

Ecological site R055DY019SD

Closed Depression

Last updated: 9/30/2026
Accessed: 10/06/2026

General information

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

MLRA notes

Major Land Resource Area (MLRA): 055D—Glacial Lake Dakota

MLRA 55D is in South Dakota (92 percent) and southeastern North Dakota (8 percent). It makes up about 3,059 square miles (7,923 square kilometers). This area, which is part of the glacial till plain region, consists of a large, glacial lake plain that was drained by the James River, which flows southward through the area. The MLRA is dominantly farmland converted from prairie, but some areas of grassland remain. Agricultural drainage practices have impacted shallow depressions in many areas. MLRA 55D has distinct boundaries. Till plains are on all sides. MLRA 55B borders the area largely to the north and is also between the Lake Dakota Plain and two prominent coteaus—the Missouri Coteau on the west and the Prairie Coteau on the east. To the south is MLRA 55C (Southern Black Glaciated Plains), which has a mesic soil temperature regime. This area is in the Central Lowland province of the Interior Plains. Elevation ranges from 1,250 to 1,330 feet (380 to 405 meters), generally increasing from south to north. The area is characterized by mostly level to moderately sloping lake plains with many depressions and drainages. Much of the area has integrated drainage; drainage channels are poorly to moderately defined. The glaciolacustrine sediments of the Lake Dakota Plain range from sandy to clayey and are commonly stratified. Some areas of the lake plain are mantled with wind-deposited materials, which are moderately coarse textured or sandy. Alluvial deposits and low terraces are common along the James River and its major tributaries but also occur in narrow and discontinuous strips along other streams.

Classification relationships

Major Land Resource Area (MLRA): Southern Black Glaciated Plains (55D) (USDA-NRCS, 2022) USFS Sub-region: Located mainly within unit 332Bc and 332Ba (Cleland et al., 2007).

Ecological site concept

The Closed Depression ecological site typically occurs in slight depressions on nearly level slopes in the upland areas. Soils are poorly drained and may have a claypan (columnar structure) within 6 inches of the soil surface or an abrupt texture change within 12 inches of the soil surface. Permeability is very slow due to the claypan (columnar structure) or the clayey subsoil and the site may pond water 4 to 8 weeks in the spring of the year. Ponded water conditions and very slow permeability and/or a natric horizon strongly influences the soil-water-plant relationship. The natric horizon in the subsoil typically has a Sodium Absorption Ratio (SAR) greater than 13 and/or an Exchangeable Sodium Percentage (ESP) greater than 15. Vegetation in the Reference State is co-dominated by cool-season grasses and grasslikes including western wheatgrass and spikerush. Common forbs include American vetch, knotweeds, smartweeds, and western dock. Change in disturbance regime may lead to a Degraded State where foxtail barley and inland saltgrass are common.

Associated sites

R055DY010SD	Loamy These sites occur on upland areas in non-depressional landforms. The soils are well drained and have less than 40 percent clay in the surface and subsoil.
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R055DY011SD	Clayey These sites occur on upland areas in non-depressional landforms. The soils are well drained and have greater than 40 percent clay in the surface and subsoil.
R055DY013SD	Claypan These sites occur on uplands in non-depressional landforms. Soils are moderately well drained and have a claypan (columnar structure) between 6 and 16 inches from the soil surface.

Similar sites

R055DY004SD	Wet Meadow The Wet Meadow site occurs in a similar landscape position. It does not have a claypan (columnar structure) within 6 inches of the soil surface or an abrupt texture change within 12 inches of the soil surface. This site may be very poorly drained, and will typically pond water more frequently and for a longer duration than the Closed Depression site. The Wet Meadow site will have more grass-likes and more tall warm-season grasses than a Closed Depression.
R055DY015SD	Thin Claypan The Thin Claypan site occurs in a similar landscape position. It is moderately well drained and has a claypan (columnar structure) within 6 inches of the soil surface. The Thin Claypan site will have less blue grama and lower production than a Closed Depression site.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Pascopyrum smithii</i> (2) <i>Hordeum jubatum</i>

Physiographic features

This site typically occurs on nearly level depressions on upland areas of lake plains.

