USDA Natural Resources
Conservation Service

Ecological site R062XY002SD
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.

MLRA notes

Major Land Resource Area (MLRA): 062X–Black Hills

The Black Hills (MLRA 62) is a unique, low lying mountain range situated in the midst of a mixed short and mid-grass prairie. It is a true Island in the Plains, as it has geophysical and biological attributes that are unlike the surrounding area. The Black Hills have strong floristic ties to four of the North American biomes: Cordilleran (Rocky Mountain) Forest, Northern Coniferous Forest, Eastern Deciduous Forest, and Grasslands.

MLRA 62 is approximately 3,040 square miles in size; 74 percent is located in South Dakota, and 26 percent is in Wyoming. The towns of Lead, Deadwood, Hill City, and Custer, South Dakota, are in this area. U.S. Highways 16 and 385 cross the MLRA. The Black Hills National Forest, Custer State Park, Mt. Rushmore National Monument, Wind Cave National Park, and Jewel Cave National Monument are located in this MLRA.

This area forms the core of the Black Hills and the Bear Lodge Mountains where the elevation ranges between 3,600 to 6,565 feet, however, Black Elk Peak (Harney Peak) rises to 7,242 feet. Slopes range from moderately sloping on some of the high plateaus to very steeply sloping along drainageways and on peaks and ridges. Narrow valleys generally are gently sloping to strongly sloping.

The Black Hills uplift is the product of the Laramide mountain-building episodes that produced most of the ranges in the Rocky Mountains. Uplift began near the end of the Cretaceous period, 65 million years ago and ended by 35 million years ago (Froiland 1990). The core of the Black Hills is a plutonic mass of granite with steeply dipping metamorphic rocks, primarily slate and schist, directly surrounding the granite core. A plateau of Mississippian limestone surrounds the igneous and metamorphic rock core. The

Madison limestone is broken around the outer edges of the uplifted area. The Permian Minnekahta limestone forms the outermost boundary of the area. Many other tilted sandstone, shale, and limestone units are exposed like a bathtub ring inside the steeply dipping Madison limestone.

The dominant soil orders in this MLRA are Alfisols (forest soils) and Mollisols (grassland soils). The soils in the area have a frigid or cryic soil temperature regime, a udic or ustic soil moisture regime, and mixed, micaceous, or smectitic mineralogy. They are shallow to very deep, generally well drained, and loamy in texture.

The Black Hills MLRA supports open to dense forest vegetation. Ponderosa pine is the dominant species across the Black Hills. White spruce grows at the higher elevations and along the major drainageways. Bur oak is found intermixed with pine in the northern and eastern fringes of the Black Hills, and Rocky Mountain juniper is more common in the southern portion of the Black Hills. Aspen and paper birch are minor components found throughout the Black Hills. Prairie dropseed, roughleaf ricegrass, green needlegrass, poverty oatgrass, Richardson's needlegrass, slender wheatgrass, and Canada wildrye are the most common native grasses under open forest stands. The most common native shrubs are bearberry, common juniper, grouse whortleberry, poison ivy, and Saskatoon serviceberry.

MLRA 62 land ownership is approximately 47 percent private and 53 percent federal. Rangeland and forestland are split almost equally between private and federal ownership (47 percent each). Minor areas of land are privately owned cropland and urban development. The forestland in this area is used mainly for timber production, recreation, and grazing.

The major resource concerns are soil erosion and surface compaction caused by logging, mining, wildfires, grazing, and urban expansion. The quality of ground and surface water is another concern, especially in the northern part of the Black Hills. The primary cause is contamination from mine waste and septic systems in areas of rural development and urban expansion (USDA-NRCS, 2006: Ag Handbook 296).

LRU notes

For development of ecological sites, MLRA 62 is divided into three LRU's or physiographic zones (A, B, C, and Y). Each LRU has a set of ecological sites that represents these zones.

The LRU is identified in the Ecological Site ID: R062XY000SD; "062X" identifies the MLRA, the next letter "Y" identifies the LRU. Note: The organization of Ecological Site ID's will likely change in the future.

The North, LRU-A includes the northern Black Hills and Bear Lodge Mountains. It receives between 22 and 30 inches of annual precipitation and has a frigid soil temperature regime.

The High Central, LRU-B includes the high elevation (> 6,200 feet) central core of the Black Hills, which receives between 25 to 35 inches of annual precipitation and has a cryic soil temperature regime.

The South, LRU-C includes the southern portion of the Black Hills and receives between 17 to 21 inches of annual precipitation and has a frigid soil temperature regime.

One additional grouping of ecological sites that are common to the entire MLRA are designated with a “Y” in the ecological site ID.

