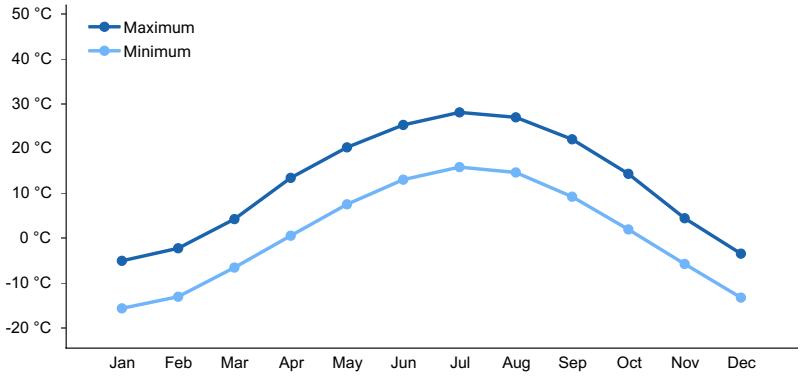



**Figure 4. Monthly average minimum and maximum temperature**

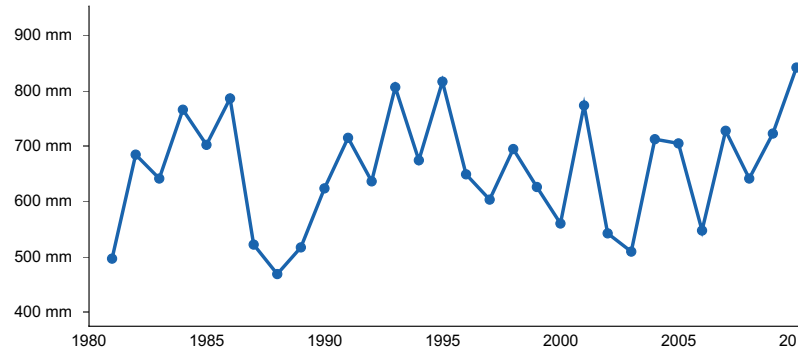



**Figure 5. Annual precipitation pattern**

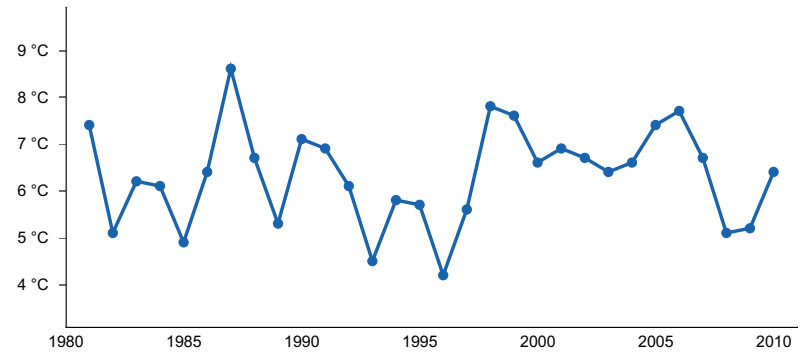



**Figure 6. Annual average temperature pattern**

## Climate stations used

- (1) ROY LAKE [USC00397326], Lake City, SD
- (2) WAUBAY NWR [USC00398980], Waubay, SD
- (3) WEBSTER [USC00399004], Webster, SD

- (4) SUMMIT 1 W [USC00398116], Summit, SD
- (5) WATERTOWN RGNL AP [USW00014946], Watertown, SD
- (6) CLARK [USC00391739], Clark, SD
- (7) ARLINGTON 1 W [USC00390281], Arlington, SD
- (8) BROOKINGS 2 NE [USC00391076], Brookings, SD
- (9) ASTORIA 4S [USC00390422], White, SD
- (10) TYLER [USC00218429], Tyler, MN
- (11) CLEAR LAKE [USC00391777], Clear Lake, SD
- (12) CASTLEWOOD [USC00391519], Castlewood, SD
- (13) WATERTOWN 1W [USC00398930], Watertown, SD
- (14) LAKE WILSON [USC00214534], Lake Wilson, MN
- (15) PIPESTONE [USC00216565], Pipestone, MN
- (16) CANBY [USC00211263], Canby, MN
- (17) DE SMET [USC00392302], De Smet, SD

## Influencing water features

This site can be classified as a Seasonally Flooded to Semipermanently Flooded Palustrine Emergent Wetland (Cowardin et al., 1979). Ponded conditions drive reference state vegetative communities.

