USDA Natural Resources Conservation Service

Ecological site R102BY007SD
Saline Lowland

Last updated: 2/09/2024
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.

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.

MLRA notes

Major Land Resource Area (MLRA): 102B–Till Plains

The Till Plains (102B) is located within the Western Lake Section of the Central Lowland Province of the Interior Plains. It is entirely in South Dakota, encompassing 2,215 square miles (Figure 1). The elevation ranges from 1,140 to 1,880 feet. The MLRA is characterized by glaciated, nearly level to hilly plains populated by stagnation and end moraines, glacial outwash terraces, and floodplains as the major landforms. The dominant parent materials are silty drift, glacial till, glacial outwash, and alluvium. (USDA-NRCS 2006)

The dominant soil order in this MLRA is Mollisols. The soils in the area dominantly have a mesic temperature regime, a udic ustic moisture regime and mixed or smectitic mineralogy. They generally are very deep, well drained to poorly drained, and clayey or loamy. This area is in the western area of the tall grass prairie and supports big bluestem (Andropogon gerardi), little bluestem (Schizachyrium scoparium), Indiangrass (Sorghastrum nutans), porcupine grass (Hesperostipa spartea), and green needlegrass (Nassella viridula) as the dominant native species. Cattails (Typha), prairie cordgrass (Spartina pectinate), bulrush (Cyperaceae) and reed canarygrass (Phalaris arundinacea) are commonly found on the poorly drained soils. (USDA-NRCS, 2006).

Classification relationships

Major Land Resource Area (MLRA): Till Plains (102B) (USDA-NRCS, 2006)

USFS Subregions: North Central Glaciated Plains Section (251B); Outer Coteau des Prairies (251Bb); Yankton Hills and Valleys (251Bf); Northwest Iowa Plains (251Bd); (Cleland et al., 2007).

US EPA Level IV Ecoregion: Southern Missouri Coteau (42e); Southern Missouri Coteau Slope (42f); James River Lowland (46n) - (USEPA, 2013)

Ecological site concept

The Saline Lowland ecological site typically occurs in drainageways. Soils are poorly and very poorly drained and 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. The soils will have visible salts within 16 inches of the soil surface. Dominant vegetation is adapted to high salinity and excessive wetness, which include species such as Prairie and Alkali cordgrass, and Nuttall's alkaligrass. Salt tolerant forbs present may include alkali plantain, western dock, and Pursh seepweed. The site my become degraded due to change in disturbance regime, and vegetation may shift to community dominated by foxtail barley, inland saltgrass, and bareground.

Associated sites

R102BY002SD	**Linear Meadow** These sites occur in drainageways. Soils are poorly and very poorly drained and 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. Soils do not have visible salts within 16 inches of the soil surface. The central concept soil series are Clamo and Baltic, but other series are included.

Similar sites

R102BY002SD	**Linear Meadow** These sites occur in drainageways. Soils are poorly and very poorly drained and 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. Soils do not have visible salts within 16 inches of the soil surface. The central concept soil series are Clamo and Baltic, but other series are included.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Spartina pectinata* (2) *Spartina gracilis*

Physiographic features

This site occurs on nearly level flood plains or drainageways.

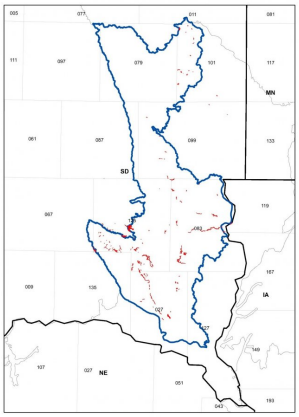


Figure 2. The Site Distribution Map for the Saline Lowland site in MLRA 102B.

Table 2. Representative physiographic features

Landforms	(1) Flood plain
Flooding frequency	None
Ponding frequency	None
Elevation	335–579 m
Slope	0–1%
Water table depth	25–76 cm
Aspect	Aspect is not a significant factor

Climatic features

Major Land Resource Area 102B is considered to have a continental climate with 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 the location of this MLRA 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 24 to 26 inches per year. The average annual temperature is about 46°F. January is the coldest month with average temperatures ranging from about 14°F (Wentworth 2 WNW, South Dakota, to about 18°F (Canton 4 WNW, SD). July is the warmest month with temperatures averaging from about 72°F (Wentworth 2 WNW, SD), to about 73°F (Canton 4 WNW, SD). The range of normal average monthly temperatures between the coldest and warmest months is about 57°F. This large annual range attests to the continental nature of the climate of this area. 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. Green-up of cool-season plants may occur in September and October when adequate soil moisture is present.