Classification relationships

USDA
Land Resource Region G—Western Great Plains Range and Irrigated Region:
Major Land Resource Area (MLRA) 62—Black Hills

US Environmental Protection Agency (EPA)
Level IV Ecoregions of the Conterminous United States:
Black Hills Plateau—17b
Black Hills Core Highlands—17c

USDA Forest Service
Ecological Subregions: Sections and Subsections of Conterminous United States:
Black Hills Coniferous Forest Province—M334:
Black Hills Section—334A
Black Hills Limestone Plateau-Core Highlands Subsection—M334Ab

Ecological site concept

The Wet Land ecological site is found throughout MLRA 62. It is a run-in site located in nearly level valleys near springs, seeps, and sloughs or other areas of flooding and ponding. Slopes range from 0 to 3 percent. The soils are very deep, very poorly drained and formed in alluvium. A surface A-horizon will range between 5 and 14 inches in depth with silt loam surface textures. An O-horizon may occur, consisting of peat or decomposed plant material that is 2-foot or greater in depth.

Vegetation in Reference State (1.0) consists of grass-likes, grasses, forbs, and scattered dense patches of shrub. All are adapted to and can tolerate wet soil conditions or are classified as wetland obligate or facultative wet species.

Associated sites

R062XY005SD	**Wet Subirrigated** The Wet Subirrigated ecological site is found adjacent to and intermixed with Wet Land ecological site. The Wet Subirrigated ecological site will have a permanent water table at 1 to 2 feet of the surface.
R062XY003SD	**Subirrigated** The Subirrigated ecological site is found adjacent to the Wet Land ecological site. The Subirrigated ecological site will have a seasonally water table within 2 to 5 feet of the surface.

Similar sites

R062XY005SD	**Wet Subirrigated** The Wet Subirrigated ecological site is found on similar landscape positions as the Wet Land site. The Wet Subirrigated site will have a permanent water table at 1 to 2 feet. The Wet Subirrigated plant community will have more prairie cordgrass, and fewer obligate grass-like species and forbs than the Wet Land ecological site.
R062XY003SD	**Subirrigated** The Subirrigated ecological site is found on similar landscape positions as the Wet Land site. The Subirrigated site will have a seasonal water table at 2 to 5 feet. The Subirrigated plant community will have more bluestem, less prairie cordgrass, and fewer obligate grass-like species and forbs than the Wet Land ecological site.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Salix bebbiana*
Herbaceous	(1) *Carex nebrascensis* (2) *Calamagrostis canadensis*

Physiographic features

The Wet Land ecological site occurs on level to nearly level valleys near springs, seeps, and sloughs or other areas of flooding and ponding. A permanent water table is always between 6 and 12 inches deep, with possible ponding rendering it at the surface.

Table 2. Representative physiographic features

Landforms	(1) Drainageway (2) Oxbow (3) Flood plain (4) Slough
Runoff class	Negligible to low

Flooding duration	Brief (2 to 7 days)
Flooding frequency	Occasional to frequent
Ponding duration	Brief (2 to 7 days) to long (7 to 30 days)
Ponding frequency	Occasional to frequent
Elevation	1,097–1,981 m
Slope	0–3%
Ponding depth	0–30 cm
Water table depth	15–30 cm
Aspect	Aspect is not a significant factor

Climatic features

MLRA 62 is in a microclimate caused by the influence of increased elevation which leads to increased precipitation, moderate air temperature, and lower wind velocities as compared to the surrounding Great Plains. In general, the Black Hills climate is a continental type, cold in the winter and hot in the summer.

Annual precipitation in MLRA 62 typically increases with elevation and decreases from west to east and from north to south. The average annual precipitation range for MLRA 62 is 18 to 35 inches. Most of the rainfall occurs as frontal storms early in the growing season, in May and June. Some high-intensity, convective thunderstorms occur in July and August. Precipitation in the winter occurs mostly as snow. Twenty to forty percent of the annual precipitation falls as snow. The annual average snowfall ranges from 23 inches at the lower elevations in the south, to 54 inches in the higher elevations of the central core of the Black Hills.

The average annual temperature ranges from 36°F to 48°F. January is the coldest month, with an average temperature of 22°F in the higher elevation of the central core, and 25°F in the southern part of MLRA 62. July is the warmest month, with an average daily temperature of 67°F in the central core, and 73°F in the southern part of this MLRA. The frost-free period ranges from 129 to 168 days. It is shortest at higher elevations and in the northwestern part of the MLRA. Hourly winds are estimated to average about 11 miles per hour (mph) annually.

Growth of cool-season plants begins in April, slowing or ceasing growth by mid-August. Warm-season plants begin growth in May and continue to mid-September. Regrowth of cool-season plants may occur in September and October, depending upon soil moisture availability.

