

Ecological site R102DY007SD Saline Lowland

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General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

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 Saline Lowland ecological site typically occurs in drainageways but can occur along the edges of larger closed depressions. 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. 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 Cordgrass and Alkali cordgrass, Nuttall's alkaligrass, and switchgrass. Salt tolerant forbs present may include alkali plantain, western dock, and Pursh seepweed. The site may become degraded due to change in disturbance regime, and vegetation may shift to community dominated by foxtail barley, inland saltgrass, and bareground.

Associated sites

R102DY001SD	Shallow Marsh These sites occur in a basin or closed depression. Soils are very poorly drained and the site will pond water until early summer in most years.
R102DY004SD	Wet Meadow 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.
R102DY002SD	Linear Meadow 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.
R102DY036SD	Saline Subirrigated These sites occur along the edges of drainageways or closed depressions. 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. Soils will effervesce with acid at or near the surface and have visible salts within 16 inches of the soil surface.

Similar sites

R102DY036SD	Saline Subirrigated The Saline Subirrigated site occurs along the edges of drainageways or closed depressions. 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. Soils will effervesce with acid at or near the surface and have visible salts within 16 inches of the soil surface. A Saline Subirrigated site will have less prairie cordgrass, more big bluestem and Indiangrass than a Saline Lowland site.
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Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Spartina pectinata</i> (2) <i>Spartina gracilis</i>

Physiographic features

This site typically occurs in flood plains.

Table 2. Representative physiographic features

Landforms	(1) Flood plain
Runoff class	Negligible to low
Flooding duration	Brief (2 to 7 days) to long (7 to 30 days)
Flooding frequency	Frequent
Ponding frequency	None
Elevation	1,000–2,000 ft
Slope	0–1%
Water table depth	0–20 in
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 151 days.

Table 3. Representative climatic features

Frost-free period (characteristic range)	117-129 days
Freeze-free period (characteristic range)	137-150 days
Precipitation total (characteristic range)	24-27 in
Frost-free period (actual range)	110-131 days
Freeze-free period (actual range)	130-151 days
Precipitation total (actual range)	22-28 in
Frost-free period (average)	122 days
Freeze-free period (average)	143 days
Precipitation total (average)	25 in

