USDA Natural Resources
Conservation Service

Ecological site R063AY001SD
Shallow Marsh

Accessed: 04/28/2024

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.

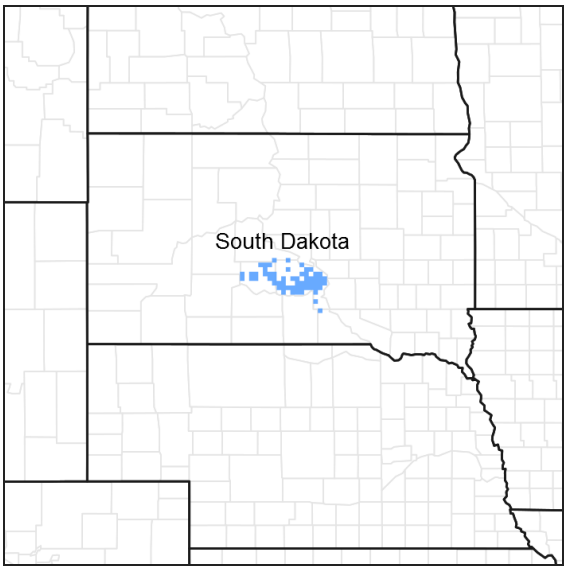


Figure 1. Mapped extent

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 Shallow Marsh ecological site occurs throughout MLRA 63A. It is located on level or nearly level upland landscapes with slopes ranging from 0 to 1 percent. They were formed on clayey alluvium. The site is poorly to very poorly drained and will pond water from 15 to 60 days in the spring and after heavy rain events. Soils are typically saturated to a depth of 3 or more feet for 30 to 60 or more days. They will have a high organic matter content. The texture of the surface layer is silty clay to clay. The high clay content of the subsurface soil layers cause water to pond but do not restrict root penetration. Vegetation in reference consists of obligate sedges, spikerush and bulrush species. As surface water levels increase, common cattail and/or hybrid cattail will increase in composition.

Associated sites

R063AY002SD	**Wet Land**
R063AY003SD	**Subirrigated**
R063AY007SD	**Saline Lowland**
R063AY020SD	**Loamy Overflow**

Similar sites

R063AY002SD	**Wet Land** Wet Land [more prairie cordgrass and reed grasses; higher production]

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Eleocharis palustris* (2) *Carex atherodes*

Physiographic features

This site occurs on upland basins.

Table 2. Representative physiographic features

Landforms	(1) Depression
Ponding duration	Very long (more than 30 days)
Ponding frequency	Frequent
Elevation	488–823 m
Slope	0–1%
Ponding depth	0–30 cm
Water table depth	30–61 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) COTTONWOOD 2 E [USC00391972], Kadoka, SD
- (2) CEDAR BUTTE 1NE [USC00391539], White River, SD
- (3) KENNEBEC [USC00394516], Kennebec, SD
- (4) POLLOCK [USC00396712], Pollock, SD

Influencing water features

The Shallow Marsh Ecological Site is considered a wetland. Cowardin, et al., 1979

Soil features

The common features of soils in this site are clay-textured subsoil and slopes of 0 to 1 percent. The soils in this site are very poorly drained and formed in clayey alluvium. The silty clay surface layer is 12 to 15 inches thick. The soils have a very slow infiltration rate except after extended dry periods when large cracks form and initial intake may be rapid. This site should show no evidence of rills, wind scoured areas, or pedestalled plants. The soil surface is stable and intact.

These soils are not susceptible to water erosion. Ponded water conditions and slow permeability strongly influences the soil-water-plant relationship.