Table 2. Representative physiographic features

Landforms	(1) Lake plain > Closed depression (2) Lake plain > Depression
Runoff class	Negligible
Flooding frequency	None

Ponding duration	Very brief (4 to 48 hours) to long (7 to 30 days)
Ponding frequency	Rare to frequent
Elevation	380 – 410 m
Slope	0 %
Ponding depth	0 – 30 cm
Water table depth	0 – 150 cm
Aspect	Aspect is not a significant factor

Climatic features

The average annual precipitation of MLRA 55D is 22 to 23 inches (549 to 594 millimeters). About 75 percent of the rainfall comes from high-intensity, convective thunderstorms during the growing season. Winter precipitation is typically snow. The average annual snowfall is 25 to 50 inches (635 to 1,270 millimeters). Strong winds commonly deposit the snow unevenly across the landscape. The average annual temperature is 43 to 45 degrees F (6 to 7 degrees C). The freeze-free period averages about 135 days and ranges from 120 to 150 days.

Table 3 Representative climatic features

Frost-free period (characteristic range)	110-120 days
Freeze-free period (characteristic range)	130-130 days
Precipitation total (characteristic range)	560-580 mm
Frost-free period (actual range)	110-120 days
Freeze-free period (actual range)	130-130 days
Precipitation total (actual range)	560-580 mm
Frost-free period (average)	120 days
Freeze-free period (average)	130 days
Precipitation total (average)	580 mm

- (1) COLUMBIA 8 N [USC00391873], Columbia, SD
- (2) ABERDEEN [USW00014929], Aberdeen, SD
- (3) BRITTON [USC00391049], Britton, SD
- (4) ANDOVER #2 [USC00390120], Andover, SD
- (5) CONDE [USC00391917], Conde, SD
- (6) TURTON [USC00398420], Turton, SD
- (7) MELLETTE 4 W [USC00395456], Northville, SD
- (8) REDFIELD [USC00397052], Redfield, SD

Influencing water features

This site is poorly drained. Areas of this site receive additional water as surface runoff from adjacent uplands. Under average climatic conditions, the soils are rarely to frequently ponded in April and May. Some components are frequently ponded in June and July. Depth of ponding typically is less than 12 inches during these months. In mid and late summer, ponded water commonly is not evident except after heavy rains.

When not ponded, a seasonal high-water table typically fluctuates with precipitation events between the surface and a depth of 1.5 feet during the months of April through June. In most soils, it is within a depth 3.5 feet through the remainder of the growing season; however, in a few soils it may be as deep as 5 feet in mid- summer.

Soil features

The common features of soils in this site are the silty clay to silty clay loam textured subsoil and slopes of 0 to 1 percent. The soils in this site are poorly drained and formed in alluvium and lacustrine sediments. Some soils may include a mantle of glaciolacustrine material over glacial till material. The silt loam surface layer is 2 to 16 inches thick. Some soils exhibit an extremely hard, clayey horizon that has round-topped or bun shaped columnar structure. These horizons are high in sodium., and are commonly referred to as "claypans". In general, the soils have a very slow infiltration rate. Available water capacity is 5 to 6 inches. The soils crack when dry and heavy traffic can cause surface compaction when wet. Subsurface soil layers are restrictive to water movement and root penetration. This site should show slight to no evidence of rills, wind scoured areas, or pedestalled plants. Water flow paths are broken, irregular in appearance, or discontinuous. The soil surface is stable and intact.

Soil series are Borup, Colvin, and Heil.

High accumulations of sodium and slow permeability strongly influence the soil-water-plant relationship on this site. Access Web Soil Survey (<http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>) for specific local soils information.

Table 4. Representative soil features

Parent material	(1) Alluvium (2) Lacustrine deposits (3) Glaciolacustrine deposits
Surface texture	(1) Silt loam (2) Silty clay loam
Family particle size	(1) Fine (2) Fine-silty
Drainage class	Poorly drained
Permeability class	Very slow to moderate

Soil depth	200 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	12.7 – 15.24 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 20 %
Electrical conductivity (0-101.6cm)	0 – 20 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0 – 20
Soil reaction (1:1 water) (0-101.6cm)	6.6 – 8.4
Subsurface fragment volume <=3" (0-101.6cm)	0 – 10 %
Subsurface fragment volume >3" (0-101.6cm)	Not specified

Ecological dynamics

The ecological dynamics in this ESD are based on concepts from the Closed Depression ESD in MLRA 55C. Future work is needed to quantify and verify these concepts in MLRA 55D.