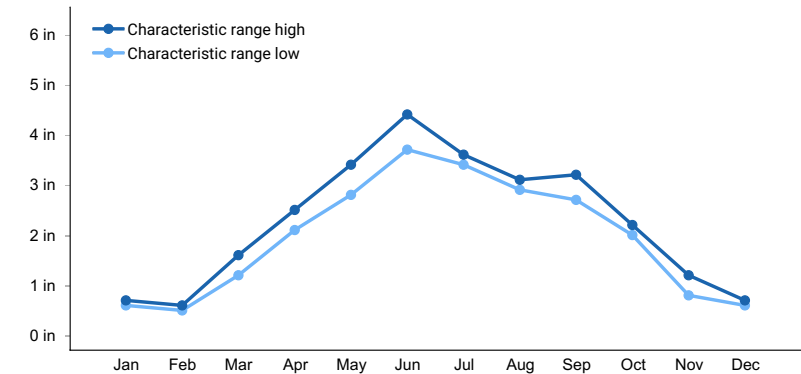


Figure 1. Monthly precipitation range

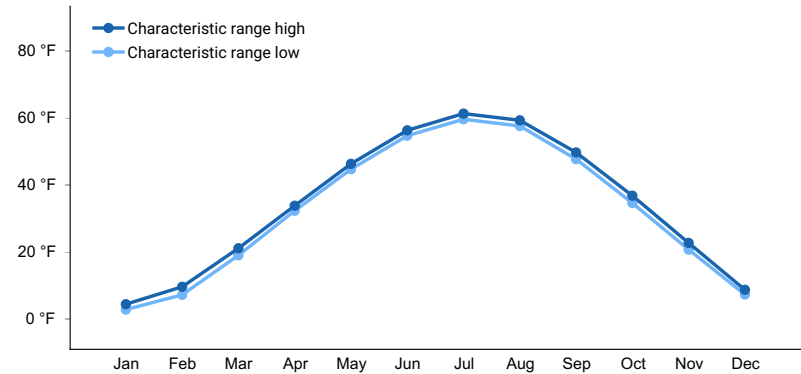


Figure 2. Monthly minimum temperature range

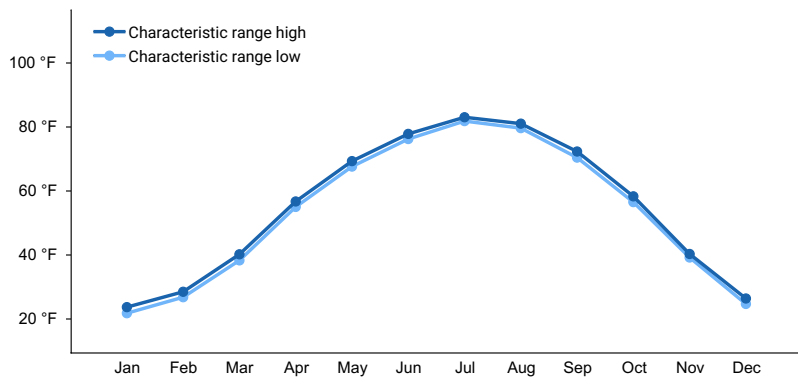


Figure 3. Monthly maximum temperature range

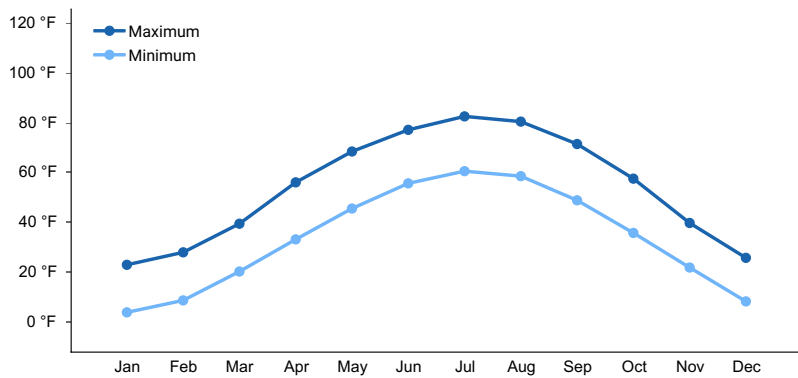


Figure 4. Monthly average minimum and maximum temperature

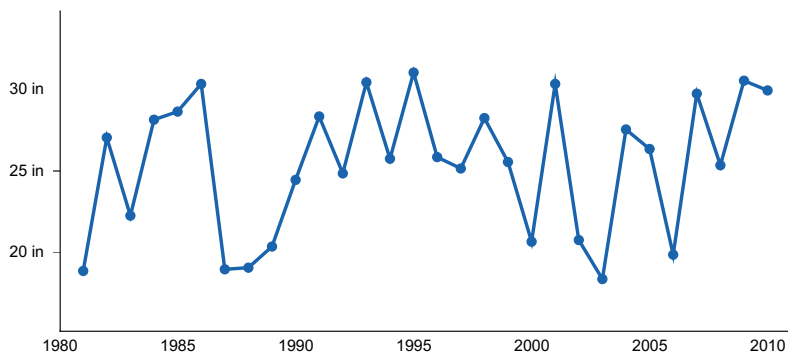


Figure 5. Annual precipitation pattern

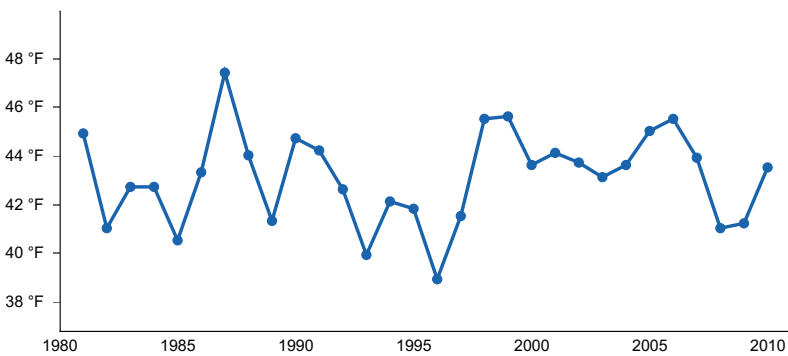


Figure 6. Annual average temperature pattern

Climate stations used

- (1) WEBSTER [USC00399004], Webster, SD
- (2) WAUBAY NWR [USC00398980], Waubay, SD
- (3) WATERTOWN RGNL AP [USW00014946], Watertown, SD