Soil correlated to the Shallow Marsh Ecological Site: Kolls

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

Table 4. Representative soil features

Parent material	(1) Alluvium–clayey shale
Surface texture	(1) Silty clay
Family particle size	(1) Clayey
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)	10.16 cm
Calcium carbonate equivalent (0-101.6cm)	0–10%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
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%

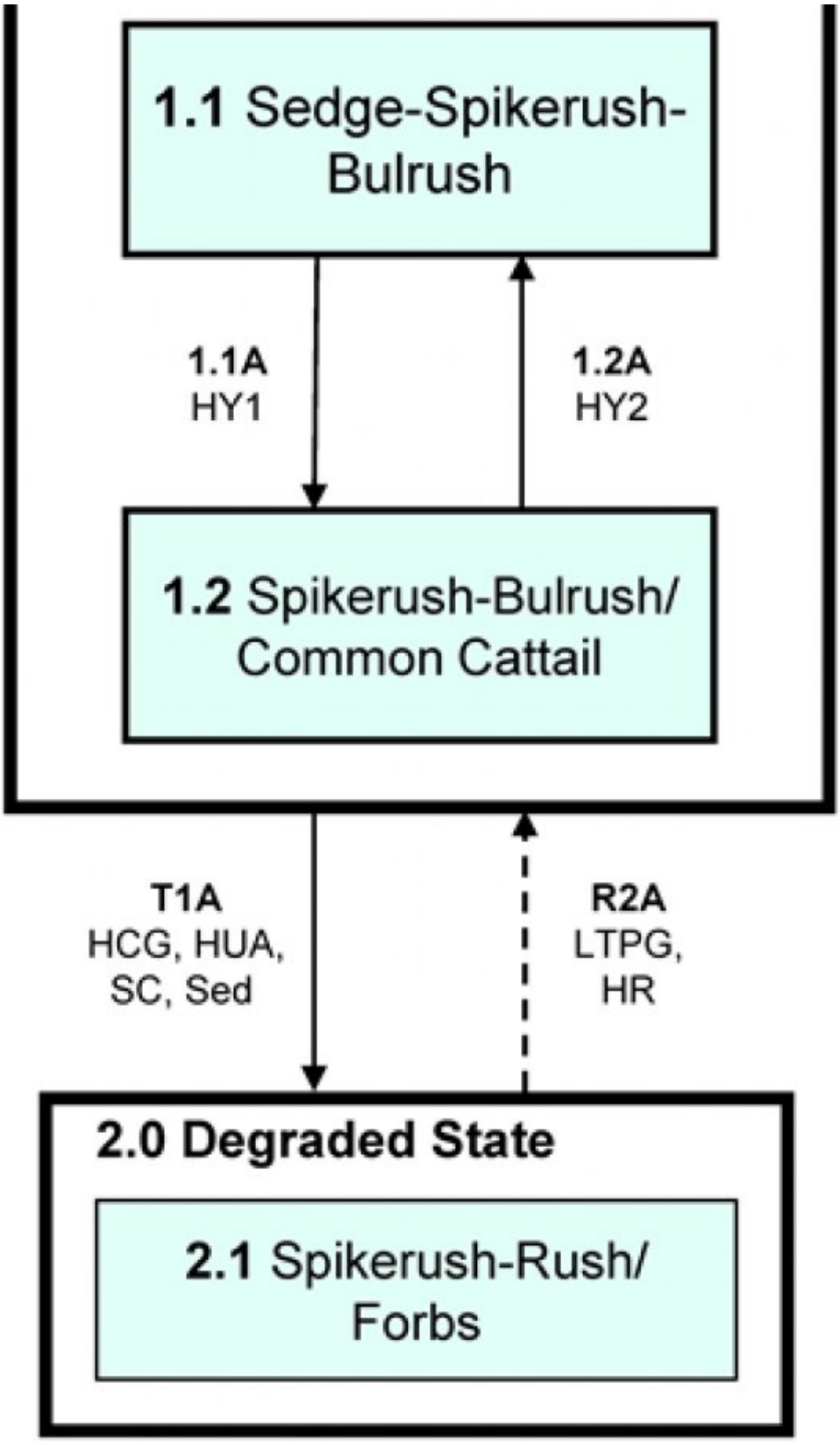
Ecological dynamics

The site developed under Northern Great Plains climatic conditions and included natural influence of large herbivores, occasional fire, and yearly flooding events. Changes will occur in the plant communities due to management actions and/or climatic conditions. Due to the nature of the soils, the site is considered highly variable but very stable. Under continued adverse impacts, a slow decline in vegetative vigor and composition will occur. Under favorable vegetative management treatments, the site can rapidly recover to the Sedge/Spikerush/Bulrush Plant Community (1.1). High variability of ponding levels and duration is the major cause of the fluctuating plant community. However, management can greatly influence the plant community dynamics during extended drought periods.

The plant community, upon which interpretations are primarily based, is the Sedge/Spikerush/Bulrush Plant Community (1.1) under normal precipitation periods. This plant community has been determined by study of rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily grazed to lightly grazed areas, seasonal use pastures, and historical accounts also have been used.
Continuous grazing without adequate recovery opportunities between grazing events over several years will cause this site to depart from the reference plant community (1.1). Species such as reed canarygrass, spikerush, and Baltic rush will increase in frequency and density. Nonuse (rest) and lack of fire will cause litter levels and plant decadence/mortality to increase. Cattails are greatly influenced by the fluctuating water regime and increase dramatically during above average precipitation cycles.

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



HCG – Heavy continuous grazing;
HR – Hydrology restoration
HUA – Heavy use area
HY1 – Hydrology – Higher stable water level
HY2 – Hydrology – Lower stable water level
LTPG – Long-term prescribed grazing.
SC – Soil compaction
Sed – Sedimentation