Table 3. Representative climatic features

Frost-free period (characteristic range)	124-127 days
Freeze-free period (characteristic range)	138-140 days
Precipitation total (characteristic range)	660 mm

Frost-free period (actual range)	123-128 days
Freeze-free period (actual range)	137-141 days
Precipitation total (actual range)	660-686 mm
Frost-free period (average)	126 days
Freeze-free period (average)	139 days
Precipitation total (average)	660 mm

Climate stations used

- (1) WENTWORTH 2.5 WNW [USC00399042], Wentworth, SD
- (2) MADISON 2SE [USC00395090], Madison, SD
- (3) MONTROSE 8N [USC00395738], Montrose, SD
- (4) CANTON [USC00391392], Canton, SD
- (5) CENTERVILLE 6 SE [USC00391579], Beresford, SD

Influencing water features

Wetland Description: Cowardin, et. al., 1979
System: Palustrine
Subsystem: N/A
Class: Emergent Wetland
Subclass: Persistent

Soil features

The common features of soils in this site are the silt loam to silty clay textured subsoil and slopes of zero to one percent. The soils in this site are poorly drained and formed in alluvium. The silty clay loam surface layer is typically 18 to 24 inches thick. The soils have a very slow infiltration rate. Areas within the Saline lowland site can become nearly barren due to the accumulation of sodium at the surface. Where vegetation is present, 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 somewhat susceptible to water erosion. Slow permeability and salt accumulation strongly influences the soil-water-plant relationship.

The central concept soil series for this site is Salmo, but other series are included.

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

Table 4. Representative soil features

Surface texture	(1) Silty clay loam
Family particle size	(1) Loamy
Drainage class	Poorly drained
Permeability class	Very slow
Soil depth	203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	17.78–20.32 cm
Calcium carbonate equivalent (0-101.6cm)	1–25%

Electrical conductivity (0-101.6cm)	4–16 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	2–7
Soil reaction (1:1 water) (0-101.6cm)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

State and Community Phases
The information in this Ecological Site Description, including the state-and-transition model (STM), was developed based on historical data, current field data, professional experience, and a review of the scientific literature. As a result, all possible scenarios or plant species may not be included. Key indicator plant species, disturbances, and ecological processes are described to inform land management decisions.

The site which is located in the Till Plain Region developed under Northern Great Plains climatic conditions and included natural influence of large herding herbivores and occasional fire. Changes occur in the plant communities due to weather fluctuations and 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 1.1 Prairie Cordgrass-Alkali Cordgrass-Nuttall’s Alkaligrass Plant Community Phase. This community phase and the Reference State have 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 to lightly grazed areas, seasonal use pastures, and historical accounts also have been considered.