## Soil features

Soils are very deep and formed in alluvium, till, and occasionally in lacustrine deposits. Surface textures are silty clay loam to silty clay. These soils are poorly to very poorly drained and are characterized by slow permeability.

**Table 4. Representative soil features**

| | |
|---|---|
| Parent material | (1) Alluvium<br>(2) Till<br>(3) Lacustrine deposits |
| Surface texture | (1) Silty clay loam<br>(2) Silty clay |
| Family particle size | (1) Fine<br>(2) Fine-silty |
| Drainage class | Very poorly drained to poorly drained |
| Permeability class | Very slow to slow |
| Depth to restrictive layer | 203 cm |
| Soil depth | 203 cm |
| Surface fragment cover <=3" | 0% |
| Surface fragment cover >3" | 0% |
| Available water capacity (0-101.6cm) | 14.99–20.32 cm |
| Soil reaction (1:1 water) (0-25.4cm) | 6.1–7.8 |
| Subsurface fragment volume <=3" (0-152.4cm) | 0–4% |
| Subsurface fragment volume >3" (0-152.4cm) | 0–2% |

## Ecological dynamics

The site developed under Northern Great Plains climatic conditions and included natural influence of large herding herbivores and occasional fire. Changes will occur in the plant communities due to weather fluctuations and/or management actions. Under adverse impacts, a relatively rapid decline in vegetative vigor and composition can

occur. Under favorable conditions the site has the potential to resemble the Reference State. Interpretations for this site are based primarily on the Common Rivergrass/Slough Sedge Plant Community Phase (1.1). This community phase and the Reference State 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 considered. Community phases, community pathways, states, transitions, thresholds and restoration pathways have been determined through similar studies and experience.

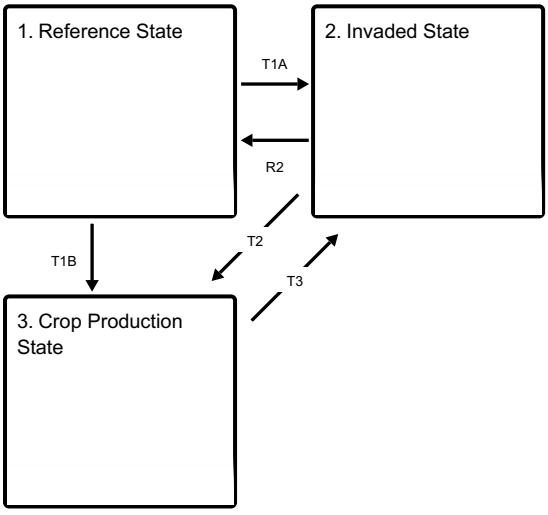
This ecological site (ES) has been grazed by domestic livestock since introduced into the area. The introduction of domestic livestock and the use of fencing and reliable water sources have changed the disturbance regime of this site. Heavy continuous grazing without adequate recovery periods following each grazing occurrence causes this site to depart from the Reference State. Species such as fowl bluegrass, spikerush, and Baltic rush will initially increase. Common Rivergrass and slough sedge will decrease in frequency and production. Continued heavy grazing eventually causes a dominance by spikerush, rushes, and unpalatable forbs such as curly dock.

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

The following is a diagram that illustrates the common plant community phases that can occur on the site and the transition and community pathways between them. The ecological processes will be discussed in more detail in the plant community descriptions following the diagram.