This site developed under Northern Great Plains climatic conditions, and included natural influence of large herding herbivores and occasional fire. Changes will occur in the plant communities due to weather fluctuations and/or management actions. Under adverse impacts, a relatively rapid decline in vegetative vigor and composition can occur. Under favorable conditions the site has the potential to resemble the Reference State. Interpretations for this site are based primarily on the 1.1 Reference Plant Community Phase. This community phase and the Reference State have been determined by study of rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily grazed to lightly grazed areas, seasonal use pastures, and historical accounts also have been considered. Plant community phases, states, transitional pathways, and thresholds have been determined through similar studies and experience.

This site is very sensitive to precipitation fluctuations from year to year. With above average precipitation the site becomes very wet, leading to a much different plant community than what would be present with average to below average precipitation. In dry years, plant

density becomes very low. The reference plant community is influenced strongly by precipitation alone. The Western Wheatgrass-Common Spikerush/Pale Dock plant community encompasses this natural fluctuation.

Following the state-and-transition model (STM) are narratives for each of the described states and community phases. These may not represent every possibility, but they are the most prevalent and repeatable states and community phases. The associated plant composition tables have been developed from the best available knowledge at the time of this revision. As more data are collected, some of these community phases and states may be revised or removed, and new ones may be added. The main purpose for including the descriptions here is to capture the current knowledge and experience at the time of this revision.

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1	Wheatgrasses			785-3335	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	785-3335	20-85
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	0-196	0-5
2	Cool-Season Bunchgrasses			196-1569	
	foxtail barley	HOJU	<i>Hordeum jubatum</i>	78-1373	2-35
	Nuttall's alkaligrass	PUNU2	<i>Puccinellia nuttalliana</i>	78-588	2-15
3	Short Warm-Season Grasses			39-392	
	saltgrass	DISP	<i>Distichlis spicata</i>	39-392	1-10
	buffalograss	BODA2	<i>Bouteloua dactyloides</i>	0-196	0-5
4	Other Native Grasses			78-392	
	Graminoid (grass or grass-like)	2GRAM	<i>Graminoid (grass or grass-like)</i>	0-392	0-10
	fowl bluegrass	POPA2	<i>Poa palustris</i>	39-196	1-5
	plains bluegrass	POAR3	<i>Poa arida</i>	39-196	1-5
5	Grass-Likes			392-1765	
	common spikerush	ELPA3	<i>Eleocharis palustris</i>	196-1569	5-40
	needle spikerush	ELAC	<i>Eleocharis acicularis</i>	39-588	1-15
	sedge	CAREX	<i>Carex</i>	78-392	2-10
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0-392	0-10
	rush	JUNCU	<i>Juncus</i>	0-196	0-5
Forb					
6	Forbs			196-2354	
	Forb, native	2FN	<i>Forb, native</i>	0-785	0-20
	curlytop knotweed	POLA4	<i>Polygonum lapathifolium</i>	0-588	0-15
	pale dock	RUAL4	<i>Rumex altissimus</i>	0-588	0-15
	Pennsylvania smartweed	POPE2	<i>Polygonum pensylvanicum</i>	0-588	0-15
	lambsquarters	CHAL7	<i>Chenopodium album</i>	0-392	0-10
	New England aster	SYNO2	<i>Symphyotrichum novae-angliae</i>	0-392	0-10
	western dock	RUAQ	<i>Rumex aquaticus</i>	0-392	0-10
	Pursh seepweed	SUCA2	<i>Suaeda calceoliformis</i>	0-392	0-5
	mealy goosefoot	CHIN2	<i>Chenopodium incanum</i>	0-196	0-5
	mint	MENTH	<i>Mentha</i>	0-196	0-5
	evening primrose	OENOT	<i>Oenothera</i>	0-196	0-5
	Indianhemp	APCA	<i>Apocynum cannabinum</i>	0-196	0-5
	golden tickseed	COTI3	<i>Coreopsis tinctoria</i>	0-196	0-5

	plantain	PLANT	<i>Plantago</i>	0-196	0-5
	povertyweed	IVAX	<i>Iva axillaris</i>	0-196	0-5
	American licorice	GLLE3	<i>Glycyrrhiza lepidota</i>	0-196	0-5
	bushy knotweed	PORA3	<i>Polygonum ramosissimum</i>	0-196	0-5
	cinquefoil	POTEN	<i>Potentilla</i>	0-196	0-5
	creeping woodsorrel	OXCO	<i>Oxalis corniculata</i>	0-118	0-3
	smooth horsetail	EQLA	<i>Equisetum laevigatum</i>	0-118	0-3
	tall fringed bluebells	MECI3	<i>Mertensia ciliata</i>	0-118	0-3