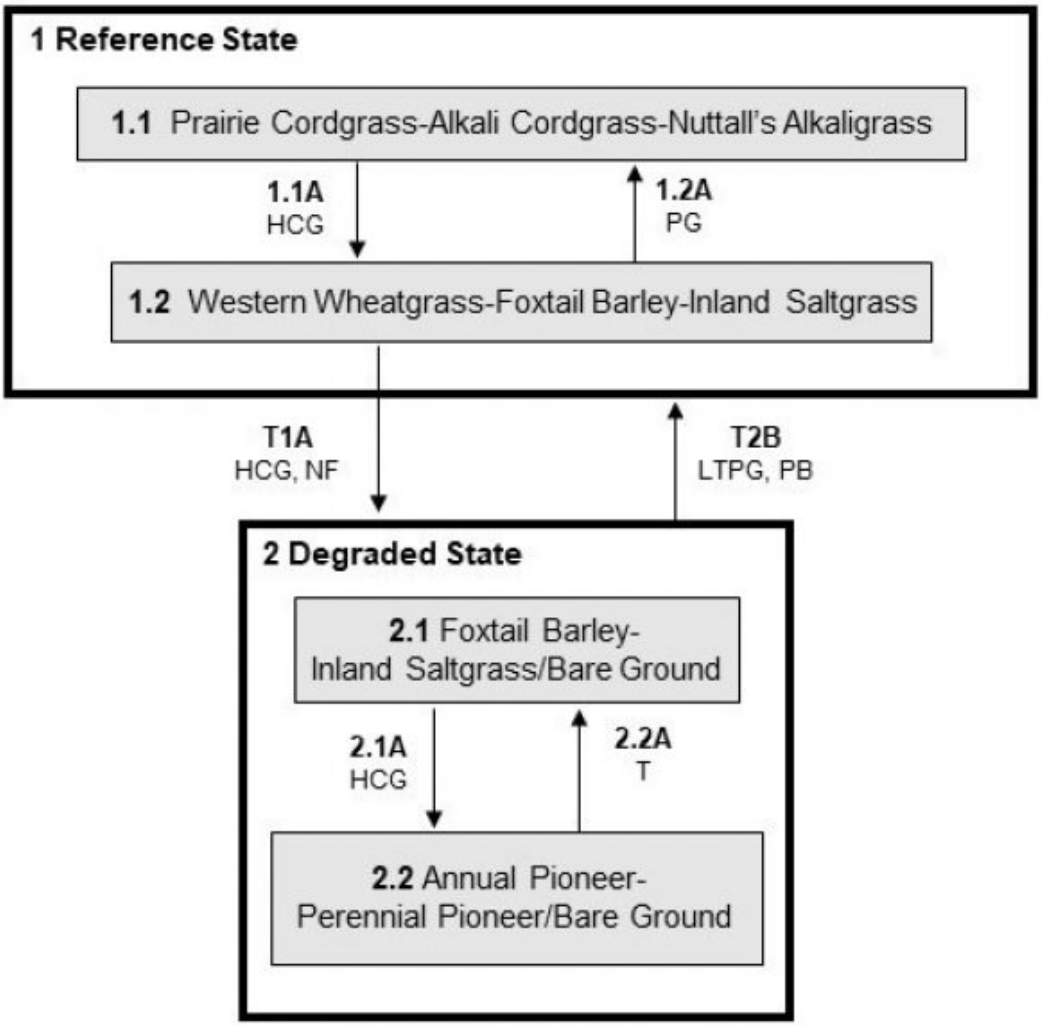
The Saline Lowland ecological site (ES) has been grazed by domestic livestock since they have been introduced into the area. As this site deteriorates, species such as inland saltgrass (*Distichlis spicata*) and foxtail barley (*Hordeum jubatum*) increase and annual species may invade the site. Grasses such as alkali sacaton (*Sporobolus airoides*), prairie cordgrass, alkali cordgrass (Spartina gracillis), western wheatgrass (*Pascopyrum smithii*), slender wheatgrass (*Elymus trachycaulus*), and Nuttall's alkaligrass (Puccinella nuttalliana), decrease in frequency and production. The high sodium content of the soils greatly influences the plant species present. Plant vigor can vary on a year-to-year basis in relation to current precipitation amounts, which influences the translocation of salts in the soil profile. Typically, only salt tolerant plants are found on this site.

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 and community phases. The following plant composition tables 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 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

Saline Lowland – R102BY007SD (8/19/19)



LEGEND
Saline Lowland – R102BY007SD

HCG – Heavy continuous grazing
LTPG – Long-term prescribed grazing
NF – No fire
PB – Prescribed burning
PG – Prescribed grazing
T – Time w/wo disturbances

Figure 9. The State-And-Transition Model and Legend for the Saline Lowland site in MLRA 102B.

Code	Process
T1A	Heavy continuous grazing, no fire
T2B	Long term prescribed grazing, prescribed burning
1.1A	Heavy continuous grazing
1.2A	Prescribed grazing with recovery periods
2.1A	Heavy continuous grazing
2.2A	Time w/wo disturbances

Figure 10. The Matrix for the Saline Lowland site in MLRA 102B.

State 1
Reference State

The vegetation in the Reference State represents the natural range of variability that influences the dynamics of this ES. This state is typically dominated by cool-season grass and grass-like species. Before Europeans settled North Americat, 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. Frequent surface fires (every 3 to 5 years), grazing, and 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.

Community 1.1
Prairie Cordgrass-Alkali Cordgrass-Nutall's Alkaligrass

Figure 11. Typical Reference Community vegetation found on the Saline lowland site.