## State and transition model

**Ecosystem states**




**T1A** - Heavy continuous grazing, inundation, no fire

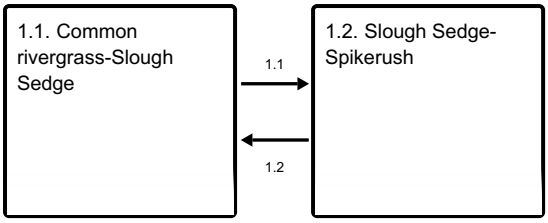
**T1B** - Tillage, artificial drainage (surface and subsurface)

**R2** - Long term prescribed grazing, wetland restoration

**T2** - Tillage, artificial drainage (surface and subsurface)

**T3** - Abandonment of cropping

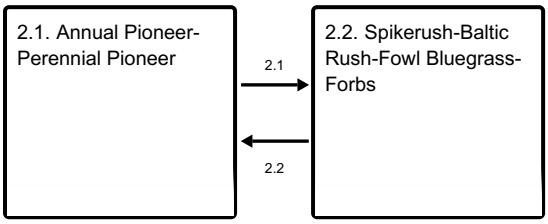
**State 1 submodel, plant communities**




**1.1** - Heavy continuous grazing

**1.2** - Prescribed grazing with recovery periods

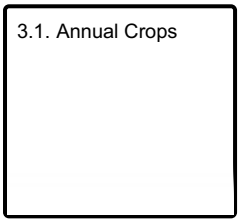
**State 2 submodel, plant communities**




**2.1** - Heavy continuous grazing, below normal precipitation period, no fire

**2.2** - Inundation

**State 3 submodel, plant communities**




## State 1
## Reference State

The Reference State represents the natural range of variability that dominates the dynamics of this ES. This state is typically dominated by cool-season grass and grass-like species. Before European settlement, the primary disturbance mechanisms for this site in the reference condition included periodic fire, grazing by large herding ungulates, and fluctuations in the water table and ponding frequency and duration. Frequent surface fires (3 to 5 years) 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, concentrated livestock grazing, and weather fluctuations. Species that are desirable for livestock and wildlife can decline and a corresponding increase in less desirable species will occur.

### Dominant plant species

- common rivergrass (*Scolochloa festucacea*), grass
- wheat sedge (*Carex atherodes*), grass
- woolly sedge (*Carex pellita*), grass
- prairie cordgrass (*Spartina pectinata*), grass
- American mannagrass (*Glyceria grandis*), grass
- knotweed (*Polygonum*), other herbaceous
- western dock (*Rumex aquaticus*), other herbaceous
- white panicle aster (*Symphyotrichum lanceolatum*), other herbaceous

## Community 1.1
## Common rivergrass-Slough Sedge

Interpretations are based primarily on the 1.1 Common Rivergrass-Slough Sedge Plant Community Phase (this is also considered to be climax). This plant community evolved with grazing by large herbivores, frequent surface 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. The potential vegetation is about 45 percent grasses, 40 percent grass-likes, and 15 percent forbs. The major grasses and grass-likes include Common rivergrass, slough sedge (also called wheat sedge), woolly sedge (*Carex pellita*), American mannagrass (*Glyceria grandis*), prairie cordgrass, and spikerush. Key forbs include smartweeds (Polygonum), western dock (*Rumex aquaticus*), and white panicle aster (*Symphyotrichum lanceolatum*). 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 variability of both the fluctuations of water table and reoccurring ponding allows for the diversity in plant species. This is a sustainable plant community in terms of soil stability, watershed function, and biologic integrity.