Figure 6. Shallow Marsh - R063AY001SD

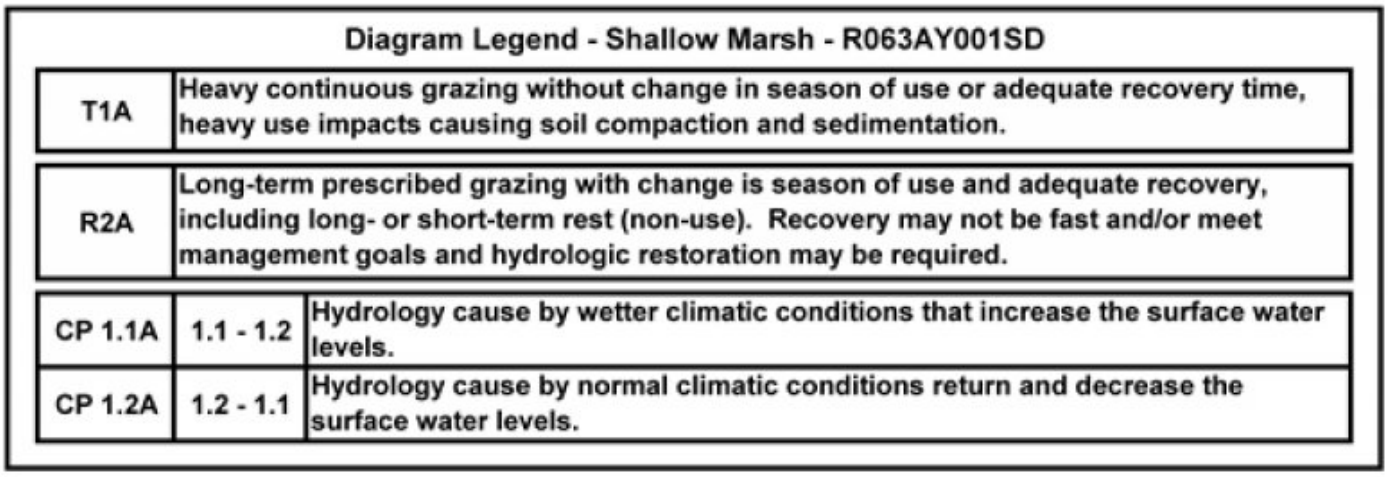


Figure 7. Shallow Marsh - R063AY001SD

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 grass-like species and forbs. Variations in annual precipitation, and length of time the site is ponded, greatly influence the species composition from year to year. During wet years the plant community will respond to higher surface water levels and cattails will increase. During dryer years the plant community will be dominated by obligate sedges and rushes. Grazing pressure on this site and surrounding sites also influence the plant community dynamics. Hoof action during wet periods can cause soil compaction and reduce rooting depth and soil saturation levels. Heavy animal concentrations on upland can increase runoff and sedimentation.

Community 1.1
Sedge-Spikerush-Bulrush Plant Community

Interpretations are based primarily on the Sedge-Spikerush-Bulrush Plant Community which is thought to be the reference plant community (1.1). Grasses and grass-likes make up 65 to 95 percent of the plant community and forbs make up 15 to 35 percent. Common grass-like species include common spikerush, wheat sedge, American bulrush, green bulrush, and woolly sedge and tend to dominate this plant community. Dominant grasses include American mannagrass and prairie cordgrass. Significant forbs found on this site are curlytop knotweed, New England aster, Pennsylvania smartweed, and swamp smartweed. The abundant production and proximity to water make this plant community important for livestock and wildlife such as birds, mule deer, and antelope. The plant community is stable and protected from excessive erosion. The biotic integrity of this plant community is usually intact. The watershed is usually functioning.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	2376	3531	4595
Forb	538	1177	1457
Total	**2914**	**4708**	**6052**

Figure 9. Plant community growth curve (percent production by month). SD6306, Pierre Shale Plains, lowland cool-season dominant.. Cool-season dominant, lowland..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	6	15	20	26	17	9	4	3	0	0

Community 1.2
Spikerush-Bulrush/Common Cattail Plant Community

