USDA Natural Resources
Conservation Service

Ecological site R063AY007SD
Saline Lowland

Accessed: 05/04/2024

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.

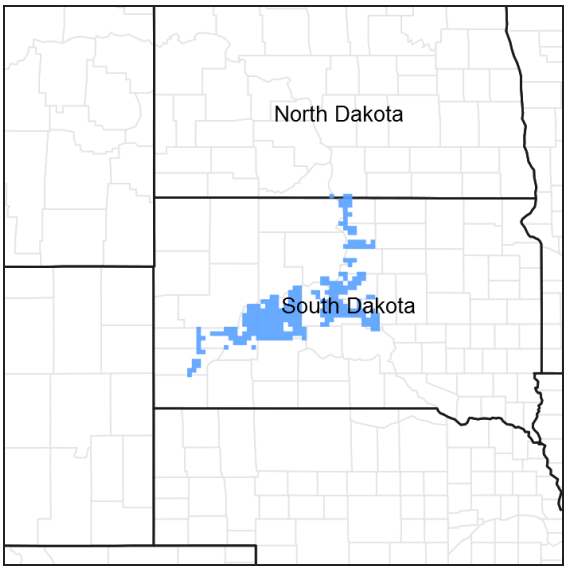


Figure 1. Mapped extent

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): 063A–Northern Rolling Pierre Shale Plains

MLRA 63A is approximately 10,160 square miles in size, the majority of which is in South Dakota and a very small portion in North Dakota. The MLRA extends west of the northern half of the South Dakota reach of the Missouri River. All five of the major rivers draining western South Dakota cross this area. From north to south, these are the Grand, Moreau, Cheyenne, Bad, and White Rivers.

Elevation range from 1,300 to 1,640 feet on the bottom land along the Missouri River to 1,640 to 2,950 feet on the shale plain uplands. Cretaceous Pierre Shale underlies almost all of this area. This is a marine sediment having layers of volcanic ash that has been altered to smectitic clays. These clays shrink as they dry and swell as they get wet. Tertiary and Quaternary river deposits, remnants of erosion from the Black Hills uplift, cap isolated highlands in this area. Deposits of alluvial sand and gravel occur on the valley floors adjacent to the major streams in the area. The average annual precipitation in this area is 15 to 20 inches.
The vegetation in this area is a transition from eastern tall grass prairie to a western mixed grass prairie, (USDA-NRCS, Ag Handbook 296).

Classification relationships

Land Resource Region (LRR): G - Western Great Plains Range and Irrigated Region, Major Land Resource Area (MLRA): 63A Northern Rolling Pierre Shale Plains, (USDA-NRCS, Ag Handbook 296).

Level IV Ecoregions of the Conterminous United States, 2013: 43c – River Breaks and 43f – Subhumid Pierre Shale Plains.

Ecological site concept

The Saline Lowland Ecological Site occurs throughout MLRA 63A. It is a run-in site located on nearly level flood plains along larger drainageways. Slopes range from 0 to 2 percent. The soils are formed in clayey alluvium, are very poorly drained, and have salt accumulation at 4 to 15 inches below the surface. The site has a seasonal water table between 1 and 5 foot in depth and permanently moist soil at 4 to 5 feet. Vegetation in reference consists of salt tolerant, cool- and warm-season grasses.

Associated sites

R063AY002SD	**Wet Land**
R063AY013SD	**Claypan**
R063AY015SD	**Thin Claypan**

Similar sites

R063AY019SD	**Closed Depression** Closed Depression [more western wheatgrass, more dock and smartweed; higher production]

Table 1. Dominant plant species

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

Physiographic features

This site occurs on gently undulating floodplains.

Table 2. Representative physiographic features

Landforms	(1) Flood plain
Flooding duration	Brief (2 to 7 days)
Flooding frequency	Occasional
Elevation	488–823 m
Slope	0–2%
Water table depth	0–152 cm
Aspect	Aspect is not a significant factor

Climatic features

MLRA 63A is considered to have a continental climate – cold winters and hot summers, low humidity, light rainfall, and abundant sunshine. Extreme temperature fluctuations are also common. The climate is the result of this MLRA's location near the geographic center of North America. There are few natural barriers on the Northern Great Plains and air masses move freely across the plains and account for rapid changes in temperature.

