USDA Natural Resources Conservation Service

Ecological site R063AY002SD
Wet Land

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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.

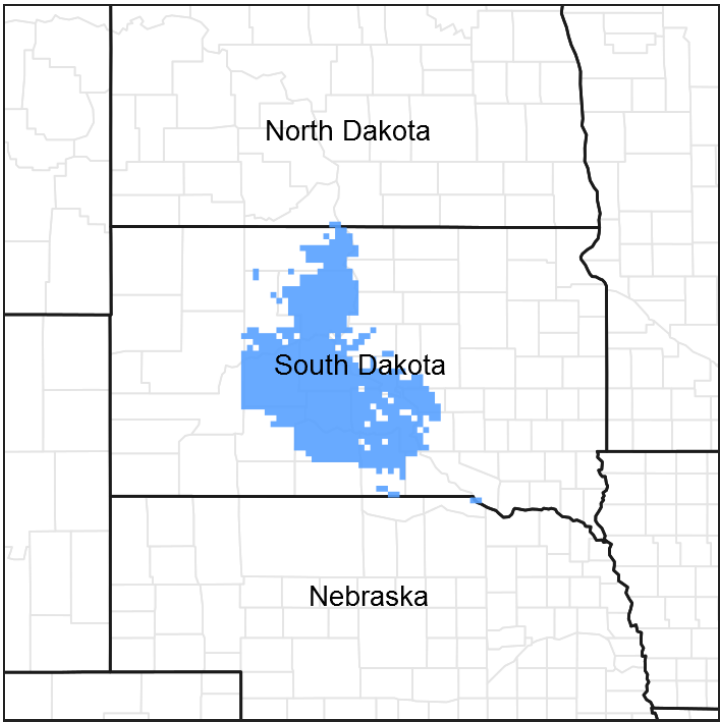


Figure 1. Mapped extent

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 Wet Land Ecological Site occurs throughout MLRA 63A. It is a run-in site located on floodplains, oxbows and sloughs. Slopes range from 0 to 2 percent. The soils are formed in clayey alluvium, are very poorly drained and have a water table that fluctuates between 0 and 2 feet. Vegetation in reference consists of grasses, sedges, and rushes that are classified as obligate or facultative wet.

Associated sites

R063AY003SD	**Subirrigated**
R063AY007SD	**Saline Lowland**
R063AY020SD	**Loamy Overflow**

Similar sites

R063AY001SD	**Shallow Marsh** Shallow Marsh [lesser amounts of prairie cordgrass, bulrush and spikerush; higher production]

Table 1. Dominant plant species

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

Physiographic features

This site occurs on floodplains.

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Oxbow (3) Slough
Flooding duration	Brief (2 to 7 days) to long (7 to 30 days)
Flooding frequency	Frequent
Ponding frequency	None
Elevation	1,600–2,700 ft
Slope	0–2%
Water table depth	0–24 in
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)	19 in

Climate stations used

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

Influencing water features

The Wet Land Ecological Site is considered a wetland. Cowardin, et al., 1979

Soil features

The soils in this site are very poorly drained and formed in clayey alluvium. The surface layer is five to six inches thick. The surface texture is silty clay or silty clay loam, while the subsurface ranges from clay to silty clay loam. This site should show no evidence of rills, wind scoured areas, or pedestalled plants. Water flow paths should not be present. The soil surface is stable and intact. These soils are not susceptible to water erosion. High accumulations of sodium and slow permeability strongly influences the soil-water-plant relationship.

Soil correlated to the Wet Land Ecological Site: Herdcamp, Albaton

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

Table 4. Representative soil features

Parent material	(1) Alluvium–clayey shale
Surface texture	(1) Silty clay (2) Silty clay loam
Family particle size	(1) Clayey

Drainage class	Poorly drained
Permeability class	Slow
Soil depth	80 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	6 in
Calcium carbonate equivalent (0-40in)	0–15%
Electrical conductivity (0-40in)	0–8 mmhos/cm
Sodium adsorption ratio (0-40in)	0–8
Soil reaction (1:1 water) (0-40in)	7.4–8.4
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 climax plant community. 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.