This plant community developed from periods of extended above-average precipitation. Grass-likes make up between 15 to 60 percent of this plant community, 0 to 15 percent grasses, and 15 to 35 percent forbs. Common spikerush, green bulrush, and rush are the dominant grass-likes, which have increased compared to the climax community. Dominant forbs found on this site include common cattails, Pennsylvania smartweed, swamp smartweed, and water knotweed. When compared to the Sedge-Spikerush-Bulrush Plant Community, the perennial grasses and the sedges have decreased. Largely unpalatable sedges, Baltic rush, and cattails have increased. Production remains relatively constant or is somewhat higher, but plant diversity is somewhat reduced. A return to normal precipitation cycles will typically shift this community back to the Sedge-Spikerush-Bulrush Plant Community.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	3945	4080	4652
Forb	538	1749	2298
Total	**4483**	**5829**	**6950**

Figure 11. Plant community growth curve (percent production by month). SD6306, Pierre Shale Plains, lowland cool-season dominant.. Cool-season dominant, lowland..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	6	15	20	26	17	9	4	3	0	0

Pathway 1.1A
Community 1.1 to 1.2

Hydrology resulting from above normal precipitation and higher surface water levels will shift this community to the Spikerush-Bulrush/Common Cattail Plant Community (1.2).

Pathway 1.2A
Community 1.2 to 1.1

Hydrology resulting from a return to more normal precipitation cycles and lower surface water levels will shift this plant community to the Sedge-Spikerush-Bulrush Plant Community (1.1).

State 2
Degraded State

Heavy long-term animal impacts have altered soil site stability, hydrologic function and the biotic elements to the point where the site will not readily recover.

Community 2.1
Spikerush-Rush/Forbs Plant Community

This plant community develops from heavy continuous grazing, soil compaction and sedimentation. When compared to the reference (1.1) plant community, all the tall cool-season grasses have disappeared, along with a reduction in green bulrush and woolly sedge. Common spikerush remains the dominant species. Significant forbs include curly dock, giant goldenrod, New England aster, cattail, and roughfruit amaranth. The production has

decreased dramatically, compared to the Sedge-Spikerush-Bulrush Plant Community.