Annual precipitation ranges from 16 to 20 inches per year. The average annual temperature is about 47°F. January is the coldest month with average temperatures ranging from about 11°F (Pollock, South Dakota (SD)), to about 22°F (Cedar Butte, SD). July is the warmest month with temperatures averaging from about 72°F (Pollock, SD), to about 76° F (Cedar Butte, SD). The range of normal average monthly temperatures between the coldest and

warmest months is about 58°F. This large annual range attests to the continental nature of this area's climate. Hourly winds are estimated to average about 11 miles per hour annually, ranging from about 13 miles per hour during the spring to about 10 miles per hour during the summer. Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 50 miles per hour.

Growth of 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 (average)	130 days
Freeze-free period (average)	151 days
Precipitation total (average)	483 mm

Climate stations used

- (1) POLLOCK [USC00396712], Pollock, SD
- (2) CEDAR BUTTE 1NE [USC00391539], White River, SD
- (3) COTTONWOOD 2 E [USC00391972], Kadoka, SD
- (4) KENNEBEC [USC00394516], Kennebec, SD

Influencing water features

Cowardin, et al., 1979

Soil features

The common features of soils in this site are clay-textured subsoil and slopes of 0 to 2 percent. The soils in this site are very poorly drained and formed in clayey alluvium. The silty clay loam surface layer is 4 to 18 inches thick. The soils have a slow infiltration rate and salt accumulation between 4 and 15 inches below the surface. This site should show no evidence of rills, wind scoured areas, or pedestalled plants. The soil surface is stable and intact. Subsurface soil layers are nonrestrictive to water movement and root penetration.

These soils are not susceptible to water erosion. Slow permeability strongly influences the soil-water-plant relationship.

Soils Correlated to the Saline Lowland Ecological Site: Egas and Durrstein.

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

Table 4. Representative soil features

Surface texture	(1) Silty clay loam
Family particle size	(1) Clayey
Drainage class	Poorly drained
Permeability class	Slow
Soil depth	203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	10.16 cm

Calcium carbonate equivalent (0-101.6cm)	1–15%
Electrical conductivity (0-101.6cm)	8–16 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–4
Soil reaction (1:1 water) (0-101.6cm)	7.4–9
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

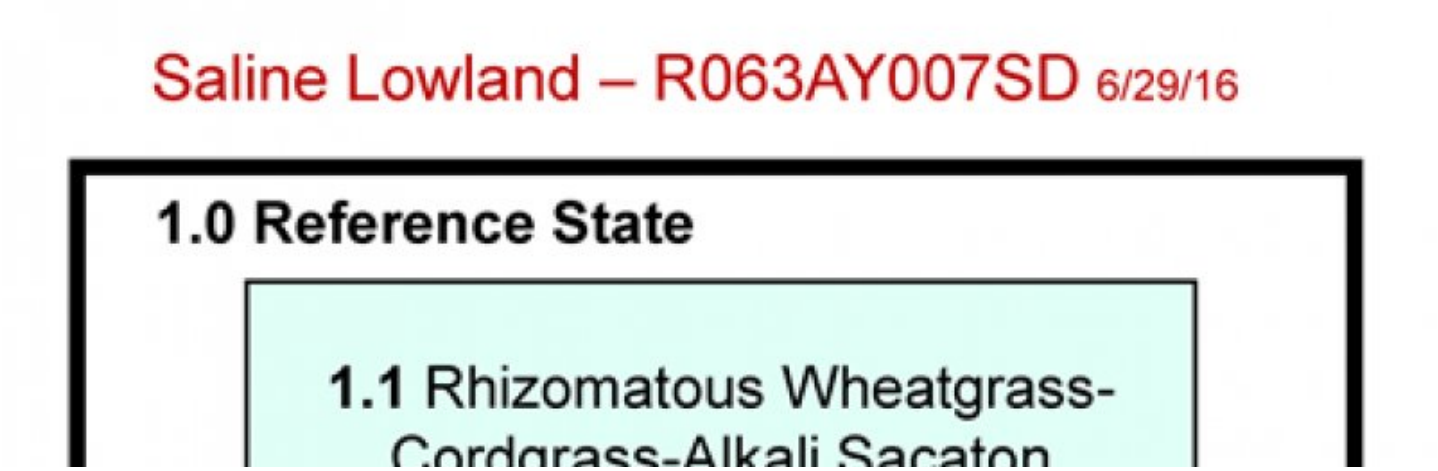
This site developed under Northern Great Plains climatic conditions, natural influences of large herbivores, occasional fire, and other biotic and abiotic factors that typically influence soil/site development. Changes will occur in the plant communities due to short-term weather variations, impacts of native and/or exotic plant and animal species, and management actions. While the following plant community descriptions describe more typical transitions between communities that will occur, severe disturbances, such as periods of well below average precipitation, can cause significant shifts in plant communities and/or species composition. Shrubs such as greasewood and rubber rabbitbrush will occur in higher amounts on the western portions of where this site occurs.