- (4) WATERTOWN 1W [USC00398930], Watertown, SD
- (5) CASTLEWOOD [USC00391519], Castlewood, SD
- (6) ARLINGTON 1 W [USC00390281], Arlington, SD
- (7) CLEAR LAKE [USC00391777], Clear Lake, SD
- (8) ASTORIA 4S [USC00390422], White, SD
- (9) TYLER [USC00218429], Tyler, MN

Influencing water features

Soils 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 August.

Soil features

Soils are formed in alluvium. Surface textures are loam, silty clay loam, and silty clay. Soils are poorly drained.

Table 4. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Loam (2) Silty clay loam (3) Silty clay
Drainage class	Poorly drained
Permeability class	Moderately slow to moderately rapid
Soil depth	80 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	5.1–6.8 in
Soil reaction (1:1 water) (0-10in)	7.4–9
Subsurface fragment volume <=3" (0-60in)	0–1%
Subsurface fragment volume >3" (0-60in)	0%

Ecological dynamics

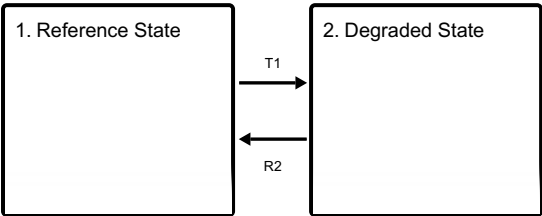
The site which is located in the Prairie Pothole Region developed under Northern Great Plains climatic conditions and included natural influence of large herding herbivores and occasional fire. Changes will occur in the plant communities due to weather fluctuations and/or management actions. Under adverse 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 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 grazed to lightly grazed areas, seasonal use pastures, and historical accounts also have been considered.

This 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, and Nuttall's alkaligrass will decrease in frequency and production. The salinity 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/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.

State and transition model

Ecosystem states



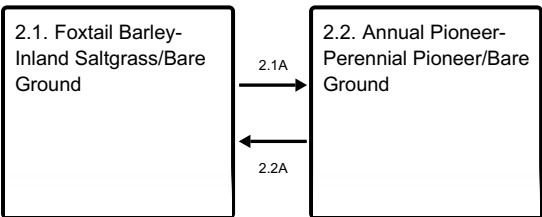
- T1 - Heavy continuous grazing, no fire
- R2 - Long-term prescribed grazing, prescribed burning

State 1 submodel, plant communities



- 1.1A - Heavy continuous grazing
- 1.2A - Prescribed grazing with recovery periods

State 2 submodel, plant communities



- 2.1A - Heavy continuous grazing
- 2.2A - Time without disturbance

State 1
Reference State

This Reference State represents the natural range of variability that dominates the dynamics of this ES. This state is typically dominated by warm-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

- alkali cordgrass (*Spartina gracilis*), grass
- Nuttall's alkaligrass (*Puccinellia nuttalliana*), grass
- western wheatgrass (*Pascopyrum smithii*), grass
- prairie cordgrass (*Spartina pectinata*), grass
- aster (*Aster*), other herbaceous
- annual marsh elder (*Iva annua*), other herbaceous
- lambsquarters (*Chenopodium album*), other herbaceous