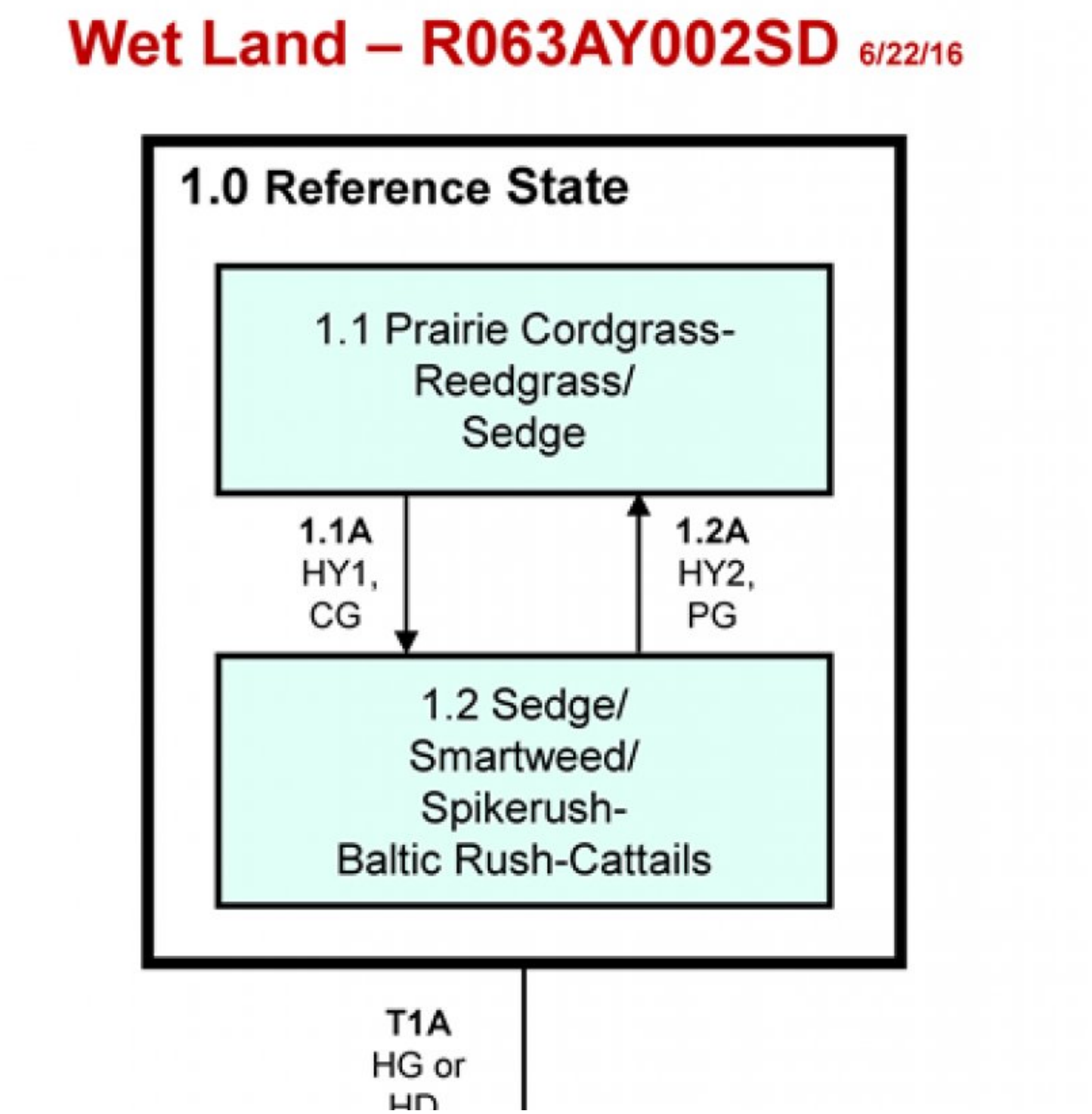
The plant community upon which interpretations are primarily based is the Prairie Cordgrass-Reedgrass/Sedge Plant Community (1.1) under normal precipitation periods. This community has been determined by study of rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily grazed to lightly grazed areas, seasonal use pastures, and historical accounts.