Table 3. Representative climatic features

Frost-free period (characteristic range)	66-106 days

Freeze-free period (characteristic range)	107-129 days
Precipitation total (characteristic range)	483-711 mm
Frost-free period (actual range)	38-110 days
Freeze-free period (actual range)	79-130 days
Precipitation total (actual range)	457-762 mm
Frost-free period (average)	84 days
Freeze-free period (average)	113 days
Precipitation total (average)	559 mm

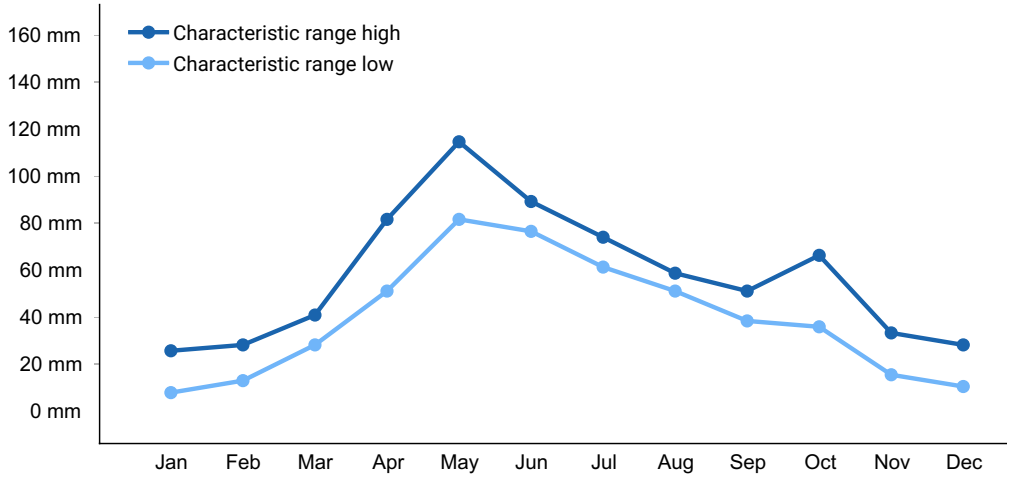

Figure 1. Monthly precipitation range

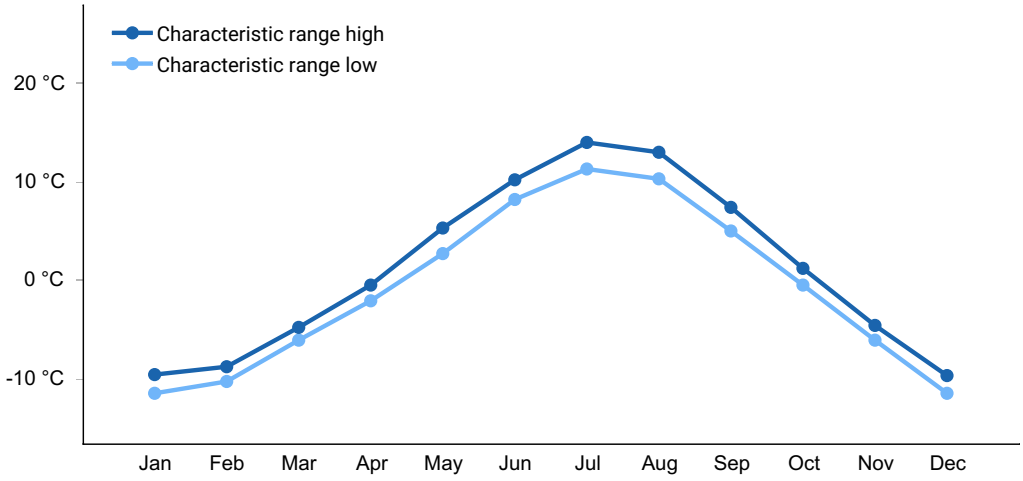

Figure 2. Monthly minimum temperature range

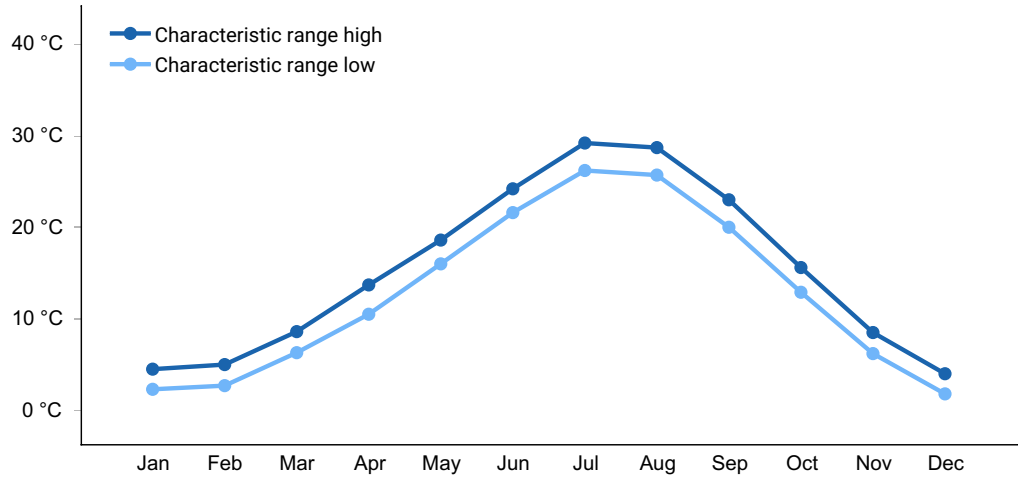

Figure 3. Monthly maximum temperature range

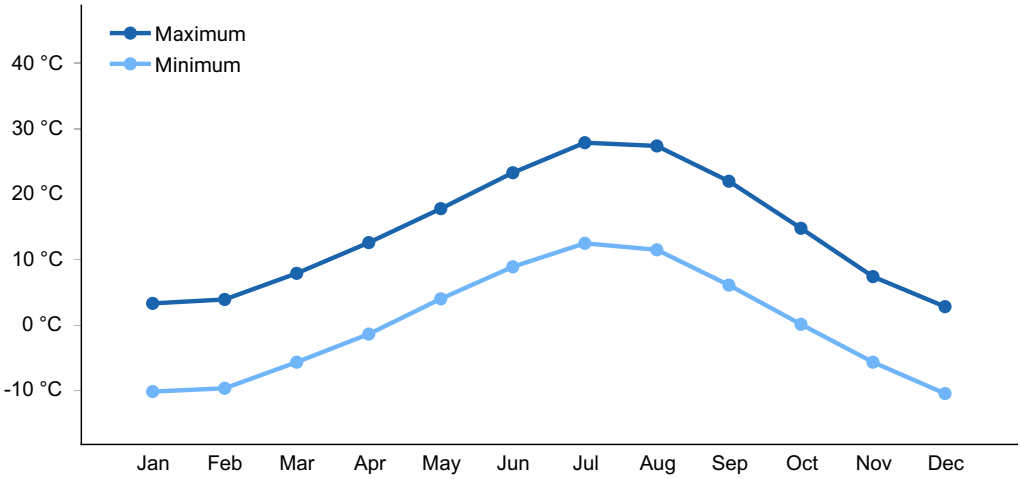

Figure 4. Monthly average minimum and maximum temperature

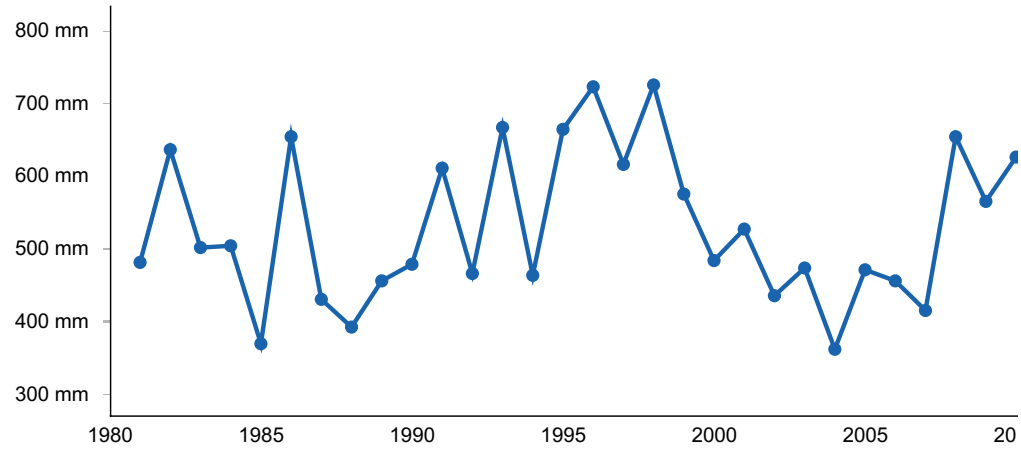

Figure 5. Annual precipitation pattern

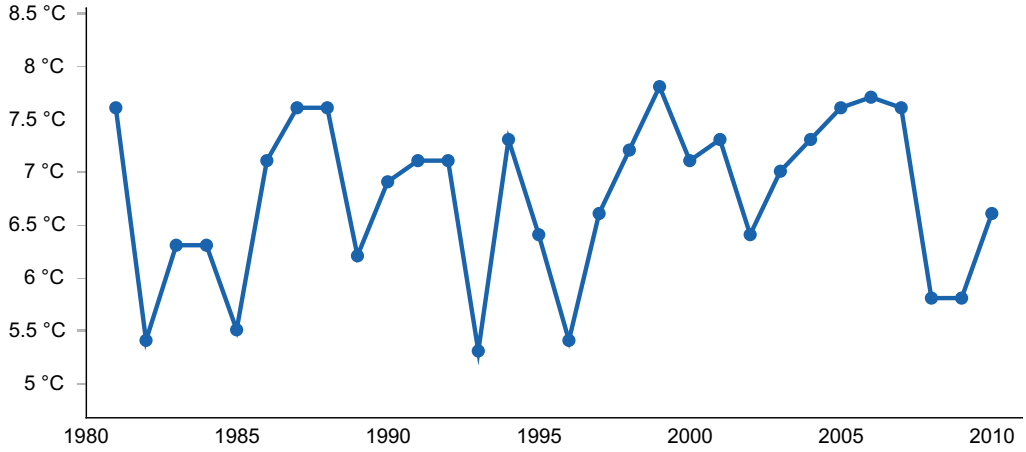

Figure 6. Annual average temperature pattern

Climate stations used

- (1) LEAD [USC00394834], Lead, SD
- (2) DEADWOOD [USC00392207], Deadwood, SD
- (3) DEADWOOD 2NE [USC00392209], Whitewood, SD
- (4) DEERFIELD 3 SE [USC00392231], Hill City, SD
- (5) PACTOLA DAM [USC00396427], Rapid City, SD
- (6) JOHNSON SIDING [USC00394343], Rapid City, SD
- (7) HILL CITY [USC00393868], Hill City, SD
- (8) MT RUSHMORE NATL MEM [USC00395870], Keystone, SD
- (9) CUSTER CO AP [USW00094032], Custer, SD
- (10) EDGEMONT 23 NNW [USC00392565], Custer, SD
- (11) WIND CAVE [USC00399347], Buffalo Gap, SD
- (12) HOT SPRINGS [USC00394007], Hot Springs, SD

Influencing water features

The Wet Land ecological site has a combination of physical and hydrological features that provide season-long ground water within one foot of the surface, allows relatively free movement of water and air in the upper part of the soil, and are occasionally or frequently flooded.

Wetland description

System: Lacustrine
Subsystem: Littoral
Class: Unconsolidated Shore