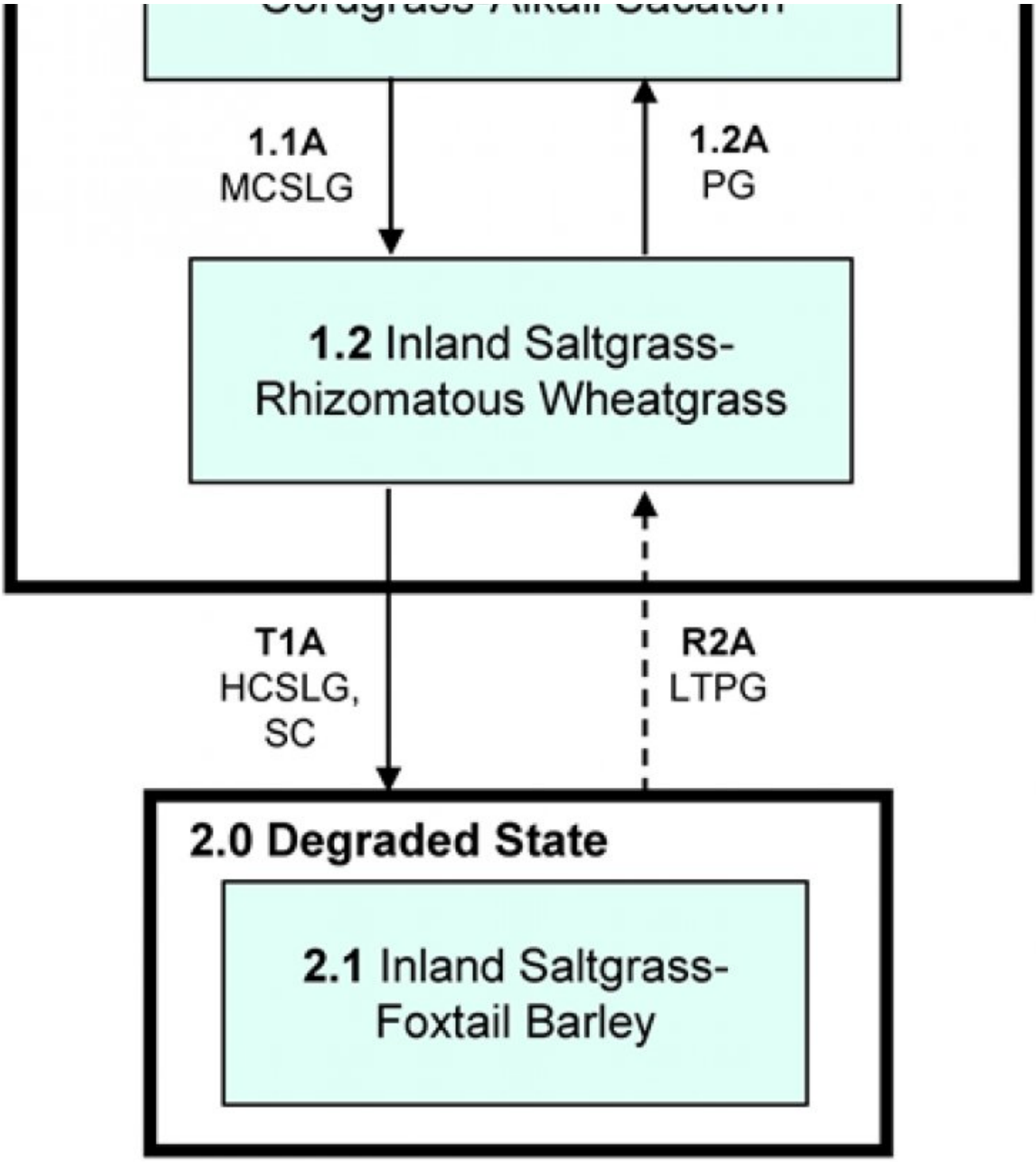
As this site deteriorates, species such as inland saltgrass and foxtail barley (and greasewood in the western portions of the MLRA) increase, and annual species may invade the site. Grasses such as alkali sacaton, rhizomatous wheatgrasses, and Nuttall's alkaligrass will decrease in frequency and production. The high salt 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.