Table 7. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1143	1401	1961
Forb	538	1401	1737
Total	**1681**	**2802**	**3698**

Figure 13. Plant community growth curve (percent production by month). SD6306, Pierre Shale Plains, lowland cool-season dominant.. Cool-season dominant, lowland..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	6	15	20	26	17	9	4	3	0	0

Transition 1A
State 1 to 2

Heavy continuous grazing, soil compaction, or heavy use surrounding the shallow marsh will lead to sedimentation will lead transition this State to the Degraded State (2.0).

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 Reference State. 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. The site may even require more comprehensive hydrology restoration activities.

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	**Grass-Likes**			706–2825	
	wheat sedge	CAAT2	*Carex atherodes*	235–1412	–
	common spikerush	ELPA3	*Eleocharis palustris*	235–1412	–
	chairmaker's bulrush	SCAM6	*Schoenoplectus americanus*	94–1177	–
	green bulrush	SCAT2	*Scirpus atrovirens*	94–1177	–
	woolly sedge	CAPE42	*Carex pellita*	94–706	–
	Sartwell's sedge	CASA8	*Carex sartwellii*	0–471	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	0–471	–
	fox sedge	CAVU2	*Carex vulpinoidea*	0–471	–
	rush	JUNCU	*Juncus*	0–471	–
	broom sedge	CASC11	*Carex scoparia*	0–235	–
2	**Tall Cool-Season Grasses**			94–706	
	American mannagrass	GLGR	*Glyceria grandis*	47–471	–
	bluejoint	CACA4	*Calamagrostis canadensis*	47–235	–
	northern reedgrass	CASTI3	*Calamagrostis stricta ssp.*	0–235	–

			inexpansa		
	slimstem reedgrass	CASTS5	*Calamagrostis stricta ssp. stricta*	0–235	–
3	**Other Native Grasses**			0–471	
	prairie cordgrass	SPPE	*Spartina pectinata*	0–471	–
	Graminoid (grass or grass-like)	2GRAM	*Graminoid (grass or grass-like)*	0–235	–
Forb					
4	**Forbs**			706–1648	
	swamp smartweed	POHY2	*Polygonum hydropiperoides*	47–471	–
	curlytop knotweed	POLA4	*Polygonum lapathifolium*	47–471	–
	Pennsylvania smartweed	POPE2	*Polygonum pensylvanicum*	47–471	–
	New England aster	SYNO2	*Symphyotrichum novae-angliae*	47–471	–
	giant goldenrod	SOGI	*Solidago gigantea*	0–235	–
	Forb, native	2FN	*Forb, native*	0–235	–
	water knotweed	POAM8	*Polygonum amphibium*	0–235	–
	roughfruit amaranth	AMTU	*Amaranthus tuberculatus*	47–141	–
	swamp milkweed	ASIN	*Asclepias incarnata*	47–141	–
	white panicle aster	SYLA6	*Symphyotrichum lanceolatum*	0–141	–
	western dock	RUAQ	*Rumex aquaticus*	0–141	–
	blue skullcap	SCLA2	*Scutellaria lateriflora*	0–94	–
	spotted water hemlock	CIMA2	*Cicuta maculata*	0–94	–
	shrubby cinquefoil	DAFRF	*Dasiphora fruticosa ssp. floribunda*	0–94	–
	cutleaf waterparsnip	BEER	*Berula erecta*	0–94	–
	longbeak buttercup	RALO2	*Ranunculus longirostris*	0–94	–
	broadleaf cattail	TYLA	*Typha latifolia*	0–94	–
	nodding beggartick	BICE	*Bidens cernua*	0–47	–
	marsh arrowgrass	TRPA28	*Triglochin palustris*	0–47	–