**Dominant plant species**

- common rivergrass (*Scolochloa festucacea*), grass
- wheat sedge (*Carex atherodes*), grass
- woolly sedge (*Carex pellita*), grass
- American mannagrass (*Glyceria grandis*), grass
- prairie cordgrass (*Spartina pectinata*), grass
- spikerush (*Eleocharis*), grass
- knotweed (*Polygonum*), other herbaceous
- western dock (*Rumex aquaticus*), other herbaceous
- white panicle aster (*Symphyotrichum lanceolatum*), other herbaceous

## Community 1.2
## 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 1.1 Common rivergrass-Slough Sedge Plant Community Phase, Common rivergrass, Prairie cordgrass, and American mannagrass have decreased. The grass-like species, such as slough sedge, spikerush, woolly sedge, and rushes, have increased and tend to dominate this plant community.

**Dominant plant species**

- wheat sedge (*Carex atherodes*), grass
- woolly sedge (*Carex pellita*), grass
- rush (*Juncus*), grass

## Pathway 1.1
## Community 1.1 to 1.2

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 Slough Sedge-Spikerush Plant Community Phase.

## Pathway 1.2
## Community 1.2 to 1.1

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 Common rivergrass-Slough Sedge Plant Community Phase. This pathway could also occur with a return to more normal precipitation levels and frequencies.

## State 2
## Invaded State

This state is characterized by the increase in bare ground due to trampling caused by excessive use and/or by inundation for extended periods which causes a temporary shift in the plant composition and cover. This allows for the invasion of nonnative species, which, with continued heavy grazing, can increase to eventual dominance. Loss or reduction of native cool- and warm-season species can negatively impacted energy flow and nutrient cycling. Infiltration will be reduced and native plant mortality will increase. As the disturbance level increases, native plant density decreases even more, giving way to annual species and invasive perennial species, as well as, a further increase in bare ground.

**Dominant plant species**

- foxtail barley (*Hordeum jubatum*), grass
- rough barnyardgrass (*Echinochloa muricata*), grass
- quackgrass (*Elymus repens*), grass
- fowl bluegrass (*Poa palustris*), grass
- Kentucky bluegrass (*Poa pratensis*), grass
- mountain rush (*Juncus arcticus ssp. littoralis*), grass
- knotweed (*Polygonum*), other herbaceous
- Canada thistle (*Cirsium arvense*), other herbaceous

### Community 2.1
### Annual Pioneer-Perennial Pioneer

This plant community developed with heavy continuous grazing without adequate recovery periods between grazing events and no surface fire or abandonment after cropping. The dominant vegetation includes pioneer annual and/or perennial native and non-native grasses, grass-likes, forbs, and shrubs. Grasses may include foxtail barley (*Hordeum jubatum*), rough barnyard grass (*Echinochloa muricata*), quackgrass, fowl bluegrass, Kentucky bluegrass, Baltic rush (also known as mountain rush), and sedges. The dominant forbs include knotweed (Polygonum), Canada thistle (*Cirsium arvense*), and other early successional species. This is due to the loss of diversity (including the loss of the seed bank), within the existing plant community, and the plant communities on adjacent sites. 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.

**Dominant plant species**

- foxtail barley (*Hordeum jubatum*), grass
- rough barnyardgrass (*Echinochloa muricata*), grass
- quackgrass (*Elymus repens*), grass
- fowl bluegrass (*Poa palustris*), grass
- Kentucky bluegrass (*Poa pratensis*), grass
- mountain rush (*Juncus arcticus ssp. littoralis*), grass
- sedge (*Carex*), grass
- knotweed (*Polygonum*), other herbaceous
- Canada thistle (*Cirsium arvense*), other herbaceous

### Community 2.2
### 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 (Schoenoplectus), and other less desirable grass-likes, along with grasses such as fowl bluegrass, and American sloughgrass (*Beckmannia syzigachne*), dominate the community. Quackgrass (*Elymus repens*), creeping meadow foxtail (*Alopecurus arundinaceus*), Kentucky bluegrass (*Poa pratensis*), and other nonnative species can invade on drier portions of the community. Common rivergrass, slough sedge, other sedges, prairie cordgrass, and reedgrass (Calamagrostis) will be virually eliminated from the plant community. Smartweed (Polygonum), dock (Rumex), and cinquefoil (Potentilla) 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 1.1 Common rivergrass-Slough Sedge Plant Community Phase. 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 with improved management or return of more normal precipitation patterns.