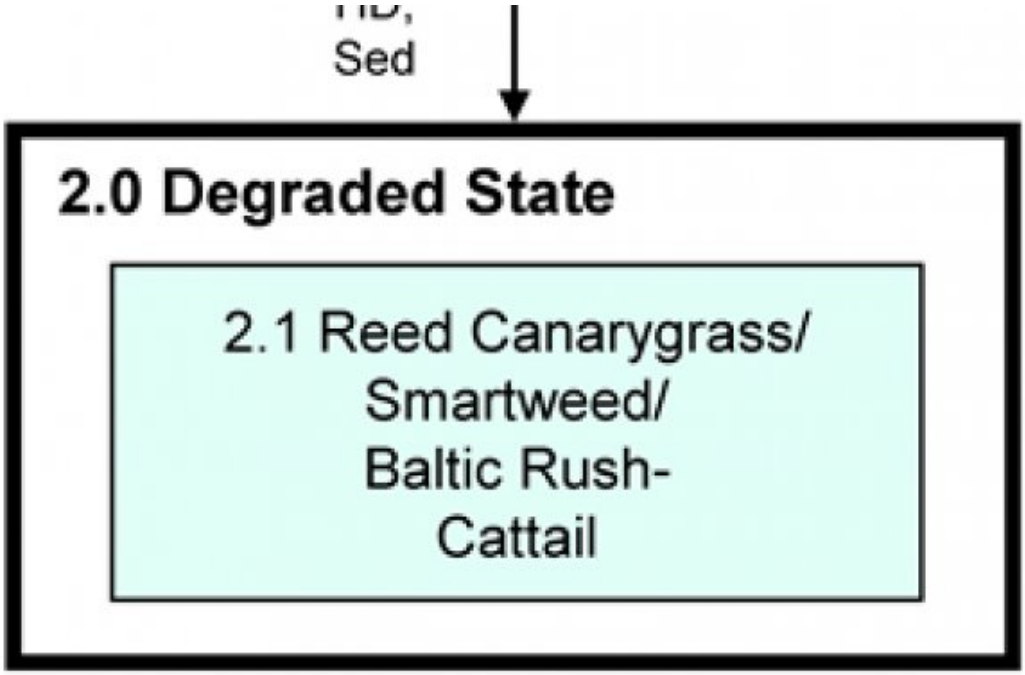
Continuous grazing without adequate recovery opportunities between grazing events over several years will cause this site to depart from the reference plant community (1.1).

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





CG – Continuous grazing without adequate recovery periods
HD – Heavy disturbance
HG – Heavy grazing
HY1 – Hydrology – Higher stable water level
HY2 – Hydrology – Lower stable water level
PG – Prescribed grazing with adequate recovery opportunity
Sed - Sedimentation

Figure 6. Wet Land - R063AY002SD

Diagram Legend - Wet Land - R063AY002SD

T1A	Heavy grazing without change in season of use or adequate recovery time, or a heavy disturbance causing sedimentation and change in hydrologic function.	
CP 1.1A	1.1 - 1.2	Change to a wetter hydrologic cycle with a higher stable water level and continuous grazing.
CP 1.2A	1.2 - 1.1	Return to a normal or slightly drier hydrologic cycle and prescribed grazing that provided change in season of use and adequate recovery time.

Figure 7. Wet Land - R063AY002SD

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 grasses, 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. Grassing pressure on this site and surrounding sites also influence the plant community dynamics. Hoof action during dry periods can cause soil compaction and reduce rooting depth and soil saturation levels. Heavy animal concentrations or cropping on the surrounding landscapes can increase runoff and sedimentation.

Community 1.1
Prairie Cordgrass-Reedgrass/Sedge Plant Community

This plant community occurs during the more normal to drier precipitation/hydrology cycles. During these periods, grasses become more dominant in the plant community. Grasses and grass-likes will make up about 80 to 95 percent of the community, forbs make up 5 to 10 percent, and shrubs 1 to 7 percent. Dominant species are prairie cordgrass, bluejoint reedgrass, northern reedgrass, Nebraska sedge, and Sartwell's sedge. Common forbs include cattail, Pennsylvania smartweed, and swamp smartweed. Shrubs familiar to the site are false indigo and willow. The plant community is well adapted to the Northern Great Plains climatic conditions. It is a critical plant community, providing water and habitat for the surrounding area. The diversity in plant species provides a variety of habitats for wildlife. It is resistant to drought due to a dependable water table. This is a sustainable plant community (soil stability, watershed function, and biologic integrity).