Table 9. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Grass-Likes**			1749–4080	
	common spikerush	ELPA3	*Eleocharis palustris*	291–2331	–
	chairmaker's bulrush	SCAM6	*Schoenoplectus americanus*	583–1749	–
	green bulrush	SCAT2	*Scirpus atrovirens*	583–1749	–
	rush	JUNCU	*Juncus*	117–874	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	0–583	–
	wheat sedge	CAAT2	*Carex atherodes*	0–583	–
	woolly sedge	CAPE42	*Carex pellita*	0–291	–
	Sartwell's sedge	CASA8	*Carex sartwellii*	0–291	–
	fox sedge	CAVU2	*Carex vulpinoidea*	0–291	–
	broom sedge	CASC11	*Carex scoparia*	0–175	–
2	**Tall Cool-Season Grasses**			0–466	

	American mannagrass	GLGR	*Glyceria grandis*	0–291	–
	bluejoint	CACA4	*Calamagrostis canadensis*	0–175	–
	northern reedgrass	CASTI3	*Calamagrostis stricta ssp. inexpansa*	0–175	–
	slimstem reedgrass	CASTS5	*Calamagrostis stricta ssp. stricta*	0–175	–
3	**Other Native Grasses**			0–291	
	prairie cordgrass	SPPE	*Spartina pectinata*	0–291	–
	Graminoid (grass or grass-like)	2GRAM	*Graminoid (grass or grass-like)*	0–175	–
Forb					
4	**Forbs**			1166–2331	
	broadleaf cattail	TYLA	*Typha latifolia*	291–1749	–
	water knotweed	POAM8	*Polygonum amphibium*	0–466	–
	swamp smartweed	POHY2	*Polygonum hydropiperoides*	0–466	–
	curlytop knotweed	POLA4	*Polygonum lapathifolium*	0–466	–
	Pennsylvania smartweed	POPE2	*Polygonum pensylvanicum*	0–466	–
	Forb, native	2FN	*Forb, native*	0–291	–
	cutleaf waterparsnip	BEER	*Berula erecta*	0–291	–
	New England aster	SYNO2	*Symphyotrichum novae-angliae*	0–291	–
	curly dock	RUCR	*Rumex crispus*	0–291	–
	spotted water hemlock	CIMA2	*Cicuta maculata*	0–175	–
	Forb, introduced	2FI	*Forb, introduced*	0–175	–
	western dock	RUAQ	*Rumex aquaticus*	0–175	–
	roughfruit amaranth	AMTU	*Amaranthus tuberculatus*	0–157	–
	swamp milkweed	ASIN	*Asclepias incarnata*	0–157	–
	giant goldenrod	SOGI	*Solidago gigantea*	0–117	–
	white panicle aster	SYLA6	*Symphyotrichum lanceolatum*	0–58	–
	hempnettle	GALEO	*Galeopsis*	0–58	–
	marsh arrowgrass	TRPA28	*Triglochin palustris*	0–58	–
	nodding beggartick	BICE	*Bidens cernua*	0–58	–