**Dominant plant species**

- spikerush (*Eleocharis*), grass
- mountain rush (*Juncus arcticus ssp. littoralis*), grass
- bulrush (*Schoenoplectus*), grass
- fowl bluegrass (*Poa palustris*), grass
- American sloughgrass (*Beckmannia syzigachne*), grass
- quackgrass (*Elymus repens*), grass
- creeping meadow foxtail (*Alopecurus arundinaceus*), grass
- Kentucky bluegrass (*Poa pratensis*), grass
- knotweed (*Polygonum*), other herbaceous
- dock (*Rumex*), other herbaceous
- cinquefoil (*Potentilla*), other herbaceous

## Pathway 2.1
## Community 2.1 to 2.2

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 and no surface fire for extended periods of time (typically for 10 years or more) causing litter levels to become high enough to reduce native grass vigor, diversity, and density will shift this community to the 2.2 Annual Pioneer-Perennial Pioneer Plant Community Phase.

## Pathway 2.2
## Community 2.2 to 2.1

Inundation for extended periods beyond normal ponding and drying patterns will convert this plant community to the 2.1 Spikerush-Baltic Rush-Fowl Bluegrass-Forbs Plant Community Phase within the Invaded State (State 2).

## State 3
## Crop Production State

This state is characterized by the production of annual crops using a variety of tillage and cropping systems along with management practices. Cropping on this site is enabled during years with drier than normal precipitation or with artificial drainage (surface or subsurface).

**Dominant plant species**

- corn (*Zea*), grass
- wheat (*Triticum*), grass
- soybean (*Glycine*), other herbaceous
- beet (*Beta*), other herbaceous

## Community 3.1
## Annual Crops

This plant community developed with the use of a variety of tillage systems and cropping systems for the production of annual crops including corn, soybeans, wheat, sugar beet and a variety of other crops.

**Dominant plant species**

- corn (*Zea*), grass
- wheat (*Triticum*), grass

- beet (*Beta*), other herbaceous
- soybean (*Glycine*), other herbaceous

### Transition T1A
### State 1 to 2

Heavy continuous grazing (stocking levels well above carrying capacity for extended portions of the growing season and often at the same time of year each year), no surface fire for extended periods of time (typically for 10 years or more) causing litter levels to become high enough to reduce native grass vigor, diversity, and density, and/or inundation for extended periods beyond normal ponding and drying patterns will eventually cause a shift over a threshold leading to the 2.1 Spikerush-Baltic Rush-Fowl Bluegrass-Forbs Plant Community Phase within the Invaded State (State 2). Grazing repeatedly in the early growing season can expedite this shift by causing mechanical disturbance due to trampling.

### Transition T1B
### State 1 to 3

Tillage, Artificial drainage (surface and subsurface) will cause a shift over a threshold leading to the 3.1 Annual Crops within the Crop Production State (State 3).

### Restoration pathway R2
### State 2 to 1

Long-term prescribed grazing (moderate stocking levels coupled with adequate recovery periods, or other grazing systems such as high-density, low-frequency intended to treat specific species dominance, or periodic light to moderate stocking levels possibly including periodic rest) may lead this plant community phase over a threshold to the Reference State (State 1). Wetland restoration techniques may be necessary to restore biotic integrity and plant diversity and productivity.

### Transition T2
### State 2 to 3

Tillage, Artificial drainage (surface and subsurface) will cause a shift over a threshold leading to the 3.1 Annual Crops within the Crop Production State (State 3).

### Transition T3
### State 3 to 2

Cropping followed by abandonment may lead this plant community phase over a threshold to the Invaded State (State 2) and more specifically to the 2.2 Annual-Pioneer-Perennial Pioneer Plant Community Phase.