Interpretations are based primarily on the 1.1 Prairie Cordgrass-Alkali Cordgrass-Nutall's Alkaligrass Plant Community Phase. This community evolved with grazing by large herbivores, occasional prairie fires, and periodic flooding events, and can be found on areas that are properly managed with grazing and/or prescribed burning. The potential vegetation is about 85 percent grasses and grass-like plants and 15 percent forbs. The major grasses include prairie and alkali cordgrass, and Nuttall's alkaligrass. Other grass and grass-like species present include western wheatgrass, slender wheatgrass, inland saltgrass, switchgrass (*Panicum virgatum*), sedge (Carex), and foxtail barley. Salt tolerant forbs such as alkali plantain (Plantago eripoda), western dock (*Rumex aquaticus*), and Pursh seepweed (*Suaeda calceoliformis*) are common. Interpretations are based primarily on this plant community phase. This community phase is diverse, stable, productive, and well adapted to both saline soils and the Northern Great Plains climatic conditions. Community dynamics, the nutrient and water cycles, and energy flow are functioning properly. Litter is properly distributed with very little movement offsite and natural plant mortality is very low. This community is resistant to many disturbances except continuous grazing, tillage, or development into urban or other uses. The diversity in plant species allows for both the fluctuation of flooding and large variations in climate.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	3811	4640	5346
Forb	224	516	930
Total	**4035**	**5156**	**6276**

Figure 13. Plant community growth curve (percent production by month). SD0218, Till Plains, lowland cool-season/warm-season codominant.. Cool-season, warm-season codominant, lowland..

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

Community 1.2

Western Wheatgrass-Foxtail Barley-Inland Saltgrass

This community develops with heavy, continuous grazing with lack of adequate recovery periods during the growing season, and annual, early spring seasonal grazing. Lack of litter and reduced plant heights result in higher soil temperatures, poor water infiltration rates, high evapotranspiration, and increased percolation of the high water table, which increases salt concentrations on the surface. This gives inland saltgrass and other salt tolerant species a competitive advantage over less tolerant species. Nuttall's alkaligrass, slender wheatgrass, prairie cordgrass, and alkali cordgrass have decreased while western wheatgrass and inland saltgrass will initially increase in composition. Alkali muhly (*Muhlenbergia asperifolia*), foxtail barley, silverleaf cinquefoil (*Potentilla argentea*), western dock, and alkali plantain will also increase in composition. As long as the herbaceous component remains intact, the plant community tends to be resilient. However, species composition can be further altered through long-term heavy continuous grazing. With loss of Nuttall's alkaligrass, Prairie cordgrass, Alkali Cordgrass, and much of the western wheatgrass, the inland saltgrass, and foxtail barley will eventually become the dominant species. This plant community is relatively stable and well adapted to increased salinity. Plant vigor, litter, plant density, and production have decreased. The biological integrity, water, and nutrient cycles of this plant community are becoming impaired.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	2740	3432	3990
Forb	174	491	942
Total	**2914**	**3923**	**4932**

Figure 15. Plant community growth curve (percent production by month). SD0217, Till Plains, cool-season dominant, warm-season subdominant.. 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

Pathway 1.1A
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 shift this community to the 1.2 Western Wheatgrass-Foxtail Barley-Inland Saltgrass Plant Community Phase.

Pathway 1.2A
Community 1.2 to 1.1

Prescribed grazing (alternating season of use and providing adequate recovery periods), or periodic light to moderate grazing including periodic rest will convert this plant community to the 1.1 Prairie Cordgrass-Alkali Cordgrass-Nutall's Alkaligrass Plant Community Phase.

State 2
Degraded State

This State is characterized by the dominance of the shorter-statured, more saline tolerant species such as foxtail barley and inland saltgrass, an increase in bare ground, and the increased presence of salt accumulations on the soil surface. Infiltration is reduced, which allows the moisture and the salts carried by the moisture to be wicked up to the soil surface. The short-statured and shallow-rooted species are more capable of withstanding the higher concentrations of salts in the soil surface. As the disturbance level increases, plant density decreases even more, giving way to annual species and invasive perennial species, and a further increase in bare ground.

Community 2.1
Community Phase 2.1 Foxtail Barley-Inland Saltgrass/Bare Ground

This plant community developed with heavy, continuous season-long grazing where adequate recovery periods between grazing events was not allowed. Patches of inland saltgrass sod are typical and foxtail barley is well distributed throughout the community. Tall warm-season grasses are nearly absent, and slender and western wheatgrass have been greatly reduced and may persist in only remnant amounts, reduced in vigor. Bare ground may develop in micro lows where salt concentrations are highest. A white salt crust may form on the soil surface. The forb component is comprised of salt tolerant species such as Pursh seepweed and silverleaf cinquefoil. This plant community is resistant to change due to the grazing tolerance of inland saltgrass and increased surface salts. A significant amount of production and diversity has been lost when compared to 1.1 Prairie Cordgrass-Alkali Cordgrass-Nuttall's Alkaligrass Plant Community Phase. Loss of key warm-season grasses and increased bare ground has negatively impacted energy flow and nutrient cycling. Water infiltration is reduced significantly due to the shallow rooting depth of inland saltgrass and increased bare ground.