The plant community upon which interpretations are primarily based is the Rhizomatous Wheatgrass-Cordgrass-Alkali Sacaton Plant Community (1.1). This plant community has been determined by studying rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily grazed to lightly grazed areas, seasonal use pastures, and historical accounts also have been used. Plant communities, states, transitional pathways, and thresholds have been determined through similar studies and experience.

The following diagram illustrates the common plant communities and vegetation states commonly occurring on the site and the transition pathways between communities and states. The ecological processes will be discussed in more detail in the plant community descriptions following the diagram.

State and transition model





HCSLG – Heavy continuous season-long grazing.
LTPG – Long-term prescribed grazing;
MCSLG – Moderate, continuous season-long grazing;
PG – Prescribed grazing (proper stocking rates with adequate recovery periods during the growing season).
SC – Soil Compaction
------→ Recovery may not be feasible.

Figure 6. Saline Lowland - R063AY007SD

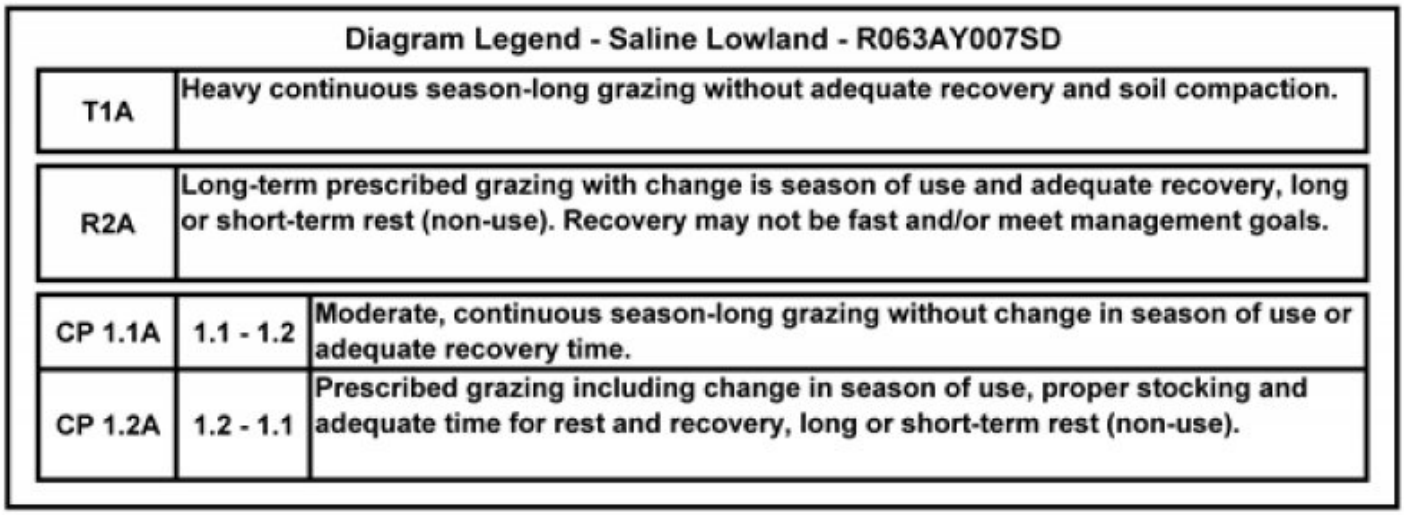


Figure 7. Saline Lowland - R063AY007SD

State 1
Reference State

This State represents what is believed to show the natural range of variability that dominated the dynamics of the ecological site prior to European settlement. This site, in reference, is dominated by salt tolerant warm- and cool-season grasses, forbs and shrubs. As grazing pressure and hoof action increases, the resulting soil compaction will cause salts to accumulate closer to the soil surface and inland saltgrass will increase. Greasewood and rubber rabbitbrush will also increase on the western side of the MLRA.