Table 6. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1	Wheatgrasses			370-986	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	370-986	15-40
2	Cool-Season Bunchgrasses			123-493	
	foxtail barley	HOJU	<i>Hordeum jubatum</i>	74-370	3-15
	Nuttall's alkaligrass	PUNU2	<i>Puccinellia nuttalliana</i>	25-247	1-10
3	Short Warm-Season Grasses			247-986	
	saltgrass	DISP	<i>Distichlis spicata</i>	247-986	10-40
	buffalograss	BODA2	<i>Bouteloua dactyloides</i>	0-74	0-3
4	Other Native Grasses			25-247	
	Graminoid (grass or grass-like)	2GRAM	<i>Graminoid (grass or grass-like)</i>	25-247	1-10
	fowl bluegrass	POPA2	<i>Poa palustris</i>	0-74	0-3
	plains bluegrass	POAR3	<i>Poa arida</i>	0-74	0-3
5	Grass-Likes			123-616	
	common spikerush	ELPA3	<i>Eleocharis palustris</i>	49-370	2-15
	sedge	CAREX	<i>Carex</i>	0-197	0-8
	rush	JUNCU	<i>Juncus</i>	0-123	0-5
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0-123	0-5
	needle spikerush	ELAC	<i>Eleocharis acicularis</i>	0-123	0-5
Forb					
6	Forbs			25-247	
	curlytop knotweed	POLA4	<i>Polygonum lapathifolium</i>	0-247	0-10
	Pennsylvania smartweed	POPE2	<i>Polygonum pensylvanicum</i>	0-247	0-10
	Forb, native	2FN	<i>Forb, native</i>	0-247	0-10
	creeping woodsorrel	OXCO	<i>Oxalis corniculata</i>	0-123	0-5
	plantain	PLANT	<i>Plantago</i>	0-123	0-5
	povertyweed	IVAX	<i>Iva axillaris</i>	0-123	0-5
	Pursh seepweed	SUCA2	<i>Suaeda calceoliformis</i>	0-123	0-5
	bushy knotweed	PORA3	<i>Polygonum ramosissimum</i>	0-123	0-5
	evening primrose	OENOT	<i>Oenothera</i>	0-74	0-3
	Indianhemp	APCA	<i>Apocynum cannabinum</i>	0-74	0-3
	mealy goosefoot	CHIN2	<i>Chenopodium incanum</i>	0-74	0-3
	New England aster	SYNO2	<i>Symphyotrichum novae-angliae</i>	0-74	0-3
	pale dock	RUAL4	<i>Rumex altissimus</i>	0-74	0-3
	American licorice	GLLE3	<i>Glycyrrhiza lepidota</i>	0-74	0-3

	smooth horsetail	EQLA	<i>Equisetum laevigatum</i>	0-74	0-3
	western dock	RUAQ	<i>Rumex aquaticus</i>	0-74	0-3
	curlycup gumweed	GRSQ	<i>Grindelia squarrosa</i>	0-74	0-3
	cinquefoil	POTEN	<i>Potentilla</i>	0-25	0-1