Table 10. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Grass-Likes**			280–1681	
	common spikerush	ELPA3	*Eleocharis palustris*	140–841	–
	rush	JUNCU	*Juncus*	140–701	–
	chairmaker's bulrush	SCAM6	*Schoenoplectus americanus*	0–280	–
	green bulrush	SCAT2	*Scirpus atrovirens*	0–280	–
	Graminoid (grass or grass-like)	2GRAM	*Graminoid (grass or grass-like)*	0–140	–
	wheat sedge	CAAT2	*Carex atherodes*	0–56	–
	woolly sedge	CAPE42	*Carex pellita*	0–56	–
	Sartwell's sedge	CASA8	*Carex sartwellii*	0–56	–
	fox sedge	CAVU2	*Carex vulpinoidea*	0–56	–
3	**Other Native Grasses**			0–280	
	Graminoid (grass or grass-like)	2GRAM	*Graminoid (grass or grass-like)*	0–280	–
	prairie cordgrass	SPPE	*Spartina pectinata*	0–84	–
Forb					
4	**Forbs**			1121–1681	
	Forb, introduced	2FI	*Forb, introduced*	56–701	–
	New England aster	SYNO2	*Symphyotrichum novae-angliae*	56–560	–
	broadleaf cattail	TYLA	*Typha latifolia*	0–420	–
	giant goldenrod	SOGI	*Solidago gigantea*	0–420	–
	curly dock	RUCR	*Rumex crispus*	28–280	–
	white panicle aster	SYLA6	*Symphyotrichum lanceolatum*	0–224	–
	roughfruit amaranth	AMTU	*Amaranthus tuberculatus*	56–224	–
	Forb, native	2FN	*Forb, native*	0–140	–
	hempnettle	GALEO	*Galeopsis*	0–140	–
	water knotweed	POAM8	*Polygonum amphibium*	0–140	–
	swamp smartweed	POHY2	*Polygonum hydropiperoides*	0–140	–
	curlytop knotweed	POLA4	*Polygonum lapathifolium*	0–140	–
	Pennsylvania smartweed	POPE2	*Polygonum pensylvanicum*	0–140	–
	western dock	RUAQ	*Rumex aquaticus*	0–56	–
	swamp milkweed	ASIN	*Asclepias incarnata*	0–56	–

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 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.

Sedge-Spikerush-Bulrush Plant Community
Total Annual Production (lbs./acre, air-dry): 4200
Stocking Rate* (AUM/acre): 1.15

Spikerush-Bulrush/Common Cattail Plant Community
Total Annual Production (lbs./acre, air-dry): 5200
Stocking Rate* (AUM/acre): 1.43

Spikerush-Rush/Forbs Plant Community
Total Annual Production (lbs./acre, air-dry): 2500
Stocking Rate* (AUM/acre): 0.69

*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. No SCS-RANGE-417 clipping data collections forms have been recorded for this site.

Other references

High Plains Regional Climate Center, University of Nebraska. (http://www.hprcc.unl.edu/)
USDA, NRCS. 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, 2006
USDA, NRCS. National Ecological Site Handbook, 1st Ed. January, 2014
USDA, NRCS. National Water and Climate Center. (http://www.wcc.nrcs.usda.gov/)
USDA, NRCS. National Range and Pasture Handbook, September 1997
USDA, NRCS. National Soil Information System, Information Technology Center. (http://nasis.nrcs.usda.gov)
USDA, NRCS. 2001. The PLANTS Database, Version 3.1 (http://plants.usda.gov). National Plant Data Center.
USDA, NRCS, Various Published Soil Surveys

Contributors

April Boltjes
Stan Boltz

Acknowledgments

Rick L. Peterson updated ESD 6/22/16

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	05/09/2010
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 5 percent is typical. During periods of above average precipitation and run-on, this site may be ponded for longer than normal durations, and typical vegetation may be temporarily reduced, creating areas of bare ground for relatively short periods of time.

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 5 to 6, normally 6. Surface organic matter adheres to the soil surface. Soil surface fragments will typically retain structure indefinitely when dipped in distilled water.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** The dark surface horizons should be 12 to 15 inches thick with mollic (dark) colors when moist. Structure typically is medium to fine granular in the upper horizon.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Deep rooted species (tall rhizomatous cool- and warm-season grasses and grass-likes) with fine and coarse roots positively influences infiltration. Infiltration is somewhat limited naturally due to poor drainage and relatively low permeability.

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.

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: Grass-likes >>

Sub-dominant: Forbs > Tall cool-season grasses >

Other: Tall warm-season grasses

Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** 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 2,600-5,400 lbs./acre (air-dry weight). Reference value production is 4,200 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; Kentucky bluegrass may be prevalent during dry cycles, but will typically not dominate the site. Most invasive species will occupy the perimeter of this site.

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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.