Community 1.1

Prairie Cordgrass-Alkali Cordgrass-Nuttall's Alkaligrass

Interpretations are based primarily on the 1.1 Prairie Cordgrass-Alkali Cordgrass-Nuttall's Alkaligrass Plant Community Phase (this is also considered to be climax). 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, and sometimes on areas receiving occasional short periods of rest. The potential vegetation is about 85 percent grasses and grass-like plants and 15 percent forbs. The major grasses include prairie cordgrass, alkali cordgrass, and Nuttall's alkaligrass. Other grass and grass-like species present include western wheatgrass (*Pascopyrum smithii*), slender wheatgrass (*Elymus trachycaulus*), 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, nutrient cycle, water cycle, 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, and/or development into urban or other uses. The diversity in plant species allows for both the fluctuation of flooding, as well as, large variations in climate.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	3210	3960	4610
Forb	190	440	790
Total	3400	4400	5400

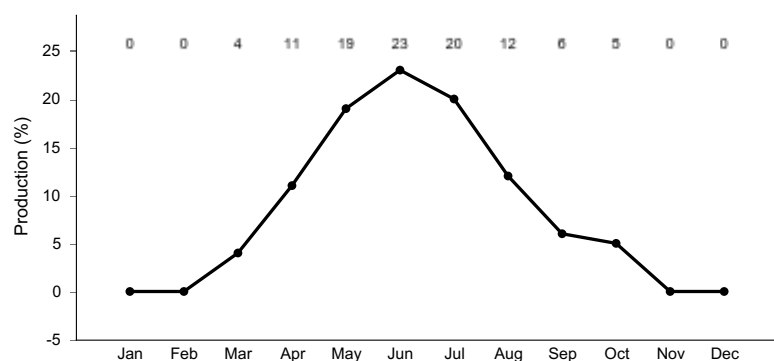


Figure 8. Plant community growth curve (percent production by month).
SD0208, Rolling Till Prairie, lowland cool-season/warm-season codominant..
Cool-season, warm-season codominant, lowland..

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/or 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 (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	2255	2887	3410
Forb	145	413	790
Total	2400	3300	4200

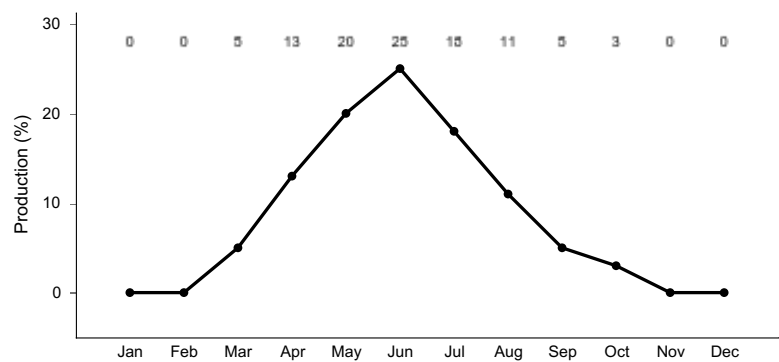


Figure 10. Plant community growth curve (percent production by month). SD0207, Rolling Till Prairie, cool-season dominant, warm-season subdominant.. Cool-season dominant, warm-season subdominant, lowland..

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 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 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 possibly including periodic rest will convert this plant community to the returned to normal disturbance regime levels and frequencies or periodic light to moderate grazing possibly including periodic rest would have converted this plant community to the 1.1 Prairie Cordgrass-Alkali Cordgrass-Nuttall’s Alkaligrass Plant Community Phase.

Conservation practices

Prescribed Grazing

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, the 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, as well as, a further increase in bare ground.

Dominant plant species

- foxtail barley (*Hordeum jubatum*), grass
- saltgrass (*Distichlis spicata*), grass
- western wheatgrass (*Pascopyrum smithii*), grass
- spikerush (*Eleocharis*), grass
- burningbush (*Bassia scoparia*), other herbaceous
- curly dock (*Rumex crispus*), other herbaceous
- cocklebur (*Xanthium*), other herbaceous

Community 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 were 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 wheatgrass and western wheatgrass have been greatly reduced and may persist in 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 Pursue 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 (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1010	1760	2210
Forb	190	440	790
Total	1200	2200	3000