Table 7. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1	Wheatgrasses			1009-1278	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	0-67	0-5
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	0-67	0-5
2	Cool-Season Bunchgrasses			269-673	
	foxtail barley	HOJU	<i>Hordeum jubatum</i>	269-673	20-50
	Nuttall's alkaligrass	PUNU2	<i>Puccinellia nuttalliana</i>	0-40	0-3
3	Short Warm-Season Grass			135-538	
	saltgrass	DISP	<i>Distichlis spicata</i>	135-538	10-40
4	Other Native Grasses			0-67	
	fowl bluegrass	POPA2	<i>Poa palustris</i>	0-67	0-5
	Graminoid (grass or grass-like)	2GRAM	<i>Graminoid (grass or grass-like)</i>	0-67	0-5
5	Grass-Likes			67-269	
	common spikerush	ELPA3	<i>Eleocharis palustris</i>	27-202	2-15
	needle spikerush	ELAC	<i>Eleocharis acicularis</i>	0-67	0-5
	sedge	CAREX	<i>Carex</i>	0-67	0-5
	rush	JUNCU	<i>Juncus</i>	0-40	0-3
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0-40	0-3
6	Non-Native Grasses			13-108	
	Kentucky bluegrass	POPR	<i>Poa pratensis</i>	0-67	0-5
	cheatgrass	BRTE	<i>Bromus tectorum</i>	13-67	1-5
Forb					
7	Forbs			67-336	
	lambsquarters	CHAL7	<i>Chenopodium album</i>	0-202	0-15
	Forb, introduced	2FI	<i>Forb, introduced</i>	0-135	0-10
	curly dock	RUCR	<i>Rumex crispus</i>	0-135	0-10
	Forb, native	2FN	<i>Forb, native</i>	0-67	0-5
	cocklebur	XANTH2	<i>Xanthium</i>	0-67	0-5
	curlycup gumweed	GRSQ	<i>Grindelia squarrosa</i>	0-67	0-5
	curlytop knotweed	POLA4	<i>Polygonum lapathifolium</i>	0-40	0-3
	Pennsylvania smartweed	POPE2	<i>Polygonum pensylvanicum</i>	0-40	0-3
	plantain	PLANT	<i>Plantago</i>	0-40	0-3
	povertyweed	IVAX	<i>Iva axillaris</i>	0-40	0-3
	bushy knotweed	PORA3	<i>Polygonum ramosissimum</i>	0-40	0-3
	creeping woodsorrel	OXCO	<i>Oxalis corniculata</i>	0-40	0-3
	smooth horsetail	EQLA	<i>Equisetum laevigatum</i>	0-40	0-3
	mealy goosefoot	CHIN2	<i>Chenopodium incanum</i>	0-27	0-2
	Pursh seepweed	SUCA2	<i>Suaeda calceoliformis</i>	0-13	0-1

Table 8. Community 2.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 9. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Animal community

The following table lists annual, suggested initial stocking rates with average growing conditions. These are conservative estimates that should be used only as guidelines in the initial stages of conservation planning. Often, the current plant composition does not entirely match any particular plant community (as described in this ES description). Because of this, a resource inventory is necessary to document plant composition and production. More accurate carrying capacity estimates should eventually be calculated using the following stocking rate information along with animal preference data and actual stocking records particularly when grazers other than cattle are involved. Following consultation of the land manager, more intensive grazing management may result in improved harvest efficiencies and increased carrying capacity. Stocking rates are calculated using Animal-Unit-Month (AUM), which is the amount of air-dry forage required to feed a cow, with or without calf, for one month. Reference Plant Community Phase (1.1) Average Annual Production (lbs./acre, air-dry): 3,500 Stocking Rate* (AUM/acre): 0.96 Western Wheatgrass-Inland Saltgrass (1.2) Average Annual Production (lbs./acre, air-dry): 2,200 Stocking Rate* (AUM/acre): 0.60 Foxtail Barley-Inland Saltgrass (2.1) Average Annual Production (lbs./acre, air-dry): 1,200 Stocking Rate* (AUM/acre): 0.33 *Based on 912 lbs./acre (air-dry weight) per Animal Unit Month (AUM), and on 25 percent harvest efficiency (refer to United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) National Range and Pasture Handbook). Grazing by domestic livestock is one of the major income-producing industries in the area. Rangeland in this area may provide yearlong forage. During the dormant period, the forage for livestock will likely be lacking protein to meet livestock requirements and added protein will allow ruminants to better utilize the energy stored in grazed plant materials. A forage quality test (either directly or through fecal sampling) should be used to determine the level of supplementation needed.