Subclass: Permanently, or Semi-permanently, or Seasonally Flooded
(Cowardin, et. al., 1979)

System: Palustrine
Subsystem: N/A

Class: Persistent Emergent Wetland
Subclass: Permanently, or Semi-permanently, or Seasonally Flooded, or Saturated (Cowardin, et. al., 1979)

Soil features

Soils common to the Wet Land ecological site are very deep as well as very poorly drained and formed in alluvium. Slopes are 0 to 3 percent. Soils have a silt loam textured surface layer that is 5 to 14 inches thick. An O-horizon consisting of mucky peat or decomposed plant material can be present and exceed 2-foot in depth. The texture of the subsurface layers is silty clay loam. Subsurface soil layers are nonrestrictive to water movement and root penetration.

No soil series is specifically correlated to the Wet Land ecological site in MLRA 62, but the site does occur but is of minor extent. The Wet Land ecological site will most likely be in association with the Marshbrook soil series.

Rills and gullies should not be present. Water flow patterns should be barely distinguishable if at all present. Litter typically falls in place and signs of movement are not common. Thick sedge hummocks or mats may occur but should not be confused with erosional pedestals or terracettes.

More information regarding the soil is available in soil survey reports. Contact the local USDA Service Center for details specific to your area of interest, or go online to access USDA’s Web Soil Survey.

Table 4. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Silt loam
Family particle size	(1) Loamy
Drainage class	Very poorly drained
Permeability class	Slow to moderate
Depth to restrictive layer	203 cm
Soil depth	203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	10.16–15.24 cm
Calcium carbonate equivalent (0-101.6cm)	0–40%

Electrical conductivity (0-101.6cm)	0–16 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–50
Soil reaction (1:1 water) (0-101.6cm)	5.6–9.6