Table 7. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1345	2062	2544
Forb	224	516	930
Total	**1569**	**2578**	**3474**

Figure 17. Plant community growth curve (percent production by month). SD0218, Till Plains, lowland cool-season/warm-season codominant.. Cool-season, warm-season codominant, lowland..

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

Community 2.2
Annual Pioneer-Perennial Pioneer/Bare Ground

This plant community developed under continuous, heavy grazing or other excessive disturbances. The potential plant community is made up of approximately 40 to 80 percent grasses and grass-like species and 20 to 60 percent forbs. The species present in this phase are highly variable, but often include non-native invasive and early seral species. Plant diversity is low (plant richness may be high, but areas are often dominated by a few species). The ecological processes are difficult to restore because of the loss of plant diversity and overall soil disturbance. Soil erosion is potentially very high because of the bare ground and shallow rooted herbaceous plant community. Water runoff will increase and infiltration will decrease due to animal related soil compaction and loss of root mass. This plant community will require significant economic inputs and time to move towards another plant community. This movement is highly variable in its succession. 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. Plant species from adjacent ecological sites may become minor components of this plant community. The community is susceptible to invasion of non-native species due to severe soil disturbances and relatively high percent of bare ground.

Pathway 2.1A
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 shifts this community to the 2.2 Annual Pioneer-Perennial Pioneer/*Bare Ground* Plant Community Phase.

Pathway 2.2A
Community 2.2 to 2.1

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 Foxtail Barley-Inland Saltgrass/*Bare Ground* Plant Community Phase

Transition T1A
State 1 to 2

No surface 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, and heavy, continuous grazing will lead this 1.2 Western Wheatgrass-Foxtail Barley-Inland Saltgrass Plant Community Phase within the Reference State (State 1) over a threshold resulting in the Degraded State (State 2).

Restoration pathway T2A
State 2 to 1

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 Foxtail Barley-Inland Saltgrass/*Bare Ground* Plant Community Phase

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	**Warm-season Grasses**			773–2320	
	alkali cordgrass	SPGR	*Spartina gracilis*	258–1547	–
	prairie cordgrass	SPPE	*Spartina pectinata*	258–1547	–
	switchgrass	PAVI2	*Panicum virgatum*	0–516	–
2	**Wheatgrass**			516–1031	
	western wheatgrass	PASM	*Pascopyrum smithii*	258–773	–
	slender wheatgrass	ELTR7	*Elymus trachycaulus*	258–516	–
3	**Cool-season Grasses**			516–1289	
	Nuttall's alkaligrass	PUNU2	*Puccinellia nuttalliana*	516–1289	–
	foxtail barley	HOJU	*Hordeum jubatum*	52–258	–
	plains bluegrass	POAR3	*Poa arida*	52–258	–
4	**Short Warm-season Grasses**			155–516	
	saltgrass	DISP	*Distichlis spicata*	103–516	–
	scratchgrass	MUAS	*Muhlenbergia asperifolia*	52–155	–
5	**Grass-likes**			258–773	
	sedge	CAREX	*Carex*	103–516	–
	spikerush	ELEOC	*Eleocharis*	52–258	–
	rush	JUNCU	*Juncus*	52–258	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	0–155	–
Forb					
6	**Forbs**			258–773	
	Forb, native	2FN	*Forb, native*	52–206	–
	aster	ASTER	*Aster*	52–155	–
	annual marsh elder	IVAN2	*Iva annua*	0–155	–
	povertyweed	IVAX	*Iva axillaris*	0–103	–
	Pursh seepweed	SUCA2	*Suaeda calceoliformis*	52–103	–
	redwool plantain	PLER	*Plantago eriopoda*	52–103	–
	silver cinquefoil	POAR8	*Potentilla argentea*	52–103	–
	western dock	RUAQ	*Rumex aquaticus*	52–103	–
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	52–103	–
	lambsquarters	CHAL7	*Chenopodium album*	52–103	–
	mealy goosefoot	CHIN2	*Chenopodium incanum*	52–103	–
	Flodman's thistle	CIFL	*Cirsium flodmanii*	0–103	–
	scouringrush horsetail	EQHY	*Equisetum hyemale*	0–52	–
	silverscale saltbush	ATAR2	*Atriplex argentea*	0–52	–
	red swampfire	SARU	*Salicornia rubra*	0–52	–
	rush skeletonplant	LYJU	*Lygodesmia juncea*	0–52	–