Community 1.1
Rhizomatous Wheatgrass-Cordgrass-Alkali Sacaton Plant Community

This is the interpretive plant community and is considered to be the reference plant community. This community evolved with grazing by large herbivores, occasional prairie fires and periodic flooding events. The reference plant community can be found on areas that are properly managed with grazing and occasional short periods of rest. The potential vegetation is about 85 to 95 percent grasses and grass-like plants, 5 to 10 percent forbs, 1 to 5 percent shrubs, and 0 to 2 percent trees. The major grasses include western wheatgrass, Nuttall’s alkaligrass, alkali sacaton, and prairie or alkali cordgrass. Other grasses present include thickspike wheatgrass, inland Saltgrass, and foxtail barley. Salt tolerant forbs such as alkali plantain, western dock, and seepweed are common. The shrubs that may occur on this site include black greasewood, fourwing saltbush, and rubber rabbitbrush. Plains cottonwood may also be present on this site. This plant community 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 season-long grazing, and tillage. 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 (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1961	2777	3323
Forb	140	235	359
Shrub/Vine	28	94	174
Tree	–	31	67
Total	**2129**	**3137**	**3923**

Figure 9. Plant community growth curve (percent production by month). SD6307, Pierre Shale 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

Community 1.2
Inland Saltgrass-Rhizomatous Wheatgrass Plant Community

This plant community developed from moderate, continuous season-long grazing. This plant community is made up of about 80 to 95 percent grasses and grass-like species, 5 to 15 percent forbs, 1 to 5 percent shrubs, and 0 to 2 percent trees. Lack of litter, reduced plant heights, and hoof action 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. Dominant grasses include inland saltgrass, Nuttall's alkaligrass, western wheatgrass, and prairie cordgrass. Other secondary grasses include foxtail barley and thickspike wheatgrass. Forbs such as giant sumpweed, povertyweed, Pursh seepweed, and seepweed are the dominant forbs. Common shrubs include black greasewood and rubber rabbitbrush. 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 alkaligrass, cordgrasses, slender wheatgrass, and much of the western wheatgrass, inland saltgrass becomes 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	1446	1928	2354
Forb	106	224	387
Shrub/Vine	17	67	123
Tree	–	22	50
Total	**1569**	**2241**	**2914**

Figure 11. Plant community growth curve (percent production by month). SD6308, Pierre Shale 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

Pathway 1.1A
Community 1.1 to 1.2

Moderate, continuous season-long grazing will convert this plant community to the Inland Saltgrass-Rhizomatous Wheatgrass Plant Community.

Pathway 1.2A
Community 1.2 to 1.1

Prescribed grazing that provides adequate recovery periods and change in season of use will convert this plant community to the Rhizomatous Wheatgrass-Cordgrass-Alkali Sacaton Plant Community.

State 2
Degraded State

Heavy long-term animal impacts have altered soil site stability, hydrologic function and the biotic integrity of the site. Salt accumulation near or at the soil surface has reduced the vigor of many of the species present in the Reference State. This State is resistant to change and a restoration pathway may not be feasible.

Community 2.1
Inland Saltgrass-Foxtail Barley Plant Community

This plant community is the result of long-term improper grazing with inadequate recovery periods. Patches of inland saltgrass sod are typical and foxtail barley is well distributed throughout the community. Nuttall's alkaligrass and western wheatgrass have been 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 is common on the surface. Only a few very salt tolerant annuals, such as povertyweed and seepweed, can survive. 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 the reference plant community. Loss of key cool-season grasses and increased bare ground has negatively impacted energy flow and nutrient cycling. Water infiltration is reduced significantly due to the massive shallow root system "root pan," characteristic of inland saltgrass, and increased bare ground. It will take a long time to bring this plant community back to the Rhiomatous Wheatgrass-Cordgrass-Alkali Sacaton Plant Community with management alone. Renovation (mechanical and/or chemical inputs) is not recommended due to high salt content of the soil and saltgrass persistence. The soils of this plant community are not well protected. The biotic integrity is compromised by introduced species, loss of the dominant climax species, and bare ground. Excessive runoff may occur.

Table 7. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	930	1454	1715
Forb	78	168	286
Shrub/Vine	–	43	90
Tree	–	17	39
Total	**1008**	**1682**	**2130**

Figure 13. Plant community growth curve (percent production by month). SD6309, Pierre Shale Plains, warm-season dominant, cool-season sub-dominant.. Warm-season dominant, cool-season sub-dominant, lowland..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	10	16	22	23	14	7	5	0	0

Transition 1A
State 1 to 2

Heavy continuous season-long grazing, and soil compaction will convert this plant community to the Inland Saltgrass-Foxtail Barley Plant Community. (From PCP 1.2)

Restoration pathway 2A
State 2 to 1

Under long-term prescribed grazing, including extended rest (non-use) periods and avoiding grazing when hoof action would contribute to additional soil compaction and sedimentation, this plant community could return to the Inland Saltgrass-Rhizomatous Wheatgrass Plant Community (1.2). Depending on the severity of compaction, sedimentation, and if adequate perennial plants exist, this change could take an extended period of time and may not meet management goals. (To PCP 1.2)