Subsurface fragment volume <=3" (Depth not specified)	0–5%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

The Wet Land ecological site developed under Black Hills climatic conditions; beaver activities, light to severe grazing by bison, elk, insects, and small mammals; sporadic, natural or human-caused wildfire (often of light intensities); and other biotic and abiotic factors that typically influence soil and site development. Changes occur in the plant communities due to short-term weather variations, a shift from wetter or drier hydrologic systems, upland fire, effects of native and non-native plant and animal species, and management actions. Severe disturbances, such as periods of well-below average precipitation, or non-use and no fire can cause significant shifts in plant communities and species composition.

Interpretations are primarily based on the Nebraska Sedge/Bluejoint Reedgrass-Prairie Cordgrass/Willow Plant Community (1.1). It 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. Plant communities, states, transitional pathways, and thresholds have been determined through similar studies and experience.

Heavy grazing including, continuous season-long stocking (during the typical growing season of May through October), without change in season of use, and adequate recovery periods following each grazing occurrence, causes this site to depart from the Nebraska Sedge/Bluejoint Reedgrass-Prairie Cordgrass/Willow Plant Community (1.1). Non-native cool-season grasses and weedy forbs will likely increase. Species such as Nebraska sedge, bluejoint reedgrass, and northern reedgrass will decrease in frequency and production. Shrubs will also decrease with heavy disturbance and loss of a stable water table.

The following state-and-transition diagram illustrates the common plant communities on the site and the transition pathways between communities. The ecological processes are discussed in more detail in the plant community descriptions following the diagram.