## Additional community tables

**Table 5. Community 1.1 plant community composition**

| Group | Common Name | Symbol | Scientific Name | Annual Production (Kg/Hectare) | Foliar Cover (%) |
|---|---|---|---|---|---|
| **Grass/Grasslike** | | | | | |
| 1 | **Tall Cool-season Grasses** | | | 0–493 | |
| | common rivergrass | SCFE | *Scolochloa festucacea* | 0–308 | – |
| | American mannagrass | GLGR | *Glyceria grandis* | 0–185 | – |
| 2 | **Grass-likes** | | | 2466–4624 | |
| | wheat sedge | CAAT2 | *Carex atherodes* | 925–2466 | – |
| | spikerush | ELEOC | *Eleocharis* | 616–1849 | – |
| | mountain rush | JUARL | *Juncus arcticus ssp. littoralis* | 308–925 | – |
| | woolly sedge | CAPE42 | *Carex pellita* | 308–925 | |

| | | | | | |
|---|---|---|---|---|---|
| | woolly sedge | CAPE42 | *Carex pellita* | 308–925 | – |
| | flatsedge | CYPER | *Cyperus* | 0–616 | – |
| | bottlebrush sedge | CAHY4 | *Carex hystericina* | 0–616 | – |
| | smoothcone sedge | CALA12 | *Carex laeviconica* | 0–616 | – |
| | rush | JUNCU | *Juncus* | 0–616 | – |
| | green bulrush | SCAT2 | *Scirpus atrovirens* | 0–616 | – |
| | Grass-like (not a true grass) | 2GL | *Grass-like (not a true grass)* | 0–493 | – |
| 3 | **Tall Warm-season Grasses** | | | 0–308 | |
| | prairie cordgrass | SPPE | *Spartina pectinata* | 0–308 | – |
| 4 | **Reedgrasses** | | | 0–123 | |
| | northern reedgrass | CASTI3 | *Calamagrostis stricta ssp. inexpansa* | 0–123 | – |
| | slimstem reedgrass | CASTS5 | *Calamagrostis stricta ssp. stricta* | 0–123 | – |
| 5 | **Other Native Grasses** | | | 0–308 | |
| | Graminoid (grass or grass-like) | 2GRAM | *Graminoid (grass or grass-like)* | 0–308 | – |
| | American sloughgrass | BESY | *Beckmannia syzigachne* | 0–308 | – |
| 6 | **Non-Native Grasses** | | | 62–308 | |
| | barnyardgrass | ECCR | *Echinochloa crus-galli* | 62–308 | – |
| | Graminoid (grass or grass-like) | 2GRAM | *Graminoid (grass or grass-like)* | 0–185 | – |
| **Forb** | | | | | |
| 7 | **Forbs** | | | 308–1233 | |
| | broadleaf cattail | TYLA | *Typha latifolia* | 62–247 | – |
| | Forb, introduced | 2FI | *Forb, introduced* | 0–247 | – |
| | Forb, native | 2FN | *Forb, native* | 62–247 | – |
| | Pennsylvania smartweed | POPE2 | *Polygonum pensylvanicum* | 62–247 | – |
| | giant goldenrod | SOGI | *Solidago gigantea* | 62–185 | – |
| | bur-reed | SPARG | *Sparganium* | 0–185 | – |
| | curly dock | RUCR | *Rumex crispus* | 62–185 | – |
| | knotweed | POLYG4 | *Polygonum* | 62–185 | – |
| | narrowleaf cattail | TYAN | *Typha angustifolia* | 62–185 | – |
| | hemlock waterparsnip | SISU2 | *Sium suave* | 0–123 | – |
| | white panicle aster | SYLA6 | *Symphyotrichum lanceolatum* | 0–123 | – |
| | New England aster | SYNO2 | *Symphyotrichum novae-angliae* | 0–123 | – |
| | pale dock | RUAL4 | *Rumex altissimus* | 0–123 | – |
| | Indianhemp | APCA | *Apocynum cannabinum* | 0–123 | – |
| | Flodman's thistle | CIFL | *Cirsium flodmanii* | 0–123 | – |
| | splitlip hempnettle | GABI3 | *Galeopsis bifida* | 0–123 | – |
| | Rydberg's sunflower | HENUR | *Helianthus nuttallii ssp. rydbergii* | 0–62 | – |
| | smooth horsetail | EQLA | *Equisetum laevigatum* | 0–62 | – |
| | northern water plantain | ALTR7 | *Alisma triviale* | 0–62 | – |
| | Canadian anemone | ANCA8 | *Anemone canadensis* | 0–62 | – |
| | western dock | RUAQ | *Rumex aquaticus* | 0–62 | – |
| | cinquefoil | POTEN | *Potentilla* | 0–62 | – |