Table 9. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Warm-season Grasses**			0–392	
	alkali cordgrass	SPGR	*Spartina gracilis*	0–392	–
	prairie cordgrass	SPPE	*Spartina pectinata*	0–392	–
2	**Wheatgrass**			588–1177	
	western wheatgrass	PASM	*Pascopyrum smithii*	392–981	–
	slender wheatgrass	ELTR7	*Elymus trachycaulus*	78–392	–
3	**Cool-season Grasses**			196–981	
	foxtail barley	HOJU	*Hordeum jubatum*	196–785	–
	Nuttall's alkaligrass	PUNU2	*Puccinellia nuttalliana*	0–392	–
	plains bluegrass	POAR3	*Poa arida*	39–196	–
4	**Short Warm-season Grasses**			196–785	
	saltgrass	DISP	*Distichlis spicata*	196–785	–
	scratchgrass	MUAS	*Muhlenbergia asperifolia*	39–235	–
5	**Grass-likes**			196–588	
	spikerush	ELEOC	*Eleocharis*	39–314	–
	sedge	CAREX	*Carex*	39–275	–
	rush	JUNCU	*Juncus*	39–196	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	0–118	–
Forb					
6	**Forbs**			196–785	
	Forb, introduced	2FI	*Forb, introduced*	0–196	–
	Forb, native	2FN	*Forb, native*	39–196	–
	lambsquarters	CHAL7	*Chenopodium album*	39–118	–
	aster	ASTER	*Aster*	39–118	–
	Pursh seepweed	SUCA2	*Suaeda calceoliformis*	39–118	–
	cocklebur	XANTH2	*Xanthium*	0–78	–
	curly dock	RUCR	*Rumex crispus*	0–78	–
	burningbush	BASC5	*Bassia scoparia*	0–78	–
	scouringrush horsetail	EQHY	*Equisetum hyemale*	0–78	–
	povertyweed	IVAX	*Iva axillaris*	0–78	–
	prickly lettuce	LASE	*Lactuca serriola*	0–78	–
	redwool plantain	PLER	*Plantago eriopoda*	39–78	–
	mealy goosefoot	CHIN2	*Chenopodium incanum*	39–78	–
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	39–78	–
	redroot amaranth	AMRE	*Amaranthus retroflexus*	0–78	–
	Flodman's thistle	CIFL	*Cirsium flodmanii*	0–39	–
	silver cinquefoil	POAR8	*Potentilla argentea*	0–39	–
	western dock	RUAQ	*Rumex aquaticus*	0–39	–
	annual marsh elder	IVAN2	*Iva annua*	0–39	–
	silverscale saltbush	ATAR2	*Atriplex argentea*	0–39	–
	red swampfire	SARU	*Salicornia rubra*	0–39	–

Table 10. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Wheatgrass**			0–258	
	western wheatgrass	PASM	*Pascopyrum smithii*	0–258	–
2	**Cool-season Grasses**			387–1160	
	foxtail barley	HOJU	*Hordeum jubatum*	387–1160	–
	plains bluegrass	POAR3	*Poa arida*	0–129	–
	Nuttall's alkaligrass	PUNU2	*Puccinellia nuttalliana*	0–129	–
3	**Short Warm-season Grasses**			258–773	
	saltgrass	DISP	*Distichlis spicata*	258–773	–
	scratchgrass	MUAS	*Muhlenbergia asperifolia*	26–129	–
4	**Grass-likes**			26–129	
	spikerush	ELEOC	*Eleocharis*	26–129	–
	rush	JUNCU	*Juncus*	0–103	–
	sedge	CAREX	*Carex*	0–77	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	0–52	–
Forb					
6	**Forbs**			258–773	
	burningbush	BASC5	*Bassia scoparia*	52–644	–
	Forb, introduced	2FI	*Forb, introduced*	0–258	–
	curly dock	RUCR	*Rumex crispus*	26–258	–
	cocklebur	XANTH2	*Xanthium*	0–258	–
	redroot amaranth	AMRE	*Amaranthus retroflexus*	0–206	–
	prickly lettuce	LASE	*Lactuca serriola*	0–129	–
	Pursh seepweed	SUCA2	*Suaeda calceoliformis*	26–129	–
	povertyweed	IVAX	*Iva axillaris*	0–77	–
	lambsquarters	CHAL7	*Chenopodium album*	26–77	–
	Forb, native	2FN	*Forb, native*	0–77	–
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	0–52	–
	aster	ASTER	*Aster*	0–52	–
	silverscale saltbush	ATAR2	*Atriplex argentea*	0–52	–
	mealy goosefoot	CHIN2	*Chenopodium incanum*	0–52	–
	red swampfire	SARU	*Salicornia rubra*	0–52	–