State and transition model

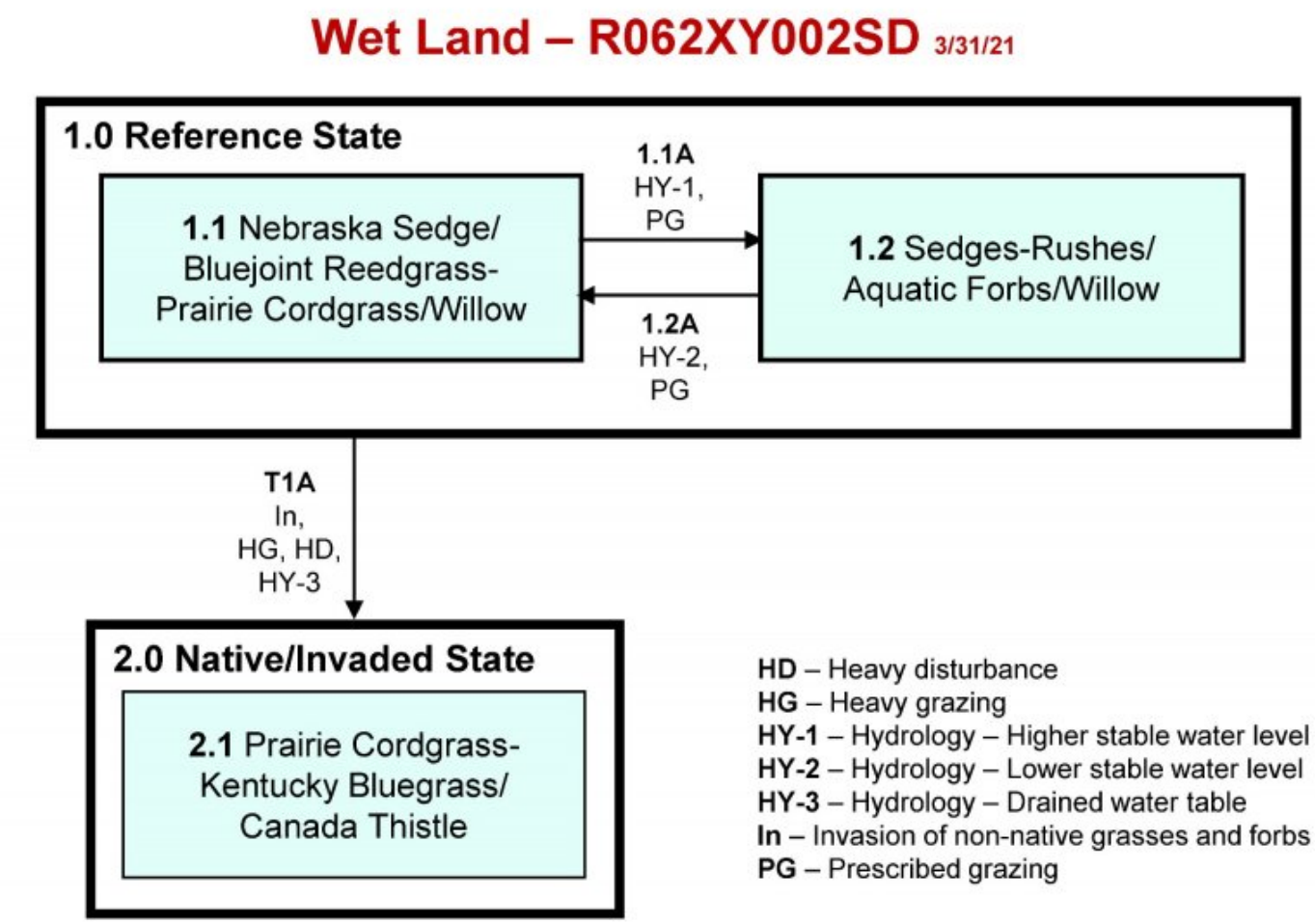

Diagram Legend: Wet Land - R062XY002SD

T1A	1.0 to 2.0	Invasion of non-native grasses and forbs; heavy grazing without change in season of use, or adequate recovery periods; heavy disturbance; and/or a drained or significantly depleted stable water table.
1.1A	1.1 to 1.2	Change to a wetter hydrologic system with a higher stable water table; prescribed grazing with proper stocking rates, change in season of use, and adequate time for plant recovery.
1.2A	1.2 to 1.1	Change to a slightly drier hydrologic system with a lower stable water table; prescribed grazing with proper stocking rates, change in season of use, and adequate time for plant recovery.