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	4500	5133	5620
Forb	245	435	695
Shrub/Vine	55	232	485
Total	**4800**	**5800**	**6800**

Figure 9. 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

Community 1.2
Sedge/Smartweed/Spikerush-Baltic Rush-Cattail Plant Community

This plant community developed with continuous grazing without adequate recovery

periods between grazing events and/or wetter precipitation/hydrology cycles. This plant community is approximately 70 to 85 percent grasses and grass-like species, 10 to 20 percent forbs, and 0 to 10 percent shrubs. The plant community becomes dominated by grass-likes such as Nebraska sedge, Sartwell's sedge, woolly sedge, spikerush, and Baltic rush. Forbs include Pennsylvania smartweed, swamp smartweed, and cattail. When compared to the Prairie Cordgrass-Reedgrass/Sedge Plant Community, prairie cordgrass, northern reedgrass, bluejoint reedgrass, and Nebraska sedge have decreased. Low growing unpalatable sedges, Baltic rush, and cattails have increased. 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 6. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	3335	3600	3805
Forb	365	675	960
Shrub/Vine	0	225	535
Total	**3700**	**4500**	**5300**

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

Continuous grazing without adequate recovery periods between grazing occurrences, and/or a wetter hydrologic cycle will shift this community to the Sedge/Smartweed/Spikerush/Baltic Rush/Cattail Plant Community.

Pathway 1.2A
Community 1.2 to 1.1

Prescribed grazing that provided change in season of use and adequate recovery time and/or a return to a normal or slightly dryer precipitation/hydrologic cycle will shift this plant community to the Prairie Cordgrass-Reedgrass/Sedge Plant Community.

State 2

Degraded State

Heavy long-term animal impacts have altered soil site stability, hydrologic function and biotic integrity.

Community 2.1
Reed Canarygrass/Smartweed/Baltic Rush-Cattail Plant Community

This plant community develops from sedimentation occurring after a ponding or flooding event. When compared to the Prairie Cordgrass-Reedgrass/Sedge Plant Community, prairie cordgrass, northern reedgrass, bluejoint reedgrass, and narrow reedgrass have been virtually eliminated. Reed canarygrass, Baltic rush, spikerush, and bulrushes have increased. A significant amount of production and diversity has been lost when compared to the Prairie Cordgrass-Reedgrass/Sedge Plant Community. Loss or reduction of native grasses, grass-likes, and forbs has negatively impacted energy flow and nutrient cycling. It will take a relatively long time to restore this plant community back to the Prairie Cordgrass-Reedgrass/Sedge Plant Community with improved management alone. No restoration pathway has been identified or is expected to occur outside of extensive renovation practices.

Table 7. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	2820	2900	3565
Forb	480	900	1240
Shrub/Vine	0	200	475
Total	**3300**	**4000**	**5280**

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 grazing or a heavy disturbance causing sedimentation and a change in the hydrologic function will shift the Reference State to the Degraded State.

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	**Tall Warm-Season Grasses**			1450–2610	
	prairie cordgrass	SPPE	*Spartina pectinata*	1450–2610	–
2	**Tall Cool-Season Grasses**			870–1450	
	bluejoint	CACA4	*Calamagrostis canadensis*	290–1160	–
	northern reedgrass	CASTI3	*Calamagrostis stricta ssp. inexpansa*	290–1160	–
	slimstem reedgrass	CASTS5	*Calamagrostis stricta ssp. stricta*	0–580	–
	reed canarygrass	PHAR3	*Phalaris arundinacea*	0–290	–
3	**Sedge**			870–1450	
	Nebraska sedge	CANE2	*Carex nebrascensis*	290–870	–
	Sartwell's sedge	CASA8	*Carex sartwellii*	290–870	–
	broom sedge	CASC11	*Carex scoparia*	0–580	–
	fox sedge	CAVU2	*Carex vulpinoidea*	0–580	–
	woolly sedge	CAPE42	*Carex pellita*	116–580	–
4	**Other Grass-likes**			116–464	
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	0–290	–
	green bulrush	SCAT2	*Scirpus atrovirens*	0–290	–
	spikerush	ELEOC	*Eleocharis*	58–174	–
	mountain rush	JUARL	*Juncus arcticus ssp. littoralis*	0–174	–
	rush	JUNCU	*Juncus*	0–174	–
Forb					
5	**Forbs**			290–580	
	Forb, native	2FN	*Forb, native*	0–290	–
	swamp smartweed	POHY2	*Polygonum hydropiperoides*	58–174	–
	Pennsylvania smartweed	POPE2	*Polygonum pensylvanicum*	58–174	–
	broadleaf cattail	TYLA	*Typha latifolia*	0–174	–
	water knotweed	POAM8	*Polygonum amphibium*	0–116	–
	western dock	RUAQ	*Rumex aquaticus*	0–116	–
	blue skullcap	SCLA2	*Scutellaria lateriflora*	58–116	