Hydrological functions

Water is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic group D. Infiltration varies from very slow to slow and runoff potential for this site varies from high to very high depending on soil hydrologic group, slope, and ground cover. In many cases, areas with greater than 75 percent ground cover have the greatest potential for high infiltration and lower runoff. An example of an exception would be an area where short-grasses form a strong sod and dominate the site. Dominance by blue grama, buffalograss, bluegrass, or smooth brome grass will result in reduced infiltration and increased runoff. Areas where ground cover is less than 50 percent have the greatest potential to have reduced infiltration and higher runoff (refer to Section 4, NRCS National Engineering Handbook for runoff quantities and hydrologic curves).

Recreational uses

This site provides hunting, 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

Ecological Site Correlation Issues and Questions: The following is the list of national mapunit symbols for the mapunits which contain a component correlated to the MLRA 55D Closed Depression ecological site: 2sd3d, 2sd3n, 2sd5m, 2sd5n, 2sd65, 2sd66, 2sl41, 2sd1y, 2sd6d, 2sd6f, 2sd6g, 2sd6h, 2sd6j, 2sd69, 2sd6b, 2sd31, 2sd3m, 2sd3j, 2sd3h

Inventory data references

Information presented here has been derived from NRCS clipping data and other inventory data from the adjacent MLRA 55C. Field observations from range-trained personnel were also used. Those involved in developing this site include: Stan Boltz, Former Range Management Specialist, NRCS. Bruce Kunze, Soil Scientist, NRCS Lance Howe, Soil Scientist, NRCS-SPSD, Redfield, SD Landon Wolter, Range Management Specialist, NRCS-SPSD, Redfield, SD

Other references

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Approval

Jamin Johanson, 9/30/2026

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This site concept was developed using the Closed Depression ESD of the adjacent MLRA 55C. Future work is needed to verify these site concepts in MLRA 55D. Lance Howe (Lance.Howe@usda.gov), Soil Survey Office Leader, USDA-NRCS, Redfield, SD; and Steve Winter (Steven.Winter@usda.gov), Soil Scientist, USDA-NRCS, Redfield, SD Additional Information Acknowledgment: Jason Hermann (Jason.Hermann@usda.gov), Area Rangeland Management Specialist, USDA-NRCS, Redfield, SD. This Provisional Ecological Site concept has passed both Quality Control and Quality Assurance processes in MLRA 55C. Officially approved for publication in MLRA 55C by David Kraft as of 11/12/2020. Non-discrimination Statement In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident. Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotope, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English. To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, available online and at any USDA office, or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632- 9992. Submit your completed form or letter to USDA by: (1) mail: U.S.

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	12/07/2004
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. Number and extent of rills: Rills should not be present.

2. Presence of water flow patterns: Barely observable or not present.

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):
Normally bare ground is less than 5 percent and patches less than two inches in diameter. Following well-above average or well-below average precipitation periods, bare ground can be very high for brief periods of time.

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

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

7. Amount of litter movement (describe size and distance expected to travel): Little to no plant litter movement. Plant litter remains in place and is not moved by erosional forces.

8. Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values): Soil aggregate stability normally a 4 to 6 rating. Typically high root content and organic matter in the soil surface. Soil surface is very resistant to erosion.

9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness): Use soil series description for depth and color of A-horizon.

10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: Healthy, deep-rooted native grass and grass-like species enhance infiltration and reduce runoff, but because of the nature of the site, infiltration is often poor due to soil characteristics.

11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site): No compaction layer should be present. Platy layers naturally occur near the surface of some soils and should not be confused with compaction.

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: Drier precipitation cycles: Wheatgrasses (mid, cool-season rhizomatous) >> mid, cool-season bunchgrasses > Wetter precipitation cycles: Grass-like species = forbs >

Sub-dominant:

Other: Drier precipitation cycles: Forbs > grass-like species Wetter precipitation cycles: Mid, cool-season bunchgrasses

Additional: Other grasses in other functional groups occur in minor amounts.

13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence): Very little to no evidence of decadence or mortality, except after extended periods of ponding as a result of heavy precipitation late in the growing season.

14. Average percent litter cover (%) and depth (in): 10-60 percent plant litter cover, roughly 0.5 inch in depth. Litter cover is in contact with the soil surface.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**
2,000-4,500 lbs./acre air-dry weight; average 3,500 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: Refer to State and local Noxious Weed List.**
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17. **Perennial plant reproductive capability: Perennial grass and grass-like species have vigorous rhizomes and/or tillers.**
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