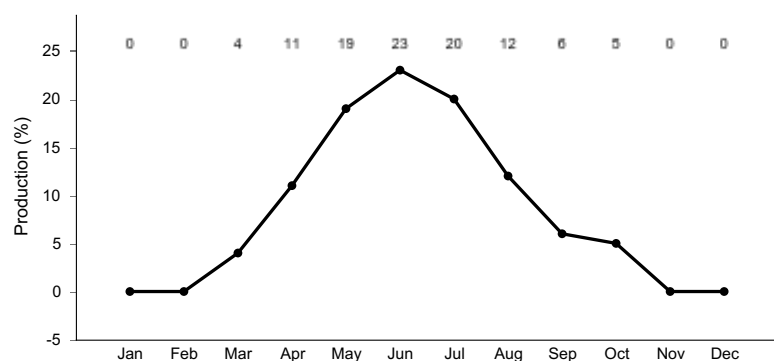


Figure 12. Plant community growth curve (percent production by month). SD0208, Rolling Till Prairie, lowland cool-season/warm-season codominant.. Cool-season, warm-season codominant, lowland..

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 nonnative invasive and/or 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 due to low plant diversity and vigor. 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.

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 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 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 T1

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/or heavy continuous grazing will likely 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 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) coupled with prescribed burning may lead this Degraded State (State 2) over a threshold to the Reference State (State 1).

Conservation practices

Prescribed Grazing

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	Warm-season Grasses			660–1980	
	alkali cordgrass	SPGR	<i>Spartina gracilis</i>	220–1320	–
	prairie cordgrass	SPPE	<i>Spartina pectinata</i>	220–1320	–
	switchgrass	PAVI2	<i>Panicum virgatum</i>	0–440	–
2	Wheatgrass			440–880	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	220–660	–
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	220–440	–
3	Cool-season Grasses			440–1100	
	Nuttall's alkaligrass	PUNU2	<i>Puccinellia nuttalliana</i>	440–1100	–
	foxtail barley	HOJU	<i>Hordeum jubatum</i>	44–220	–
	plains bluegrass	POAR3	<i>Poa arida</i>	44–220	–
4	Short Warm-season Grasses			132–440	
	saltgrass	DISP	<i>Distichlis spicata</i>	88–440	–
	scratchgrass	MUAS	<i>Muhlenbergia asperifolia</i>	44–132	–
5	Grass-like			220–660	
	sedge	CAREX	<i>Carex</i>	88–440	–
	spikerush	ELEOC	<i>Eleocharis</i>	44–220	–
	rush	JUNCU	<i>Juncus</i>	44–220	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–132	–
Forb					
6	Forbs			220–660	
	Forb, native	2FN	<i>Forb, native</i>	44–176	–
	aster	ASTER	<i>Aster</i>	44–132	–
	annual marsh elder	IVAN2	<i>Iva annua</i>	0–132	–
	povertyweed	IVAX	<i>Iva axillaris</i>	0–88	–
	Pursh seepweed	SUCA2	<i>Suaeda calceoliformis</i>	44–88	–
	redwool plantain	PLER	<i>Plantago eriopoda</i>	44–88	–
	silver cinquefoil	POAR8	<i>Potentilla argentea</i>	44–88	–
	western dock	RUAQ	<i>Rumex aquaticus</i>	44–88	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	44–88	–
	lambsquarters	CHAL7	<i>Chenopodium album</i>	44–88	–
	mealy goosefoot	CHIN2	<i>Chenopodium incanum</i>	44–88	–
	Flodman's thistle	CIFL	<i>Cirsium flodmanii</i>	0–88	–
	scouringrush horsetail	EQHY	<i>Equisetum hyemale</i>	0–44	–
	silverscale saltbush	ATAR2	<i>Atriplex argentea</i>	0–44	–
	red swampfire	SARU	<i>Salicornia rubra</i>	0–44	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–44	–