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	**Rhizomatous Wheatgrass**			628–1098	
	western wheatgrass	PASM	*Pascopyrum smithii*	314–1098	–
	thickspike wheatgrass	ELLAL	*Elymus lanceolatus ssp. lanceolatus*	157–628	–
2	**Cordgrass**			314–785	
	prairie cordgrass	SPPE	*Spartina pectinata*	157–785	–
	alkali cordgrass	SPGR	*Spartina gracilis*	157–628	–
3	**Sacaton**			157–471	
	alkali sacaton	SPAI	*Sporobolus airoides*	157–471	–
4	**Cool-Season Grasses**			314–628	
	Nuttall's alkaligrass	PUNU2	*Puccinellia nuttalliana*	157–471	–
	slender wheatgrass	ELTR7	*Elymus trachycaulus*	0–157	–
	foxtail barley	HOJU	*Hordeum jubatum*	31–157	–
	Graminoid (grass or grass-like)	2GRAM	*Graminoid (grass or grass-like)*	0–157	–
	squirreltail	ELEL5	*Elymus elymoides*	0–94	–
	plains bluegrass	POAR3	*Poa arida*	0–94	–
5	**Short Warm-Season Grasses**			63–314	
	saltgrass	DISP	*Distichlis spicata*	63–314	–
	scratchgrass	MUAS	*Muhlenbergia asperifolia*	0–94	–
6	**Grass-Likes**			0–251	
	sedge	CAREX	*Carex*	0–157	–
	rush	JUNCU	*Juncus*	0–157	–
	bulrush	SCHOE6	*Schoenoplectus*	0–157	–
	spikerush	ELEOC	*Eleocharis*	0–94	–
Forb					
8	**Forbs**			157–314	
	Forb, native	2FN	*Forb, native*	0–157	–
	seepweed	SUAED	*Suaeda*	0–94	–
	Pursh seepweed	SUCA2	*Suaeda calceoliformis*	0–94	–
	western dock	RUAQ	*Rumex aquaticus*	0–63	–
	red swampfire	SARU	*Salicornia rubra*	31–63	–
	American licorice	GLLE3	*Glycyrrhiza lepidota*	0–63	–
	aster	ASTER	*Aster*	31–63	–
	mealy goosefoot	CHIN2	*Chenopodium incanum*	31–63	–
	annual marsh elder	IVAN2	*Iva annua*	0–63	–
	povertyweed	IVAX	*Iva axillaris*	31–63	–
	redwool plantain	PLER	*Plantago eriopoda*	31–63	–
	silver cinquefoil	POAR8	*Potentilla argentea*	0–31	–
	curlycup gumweed	GRSQ	*Grindelia squarrosa*	0–31	–
Shrub/Vine					
9	**Shrubs**			31–157	
	fourwing saltbush	ATCA2	*Atriplex canescens*	0–94	–
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	0–94	–

	greasewood	SAVE4	*Sarcobatus vermiculatus*	0–94	–
	Gardner's saltbush	ATGA	*Atriplex gardneri*	0–63	–
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–63	–
Tree					
10	**Trees**			0–63	
	plains cottonwood	PODEM	*Populus deltoides ssp. monilifera*	0–63	–

Table 9. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Rhizomatous Wheatgrass**			112–448	
	western wheatgrass	PASM	*Pascopyrum smithii*	112–448	–
	thickspike wheatgrass	ELLAL	*Elymus lanceolatus ssp. lanceolatus*	0–224	–
2	**Cordgrass**			0–224	
	prairie cordgrass	SPPE	*Spartina pectinata*	0–224	–
	alkali cordgrass	SPGR	*Spartina gracilis*	0–112	–
3	**Sacaton**			0–112	
	alkali sacaton	SPAI	*Sporobolus airoides*	0–112	–
4	**Cool-Season Grasses**			336–560	
	Nuttall's alkaligrass	PUNU2	*Puccinellia nuttalliana*	224–448	–
	foxtail barley	HOJU	*Hordeum jubatum*	45–224	–
	Graminoid (grass or grass-like)	2GRAM	*Graminoid (grass or grass-like)*	0–112	–
	squirreltail	ELEL5	*Elymus elymoides*	0–45	–
	plains bluegrass	POAR3	*Poa arida*	0–22	–
5	**Short Warm-Season Grasses**			336–673	
	saltgrass	DISP	*Distichlis spicata*	336–673	–
	scratchgrass	MUAS	*Muhlenbergia asperifolia*	0–112	–
6	**Grass-Likes**			0–112	
	sedge	CAREX	*Carex*	0–67	–
	spikerush	ELEOC	*Eleocharis*	0–67	–
	rush	JUNCU	*Juncus*	0–67	–
	bulrush	SCHOE6	*Schoenoplectus*	0–67	–
7	**Non-Native Grasses**			0–112	
	cheatgrass	BRTE	*Bromus tectorum*	0–112	–
	bluegrass	POA	*Poa*	0–112	–
Forb					
8	**Forbs**			112–336	
	seepweed	SUAED	*Suaeda*	22–112	–
	Pursh seepweed	SUCA2	*Suaeda calceoliformis*	22–112	–
	Forb, introduced	2FI	*Forb, introduced*	0–112	–
	Forb, native	2FN	*Forb, native*	0–112	–
	povertyweed	IVAX	*Iva axillaris*	22–90	–