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. Stocking rates are calculated using Animal-Unit-

Month (AUM), which is the amount of air-dry forage required to feed a cow, with or without calf, for one month.

Prairie Cordgrass/Alkali Cordgrass/Alkaligrass (1.1)
Average Annual Production (lbs./acre, air-dry): 4,600
Stocking Rate* (AUM/acre): 1.26

Wheatgrass/Foxtail Barley/Inland Saltgrass (1.2)
Average Annual Production (lbs./acre, air-dry): 3,500
Stocking Rate* (AUM/acre): 0.96

Foxtail Barley/Inland Saltgrass, *Bare Ground* (2.1)
Average Annual Production (lbs./acre, air-dry): 2,300
Stocking Rate* (AUM/acre): 0.63

Annual/Pioneer, Non-Native Perennial, *Bare Ground* (2.2)
Average Annual Production (lbs./acre, air-dry): 1,200
Stocking Rate* (AUM/acre): 0.33

*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 group C and D. Infiltration and runoff potential for this site varies from moderate to high depending on soil hydrologic group, slope and ground cover. In many cases, areas with greater than 75 percent ground cover have the greatest potential for high infiltration and lower runoff. An example of an exception would be where shortgrasses form a strong sod and dominate the site. Dominance by bluegrass, or smooth bromegrass will result in reduced infiltration and increased 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 variety of plants that bloom from spring until fall have an aesthetic 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.

Other information

Ecological Site Correlation Issues and Questions:

• SD079 Lake County, SD did not use the (Sa) Salmo silty clay loam (national symbol g0zy) as used in the adjoining

SD087 McCook County, SD.
• SD135 Yankton County, SD did not use the (Sa) Salmo silty clay loam (national symbol g16m) (R102BY007SD ESD) as used in the adjoining SD125 Turner County, SD. SD135 Yankton County, SD (Sb) Salmo silty clay loam (national symbol g126) (R55CBY007SD ESD) will need to be split correlated between MLRA55C and MLRA102B to match SD125 Turner County, SD ESD
• Reference and alternative states within the state and transition model are may not be fully documented and may require additional field sampling for refinement.

Inventory data references

There is no NRCS clipping data and other inventory currently available for this site. Information presented here has been derived using field observations from range-trained personnel. 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
None

Other references

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USDA, NRCS. National Soil Information System, Information Technology Center, Fort Collins, CO. http://nasis.nrcs.usda.gov

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Approval

Suzanne Mayne-Kinney, 2/09/2024

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This Provisional Ecological Site concept has passed both Quality Control and Quality Assurance processes. It was officially approved for publication by David Kraft as of 11/12/2020.

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	12/07/2004
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.

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

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

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.

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

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

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.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Stability class typically 5-6. Typically high root content. Soil surface is very resistant to erosion.

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.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** Healthy, deep rooted native grasses enhance infiltration and reduce runoff.

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 and mid warm-season rhizomatous grasses >>

    Sub-dominant: Mid cool-season bunchgrasses > mid cool-season rhizomatous grasses >

    Other: Grass-likes species = forbs > short warm-season grasses

    Additional: Due to differing root structure and distribution, Kentucky bluegrass and smooth bromegrass do not fit into

reference plant community F/S groups.

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.

14. **Average percent litter cover (%) and depth (in):** 85-90%, roughly 0.5 inch thick or less. Litter cover is in contact with soil surface.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Production ranges from 3,600-5,600 lbs./acre (air-dry weight). Reference value production is 4,600 lbs./acre (air-dry weight).

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

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