State 1
Reference State

The Reference State represents the best estimate of the natural range of variability that dominated the dynamics of the Wet Land ecological site prior to European settlement. This site, in the Reference State, is dominated by grasses, grass-like species, forbs, and shrubs. In pre-European times, the primary disturbance mechanisms for this site in the reference condition included periods of below and above average precipitation, periodic upland fire, beaver activity, and herbivory by large ungulates. Timing of fires and herbivory coupled with weather events dictated the dynamics that occurred within the natural range of variability. Today the primary disturbance is from a lack of fire and concentrated

livestock grazing and wildlife browse. Grasses and grass-likes that are desirable for livestock and wildlife can decline and a corresponding increase in less desirable grasses and grass-likes will occur. Favorable growing conditions occurred during the spring and the warm months of June through August. Today, a similar state will be difficult to find due to the predominance and invasiveness of non-native cool-season perennial gasses and Canada thistle. Wet Land fens located in the higher elevations of the Black Hills will not have much, if any, prairie cordgrass in the plant communities. Sedges and forbs will replace the warm-season grass component. In the absence of heavy browsing, willow species will be more prominent (USGS Association Detail-CEGL001188, 2000., Hornbeck, et. al., 2003).

Dominant plant species

- Bebb willow (*Salix bebbiana*), shrub
- sageleaf willow (*Salix candida*), shrub
- Nebraska sedge (*Carex nebrascensis*), grass
- bluejoint (*Calamagrostis canadensis*), grass
- prairie cordgrass (*Spartina pectinata*), grass
- cinquefoil (*Potentilla*), other herbaceous
- goldenrod (*Solidago*), other herbaceous

Community 1.1
Nebraska Sedge/Bluejoint Reedgrass-Prairie Cordgrass/Willow

Interpretations are based primarily on the Nebraska Sedge/Bluejoint Reedgrass-Prairie Cordgrass/Willow Plant Community. This is also considered to be Reference Plant Community (1.1). Potential vegetation is about 45 percent grasses, 35 percent sedges and rushes,10 percent forbs, and 10 percent shrubs. The major grasses and grass-likes include Nebraska sedge, bluejoint reedgrass, northern reedgrass, and prairie cordgrass. Other grasses include inland bluegrass, and fowl bluegrass. Other grass-likes include spike rush, mountain rush, and slough sedge. Common forbs are cinquefoil, goldenrod, field mint, and Rocky Mountain iris. Shrubs along the margin will include Bebb willow, sageleaf willow, redosier dogwood, shrubby cinquefoil, bog birch, and water birch. This plant community is well adapted to the Black Hills 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 supply. This is a sustainable plant community in terms of soil stability, watershed function, and biologic integrity.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	4680	4992	5761
Forb	247	616	729
Shrub/Vine	118	525	729
Tree	–	31	67
Total	**5045**	**6164**	**7286**

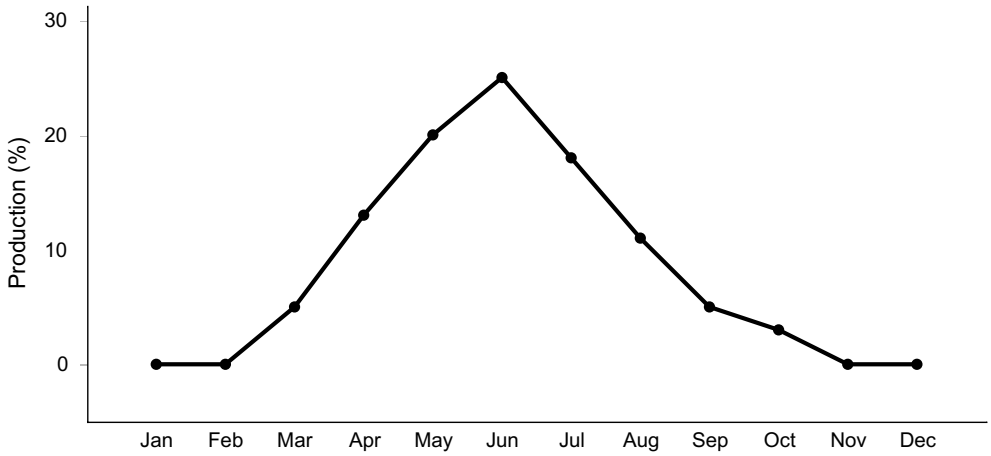

Figure 8. Plant community growth curve (percent production by month). SD6207, Black Hills, lowland cool-season dominant, warm-season sub-dominant. Lowland cool-season dominant, warm-season sub-dominant.

Community 1.2
Sedges-Rushes/Aquatic Forbs/Willow

This plant community developed due to a wetter hydrologic system and prescribed grazing. This plant community is approximately 25 percent grasses and 40 percent grass-like species, 25 percent forbs, and 10 percent shrubs. The plant community becomes dominated by grass-likes such as Nebraska sedge, mountain rush, other obligate and facultative wet sedges, and spikerush. Forbs include whitewater crowfoot, scouringrush horsetail, smartweed, and cattails. Shrubs along the margin will include Bebb willow, sageleaf willow, redosier dogwood, shrubby cinquefoil, bog birch, and water birch. When compared to the Nebraska Sedge/Bluejoint Reedgrass-Prairie Cordgrass/Willow Plant Community (1.1), bluejoint reedgrass, northern reedgrass, and prairie cordgrass have decreased. Low growing sedges, mountain rush, and cattails have increased. The abundant production and proximity to water make this plant community important for wildlife, waterfowl, and various bird species. The plant community is stable and protected from excessive erosion. The biotic integrity of this plant community is usually intact. The watershed is functioning. This plant community is well adapted to the Black Hills 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 supply. This is a sustainable plant community in terms of soil stability, watershed function, and biologic integrity.