	blue skullcap	SCLA2	*Scutellaria lateriflora*	58–116	–
	giant goldenrod	SOGI	*Solidago gigantea*	0–116	–
	white panicle aster	SYLA6	*Symphyotrichum lanceolatum*	58–116	–
	New England aster	SYNO2	*Symphyotrichum novae-angliae*	58–116	–
	curlytop knotweed	POLA4	*Polygonum lapathifolium*	58–116	–
	swamp milkweed	ASIN	*Asclepias incarnata*	58–116	–
	cutleaf waterparsnip	BEER	*Berula erecta*	0–58	–
	nodding beggartick	BICE	*Bidens cernua*	0–58	–
	spotted water hemlock	CIMA2	*Cicuta maculata*	0–58	–
	shrubby cinquefoil	DAFRF	*Dasiphora fruticosa ssp. floribunda*	0–58	–
	roughfruit amaranth	AMTU	*Amaranthus tuberculatus*	0–58	–
	marsh arrowgrass	TRPA28	*Triglochin palustris*	0–58	–
	longbeak buttercup	RALO2	*Ranunculus longirostris*	0–58	–
Shrub/Vine					
6	**Shrubs**			58–406	
	willow	SALIX	*Salix*	0–290	–
	false indigo bush	AMFR	*Amorpha fruticosa*	58–174	–
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–116	–

Table 9. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Tall Warm-Season Grasses**			0–450	
	prairie cordgrass	SPPE	*Spartina pectinata*	0–450	–
2	**Tall Cool-Season Grasses**			225–675	
	bluejoint	CACA4	*Calamagrostis canadensis*	0–450	–
	northern reedgrass	CASTI3	*Calamagrostis stricta ssp. inexpansa*	0–450	–
	reed canarygrass	PHAR3	*Phalaris arundinacea*	0–450	–
	slimstem reedgrass	CASTS5	*Calamagrostis stricta ssp. stricta*	0–135	–

3	**Sedge**			900–1800	
	Nebraska sedge	CANE2	*Carex nebrascensis*	225–1125	–
	Sartwell's sedge	CASA8	*Carex sartwellii*	225–1125	–
	woolly sedge	CAPE42	*Carex pellita*	90–900	–
	broom sedge	CASC11	*Carex scoparia*	0–675	–
	fox sedge	CAVU2	*Carex vulpinoidea*	0–675	–
4	**Other Grass-likes**			450–1125	
	spikerush	ELEOC	*Eleocharis*	225–675	–
	mountain rush	JUARL	*Juncus arcticus ssp. littoralis*	90–675	–
	rush	JUNCU	*Juncus*	0–360	–
	green bulrush	SCAT2	*Scirpus atrovirens*	0–360	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	0–360	–
Forb					
5	**Forbs**			450–900	
	Pennsylvania smartweed	POPE2	*Polygonum pensylvanicum*	90–450	–
	swamp smartweed	POHY2	*Polygonum hydropiperoides*	90–450	–
	curlytop knotweed	POLA4	*Polygonum lapathifolium*	45–360	–
	water knotweed	POAM8	*Polygonum amphibium*	45–360	–
	Forb, introduced	2FI	*Forb, introduced*	0–225	–
	Forb, native	2FN	*Forb, native*	0–225	–
	broadleaf cattail	TYLA	*Typha latifolia*	0–225	–
	white panicle aster	SYLA6	*Symphyotrichum lanceolatum*	45–180	–
	New England aster	SYNO2	*Symphyotrichum novae-angliae*	45–180	–
	swamp milkweed	ASIN	*Asclepias incarnata*	45–135	–
	giant goldenrod	SOGI	*Solidago gigantea*	0–135	–
	roughfruit amaranth	AMTU	*Amaranthus tuberculatus*	0–90	–
	spotted water hemlock	CIMA2	*Cicuta maculata*	0–90	–
	shrubby cinquefoil	DAFRF	*Dasiphora fruticosa ssp. floribunda*	0–45	–
	cutleaf waterparsnip	BEER	*Berula erecta*	0–45	–

	western dock	RUAQ	*Rumex aquaticus*	0–45	–
	blue skullcap	SCLA2	*Scutellaria lateriflora*	0–45	–
	marsh arrowgrass	TRPA28	*Triglochin palustris*	0–45	–
Shrub/Vine					
6	**Shrubs**			0–450	
	willow	SALIX	*Salix*	0–450	–
	false indigo bush	AMFR	*Amorpha fruticosa*	0–45	–