Table 9. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	Warm-season Grasses			0–330	
	alkali cordgrass	SPGR	<i>Spartina gracilis</i>	0–330	–
	prairie cordgrass	SPPE	<i>Spartina pectinata</i>	0–330	–
2	Wheatgrass			495–990	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	330–825	–
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	66–330	–
3	Cool-season Grasses			165–825	
	foxtail barley	HOJU	<i>Hordeum jubatum</i>	165–660	–
	Nuttall's alkaligrass	PUNU2	<i>Puccinellia nuttalliana</i>	0–330	–
	plains bluegrass	POAR3	<i>Poa arida</i>	33–165	–
4	Short Warm-season Grasses			165–660	
	saltgrass	DISP	<i>Distichlis spicata</i>	165–660	–
	scratchgrass	MUAS	<i>Muhlenbergia asperifolia</i>	33–198	–
5	Grass-likes			165–495	
	spikerush	ELEOC	<i>Eleocharis</i>	33–264	–
	sedge	CAREX	<i>Carex</i>	33–231	–
	rush	JUNCU	<i>Juncus</i>	33–165	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–99	–
Forb					
6	Forbs			165–660	
	Forb, introduced	2FI	<i>Forb, introduced</i>	0–165	–
	Forb, native	2FN	<i>Forb, native</i>	33–165	–
	lambsquarters	CHAL7	<i>Chenopodium album</i>	33–99	–
	aster	ASTER	<i>Aster</i>	33–99	–
	Pursh seepweed	SUCA2	<i>Suaeda calceoliformis</i>	33–99	–
	cocklebur	XANTH2	<i>Xanthium</i>	0–66	–
	curly dock	RUCR	<i>Rumex crispus</i>	0–66	–
	burningbush	BASC5	<i>Bassia scoparia</i>	0–66	–
	scouringrush horsetail	EQHY	<i>Equisetum hyemale</i>	0–66	–
	povertyweed	IVAX	<i>Iva axillaris</i>	0–66	–
	prickly lettuce	LASE	<i>Lactuca serriola</i>	0–66	–
	redwool plantain	PLER	<i>Plantago eriopoda</i>	33–66	–
	mealy goosefoot	CHIN2	<i>Chenopodium incanum</i>	33–66	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	33–66	–
	redroot amaranth	AMRE	<i>Amaranthus retroflexus</i>	0–66	–
	Flodman's thistle	CIFL	<i>Cirsium flodmanii</i>	0–33	–
	silver cinquefoil	POAR8	<i>Potentilla argentea</i>	0–33	–
	western dock	RUAQ	<i>Rumex aquaticus</i>	0–33	–
	annual marsh elder	IVAN2	<i>Iva annua</i>	0–33	–
	silverscale saltbush	ATAR2	<i>Atriplex argentea</i>	0–33	–
	red swampfire	SARU	<i>Salicornia rubra</i>	0–33	–

Table 10. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	Wheatgrass			0–220	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	0–220	–
2	Cool-season Grasses			330–990	
	foxtail barley	HOJU	<i>Hordeum jubatum</i>	330–990	–
	plains bluegrass	POAR3	<i>Poa arida</i>	0–110	–
	Nuttall's alkaligrass	PUNU2	<i>Puccinellia nuttalliana</i>	0–110	–
3	Short Warm-season Grasses			220–660	
	saltgrass	DISP	<i>Distichlis spicata</i>	220–660	–
	scratchgrass	MUAS	<i>Muhlenbergia asperifolia</i>	22–110	–
4	Grass-likes			22–110	
	spikerush	ELEOC	<i>Eleocharis</i>	22–110	–
	rush	JUNCU	<i>Juncus</i>	0–88	–
	sedge	CAREX	<i>Carex</i>	0–66	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–44	–
Forb					
5	Forbs			220–660	
	burningbush	BASC5	<i>Bassia scoparia</i>	44–550	–
	Forb, introduced	2FI	<i>Forb, introduced</i>	0–220	–
	curly dock	RUCR	<i>Rumex crispus</i>	22–220	–
	cocklebur	XANTH2	<i>Xanthium</i>	0–220	–
	redroot amaranth	AMRE	<i>Amaranthus retroflexus</i>	0–176	–
	prickly lettuce	LASE	<i>Lactuca serriola</i>	0–110	–
	Pursh seepweed	SUCA2	<i>Suaeda calceoliformis</i>	22–110	–
	povertyweed	IVAX	<i>Iva axillaris</i>	0–66	–
	lambsquarters	CHAL7	<i>Chenopodium album</i>	22–66	–
	Forb, native	2FN	<i>Forb, native</i>	0–44	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	0–44	–
	aster	ASTER	<i>Aster</i>	0–44	–
	silverscale saltbush	ATAR2	<i>Atriplex argentea</i>	0–44	–
	mealy goosefoot	CHIN2	<i>Chenopodium incanum</i>	0–44	–
	red swampfire	SARU	<i>Salicornia rubra</i>	0–44	–

Animal community

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.