	mealy goosefoot	CHIN2	*Chenopodium incanum*	22–67	–
	annual marsh elder	IVAN2	*Iva annua*	0–67	–
	western dock	RUAQ	*Rumex aquaticus*	0–45	–
	red swampfire	SARU	*Salicornia rubra*	22–45	–
	curlycup gumweed	GRSQ	*Grindelia squarrosa*	22–45	–
	redwool plantain	PLER	*Plantago eriopoda*	22–45	–
	silver cinquefoil	POAR8	*Potentilla argentea*	0–22	–
	American licorice	GLLE3	*Glycyrrhiza lepidota*	0–22	–
	aster	ASTER	*Aster*	0–22	–
Shrub/Vine					
9	**Shrubs**			22–112	
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	0–90	–
	greasewood	SAVE4	*Sarcobatus vermiculatus*	0–90	–
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–45	–
	fourwing saltbush	ATCA2	*Atriplex canescens*	0–22	–
	Gardner's saltbush	ATGA	*Atriplex gardneri*	0–22	–
Tree					
10	**Trees**			0–45	
	plains cottonwood	PODEM	*Populus deltoides ssp. monilifera*	0–45	–

Table 10. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Rhizomatous Wheatgrass**			0–168	
	western wheatgrass	PASM	*Pascopyrum smithii*	0–168	–
	thickspike wheatgrass	ELLAL	*Elymus lanceolatus ssp. lanceolatus*	0–84	–
4	**Cool-Season Grasses**			168–504	
	foxtail barley	HOJU	*Hordeum jubatum*	84–336	–
	Nuttall's alkaligrass	PUNU2	*Puccinellia nuttalliana*	84–252	–
	Graminoid (grass or grass-like)	2GRAM	*Graminoid (grass or grass-like)*	0–84	–
5	**Short Warm-Season Grasses**			504–925	
	saltgrass	DISP	*Distichlis spicata*	504–925	–
	scratchgrass	MUAS	*Muhlenbergia asperifolia*	0–84	–
6	**Grass-Likes**			0–34	
	sedge	CAREX	*Carex*	0–34	–
	spikerush	ELEOC	*Eleocharis*	0–34	–
	rush	JUNCU	*Juncus*	0–34	–
	bulrush	SCHOE6	*Schoenoplectus*	0–34	–
7	**Non-Native Grasses**			0–84	
	cheatgrass	BRTE	*Bromus tectorum*	0–84	–
	bluegrass	POA	*Poa*	0–84	–
Forb					
8	**Forbs**			84–252	
	Forb, introduced	2FI	*Forb, introduced*	0–84	–
	annual marsh elder	IVAN2	*Iva annua*	0–84	–
	povertyweed	IVAX	*Iva axillaris*	17–84	–
	seepweed	SUAED	*Suaeda*	17–84	–
	Pursh seepweed	SUCA2	*Suaeda calceoliformis*	17–84	–
	redwool plantain	PLER	*Plantago eriopoda*	17–50	–
	curlycup gumweed	GRSQ	*Grindelia squarrosa*	17–50	–
	Forb, native	2FN	*Forb, native*	0–50	–
	mealy goosefoot	CHIN2	*Chenopodium incanum*	17–50	–
	red swampfire	SARU	*Salicornia rubra*	17–34	–
Shrub/Vine					
9	**Shrubs**			0–84	
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	0–84	–
	greasewood	SAVE4	*Sarcobatus vermiculatus*	0–84	–
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–34	–
Tree					
10	**Trees**			0–34	
	plains cottonwood	PODEM	*Populus deltoides ssp. monilifera*	0–34	–

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 ecological site 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.