Table 10. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
2	**Tall Cool-Season Grasses**			400–1600	
	reed canarygrass	PHAR3	*Phalaris arundinacea*	400–1600	–
3	**Sedges**			80–600	
	Nebraska sedge	CANE2	*Carex nebrascensis*	0–400	–
	Sartwell's sedge	CASA8	*Carex sartwellii*	0–400	–
	woolly sedge	CAPE42	*Carex pellita*	0–320	–
	broom sedge	CASC11	*Carex scoparia*	0–200	–
	fox sedge	CAVU2	*Carex vulpinoidea*	0–200	–
4	**Other Grass-likes**			200–1200	
	mountain rush	JUARL	*Juncus arcticus ssp. littoralis*	80–600	–
	rush	JUNCU	*Juncus*	0–400	–
	green bulrush	SCAT2	*Scirpus atrovirens*	0–400	–
	spikerush	ELEOC	*Eleocharis*	0–400	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	0–320	–
Forb					
5	**Forbs**			600–1200	
	hybrid cattail	TYGL	*Typha ×glauca*	0–600	–
	broadleaf cattail	TYLA	*Typha latifolia*	0–600	–
	Pennsylvania smartweed	POPE2	*Polygonum pensylvanicum*	80–600	–
	swamp smartweed	POHY2	*Polygonum hydropiperoides*	80–600	–
	curlytop knotweed	POLA4	*Polygonum*	40–480	

	curlytop knotweed	POLA4	*Polygonum lapathifolium*	40–480	–
	water knotweed	POAM8	*Polygonum amphibium*	40–480	–
	Forb, introduced	2FI	*Forb, introduced*	0–400	–
	Forb, native	2FN	*Forb, native*	0–400	–
	New England aster	SYNO2	*Symphyotrichum novae-angliae*	40–400	–
	white panicle aster	SYLA6	*Symphyotrichum lanceolatum*	40–280	–
	giant goldenrod	SOGI	*Solidago gigantea*	0–200	–
	swamp milkweed	ASIN	*Asclepias incarnata*	40–200	–
	roughfruit amaranth	AMTU	*Amaranthus tuberculatus*	0–80	–
	spotted water hemlock	CIMA2	*Cicuta maculata*	0–80	–
	cutleaf waterparsnip	BEER	*Berula erecta*	0–40	–
	marsh arrowgrass	TRPA28	*Triglochin palustris*	0–40	–
Shrub/Vine					
6	**Shrubs**			0–400	
	willow	SALIX	*Salix*	0–400	–

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.

Prairie Cordgrass-Reedgrass/Sedge Plant Community
Total Annual Production (lbs./acre, air-dry): 5800
Stocking Rate* (AUM/acre): 1.59

Sedge/Smartweed/Spikerush/Baltic/Cattail Rush Plant Community
Total Annual Production (lbs./acre, air-dry): 4500
Stocking Rate* (AUM/acre): 1.23

Reed Canarygrass/Smartweed/Baltic Rush/Cattail Plant Community
Total Annual Production (lbs./acre, air-dry): 4000
Stocking Rate* (AUM/acre): 1.10

*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 records exist in the national database.

Other references

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Approval

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Rick L. Peterson, ESD Update 6/23/16

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.

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Date	05/09/2010
Approved by	Suzanne Mayne-Kinney
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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

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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. This site typically has an O-horizon (roots and partly decomposed stems and leaves of plants) that is 0-3 inches thick. 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):** A-horizon should be 5 to 6 inches thick with dark gray or gray colors when moist. Structure typically is medium to fine 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 (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.

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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant: Tall warm-season grasses >>

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

    Other: Forbs > Grass-likes > Shrubs

    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 4,800-6,800 lbs./acre (air-dry weight). Reference value production is 5,800 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; 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.