Prairie Cordgrass/Alkali Cordgrass/Alkaligrass (1.1)
Average Annual Production (lbs./acre, air-dry): 4400
Stocking Rate* (AUM/acre): 1.21

Wheatgrass/Foxtail Barley/Inland Saltgrass (1.2)
Average Annual Production (lbs./acre, air-dry): 3300
Stocking Rate* (AUM/acre): 0.90

Foxtail Barley/Inland Saltgrass, *Bare Ground* (2.2)
Average Annual Production (lbs./acre, air-dry): 2200
Stocking Rate* (AUM/acre): 0.60

Annual/Pioneer, Non-Native Perennial, *Bare Ground* (2.2)
Average Annual Production (lbs./acre, air-dry): 1200
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 groups C and D. Infiltration is typically slow to very slow and runoff potential for this site varies from negligible to low 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 inland saltgrass and/or foxtail barley 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 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.

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.

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.

Other references

Cleland, D.T., J.A. Freeouf, J.E. Keys, G.J. Nowacki, C. Carpenter, and W.H. McNab. 2007. Ecological Subregions: Sections and Subsections of the Conterminous United States. USDA Forest Service, General Technical Report WO-76. Washington, DC. 92 pps.

Gilbert, M. C., Whited, P. M., Clairain Jr, E. J., & Smith, R. D. (2006). A Regional Guidebook for Applying the Hydrogeomorphic Approach to Assessing Wetland Functions of Prairie Potholes. Washington DC.

Samson, F. B., & Knopf, F. L. (1996). Prairie Conservation Preserving North America's Most Endangered Ecosystem. Washington D.C.: Island Press.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Official Soil Series Descriptions. Available online. Accessed March 2018.

United States Department of Agriculture – Natural Resource Conservation Service (USDA-NRCS). 2003. National Range and Pasture Handbook, Revision 1. Grazing Lands Technology Institute. 214 pps.

United States Department of Agriculture – Natural Resource Conservation Service (USDA-NRCS). 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. 672pps.

United States Department of Agriculture, Natural Resources Conservation Service. 2022. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture, Agriculture Handbook 296.

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. 2018. The PLANTS Database (<http://plants.usda.gov>, 27 March 2018). National Plant Data Team, Greensboro, NC 27401-4901 USA.

U.S. Environmental Protection Agency [EPA]. 2013. Level III and Level IV Ecoregions of the Continental United States. Corvallis, OR, U.S. EPA, National Health and Environmental Effects Research Laboratory, map scale 1:3,000,000. Available at <http://www.epa.gov/eco-research/level-iii-and-iv-ecoregions-continental-united-states>. (Accessed 1 March 2018)

Contributors

Megan Baxter
Stan Boltz
Lance Howe
Steve Winter

Approval

Suzanne Mayne-Kinney, 8/14/2024

Acknowledgments

Contact for Lead Authors: Natural Resources Conservation Service (USDA-NRCS), Redfield Soil Survey Office Redfield, SD; Lance Howe (Lance.Howe@usda.gov), Soil Survey Office Leader, USDA-NRCS, Redfield, SD; and Steve Winter (Steven.Winter@usda.gov), Soil Scientist, USDA-NRCS, Redfield, SD

Additional Information Acknowledgment: Jason Hermann (Jason.Hermann@usda.gov), Area Rangeland

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.

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:** Healthy, deep rooted native grasses enhance infiltration and reduce runoff.
-
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.
-
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 warm-season rhizomatous grass >> mid cool-season bunch grass
- Sub-dominant: > mid cool-season rhizomatous grass = short warm-season grass = short cool-season grass = forb
- Other:
- Additional:
-
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):** 3800 – 5000 lbs./acre air-dry weight, average 4,400 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.
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