Rhizomatous Wheatgrass-Cordgrass-Alkali Sacaton Plant Community (1.1)
Total Annual Production (lbs./acre, air-dry): 2800
Stocking Rate* (AUM/acre): 0.76

Inland Saltgrass-Rhizomatous Wheatgrass Plant Community (1.2)
Total Annual Production (lbs./acre, air-dry): 2000
Stocking Rate* (AUM/acre): 0.55

Inland Saltgrass-Foxtail Barley Plant Community (2.1)
Total Annual Production (lbs./acre, air-dry): 1500
Stocking Rate* (AUM/acre): 0.41

*Based on 912 lbs./acre (air-dry weight) per Animal Unit Month (AUM), and on 25 percent harvest efficiency (refer to USDA 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 D. Infiltration is very slow to slow and runoff potential is very high depending on 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. 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 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

Revision Notes: “Previously Approved Provisional

This Provisional ecological site concept has passed Quality Control (QC) and Quality Assurance (QA) to ensure that the site meets the 2014 NESH standards for a Provisional ecological site. This is an updated “Previously Approved” ESD which represents a first generation tier of documentation that prior to the release of the 2014 National Ecological Site Handbook (NESH), met all requirement as an Approved ESD as laid out in the 2003 National Range and Pasture Handbook (NRPH). The document fully describe the reference state and community phase in the state and transition model. All other alternative states are at least described in narrative form. The “Previously Approved” ESD has been field tested for a minimum of five years and is a proven functional document for conservation planning. The “Previously Approved” ESD does not contain all tabular and narrative entries as required in the current Approved level of documentation but it is expected that the “Previously Approved” ESD will continue refinement towards an Approved status.

Site Development and Testing Plan:
Future work, as described in a Project Plan, to validate the information in this Provisional Ecological Site Description is needed. This will include field activities to collect low, medium and high intensity sampling, soil correlations, and analysis of that data. Annual field reviews should be done by soil scientists and vegetation specialists. A final field review, peer review, quality control, and quality assurance reviews of the ESD will be needed to produce the final document.

Inventory data references

Information presented here has been derived from NRCS clipping data and other inventory data. Field observations from range-trained personnel were also used. Those involved in developing this site include: April Boltjes, Range Management Specialist (RMS), NRCS; Stan Boltz, RMS, NRCS; Kent Cooley, Soil Scientist, NRCS; Rick Peterson, RMS, NRCS; and L. Michael Stirling, RMS, NRCS. There are no SCS-RANGE-417 clipping records in the national database.

Other references

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Contributors

Stan Boltz

Acknowledgments

Rick L. Peterson, ESD update 6/30/16

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)	Stan Boltz
Contact for lead author	stanley.boltz@sd.usda.gov, 605-352-1236

Date	05/08/2010
Approved by	Stan Boltz
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None.

2. **Presence of water flow patterns:** None.

3. **Number and height of erosional pedestals or terracettes:** None.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 0 to 10 percent is typical.

5. **Number of gullies and erosion associated with gullies:** None.

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

7. **Amount of litter movement (describe size and distance expected to travel):** Litter falls in place.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil aggregate stability ratings should typically be greater than 3. Surface organic matter adheres to the soil surface. Soil surface fragments will typically retain structure at least for short periods when dipped in distilled water. Some fragments will dissolve in less than 1 minute

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** A-horizon should be 4 to 18 inches thick with dark grayish brown colors when moist. Structure typically is coarse sub-angular blocky in the A-horizon.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Deep rooted species (mid and tall rhizomatous cool- and warm-season grasses and grass-likes) with fine and coarse roots positively influences infiltration.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None – when dry, B horizons can be hard and appear to be compacted, but no

platy structure will be present.

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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: Mid cool-season rhizomatous grasses > Tall warm-season rhizomatous grasses >

    Sub-dominant: Mid cool-season grasses > Mid warm-season grasses >

    Other: Short warm-season grasses = Forbs > Grass-likes > Shrubs > Trees

    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 evidence of decadence or mortality.

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14. **Average percent litter cover (%) and depth (in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Production ranges from 1,900-3,500 lbs./acre (air-dry weight). Reference value production is 2,800 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:** State and local noxious weeds; Russian olive can dominate this site in localized areas

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17. **Perennial plant reproductive capability:** All species exhibit high vigor relative to climatic conditions. Do not rate based solely on seed production. Perennial grasses and grass-likes should have vigorous rhizomes or tillers.