| | | | | | |
|---|---|---|---|---|---|
| | marsh arrowgrass | TRPA28 | *Triglochin palustris* | 0–62 | – |

## Animal community

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.

Common rivergrass/Slough Sedge (1.1)
Average Anuual Production (lbs./acre, air-dry): 6800
Stocking Rate* (AUM/acre): 1.86

Slough Sedge/Spikerush (1.2)
Average Annual Production (lbs./acre, air-dry): 5500
Stocking Rate* (AUM/acre): 1.51

Spikerush/Baltic Rush/Fowl Bluegrass/Forbs (2.1)
Average Annual Production (lbs./acre, air-dry): 3200
Stocking Rate* (AUM/acre): 0.88

Annual/Pioneer, Non-Native Perennial (2.2)
Average Annual Production (lbs./acre, air-dry): 1600
Stocking Rate* (AUM/acre): 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.

## Hydrological 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 is negligible due to the concave shape of the landform that this site occupies.

## 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 asthetic value that appeals to visitors.

## Wood products

No appreciable wood products are typically present on this site.

## Other products

Seed harvest of native plant species can provide additional income on this site.

## Inventory data references

MLRA 102D was created in 2022 with Agricultural Handbook 296 updated. This area was MLRA 102A prior to this time . Information was copied from MLRA 102A ESDs to create the MLRA 102D ESDs.

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.

Data Source Sample Period State County
NP-ESC-1 (0150746039) 2007 SD Deuel
NP-ESC-1 (0010846039) 2008 SD Deuel

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## 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) | David Schmidt, Tim Nordquist, Stan Boltz |
| Contact for lead author | |
| Date | 12/04/2007 |
| Approved by | Suzanne Mayne-Kinney |
| Approval date | |
| Composition (Indicators 10 and 12) based on | Annual Production |

## Indicators

1. **Number and extent of rills:** Rills should not be present.

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2. **Presence of water flow patterns:** Barely observable.

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3. **Number and height of erosional pedestals or terracettes:** Essentially non-existent.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not**

**bare ground):** Bare ground less than 5% and less than 2 inches in diameter.

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5. **Number of gullies and erosion associated with gullies:** Active gullies should not be present.

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

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7. **Amount of litter movement (describe size and distance expected to travel):** Little to no plant litter movement. Plant litter remains in place and is not moved by erosional forces.

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Stability class 6. Typically high root content, and organic matter. Soil surface is very resistant to erosion.

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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 and color of A-horizon.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Healthy, deep rooted native grasses enhance infiltration and reduce runoff.

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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):** No compaction layer should be evident.

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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 rhizomatous grass > mid & tall cool-season rhizomatous grass-like

    Sub-dominant: > tall warm-season rhizomatous grass > forb

    Other:

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Very little to no evidence of decadence or mortality.

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14. **Average percent litter cover (%) and depth ( in):** 85-90%, roughly 1-2 inches. Litter cover 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):** 6200 – 7400 lbs./acre air-dry weight, average 6,800 lbs./acre air-dry weight.

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** Refer to State and Local Noxious Weed List, also reed canarygrass.

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17. **Perennial plant reproductive capability:** All species are capable of reproducing.

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