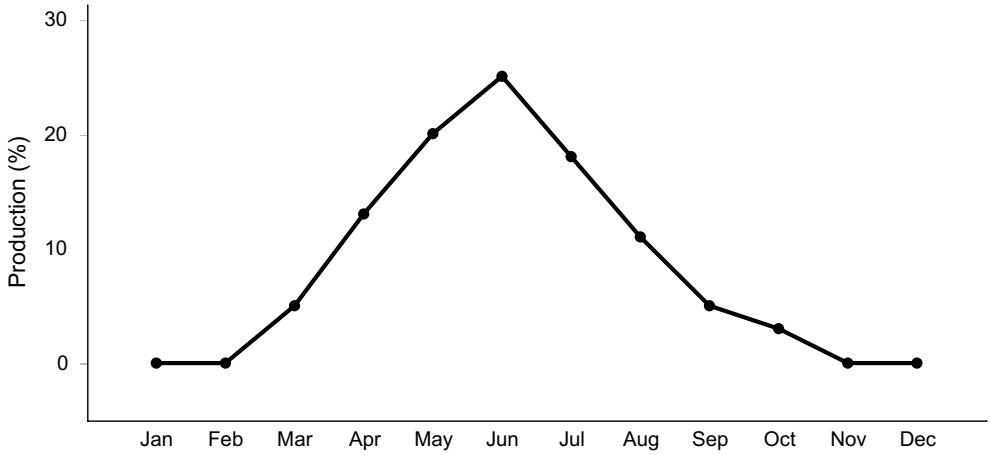

Figure 9. Plant community growth curve (percent production by month). SD6207, Black Hills, lowland cool-season dominant, warm-season sub-dominant. Lowland cool-season dominant, warm-season sub-dominant.

Pathway 1.1A
Community 1.1 to 1.2

Prescribed grazing that provides proper stocking rates, change in season of use, and adequate time for plant recovery, and a change to a wetter hydrologic system with a higher stable water table, will shift the Reference Plant Community (1.1) to the Sedges-Rushes/Aquatic Forbs/Willow Plant Community (1.2).

Conservation practices

Prescribed Grazing

Pathway 1.2A
Community 1.2 to 1.1

Prescribed grazing that provides proper stocking rates, change in season of use, and adequate time for plant recovery, and a shift to a drier hydrologic system, with a lower stable water table, will shift the Sedges-Rushes/Aquatic Forbs/Willow Plant Community (1.2) to the Nebraska Sedge/Bluejoint Reedgrass-Prairie Cordgrass/Willow Plant Community. (1.1).

Conservation practices

Prescribed Grazing

State 2
Native/Invaded State

The Native/Invaded State is dominated by native and non-native cool-season grasses and grass-likes. The non-native cool-season grasses, primarily Kentucky bluegrass, make up

15 to 20 percent of the total annual production. The Native/Invaded State is the result of heavy grazing, or heavy disturbance which can create soil compaction and sedimentation. Typically, the stable water table has drained or lowered significantly, and the plant community is shifting towards a more mesic community with upland grasses and forbs. Prairie cordgrass, wheatgrass and possibly timothy have increased and replaced the reference plant communities. Canada thistle and other weedy forbs are often present. The shrub component is declining due to the loss of stable water table, heavy disturbance, and insects and disease. The Native/Invaded State (2.0) is very resilient and resistant to change.

Dominant plant species

- prairie cordgrass (*Spartina pectinata*), grass
- Kentucky bluegrass (*Poa pratensis*), grass
- Canada thistle (*Cirsium arvense*), other herbaceous
- Forb, introduced (*Forb, introduced*), other herbaceous

Community 2.1
Prairie Cordgrass-Kentucky Bluegrass/Canada Thistle

This plant community developed with heavy grazing, or heavy disturbance and sedimentation. Kentucky bluegrass, possible timothy and red clover have invaded the site, displacing many of the native grasses and grass-like species. Canada thistle and other weedy forbs are common. The shrub component is in decline. When compared to the Nebraska Sedge/Bluejoint Reedgrass-Prairie Cordgrass/Willow Plant Community (1.1), Nebraska sedge and bluejoint reedgrass have decreased but may continue to persist. Prairie cordgrass will likely increase, as will non-native cool-season grasses, and weedy forbs. The plant community is stable. The biotic integrity of this plant community is declining. The watershed is usually functioning but is susceptible to erosion during high water events.

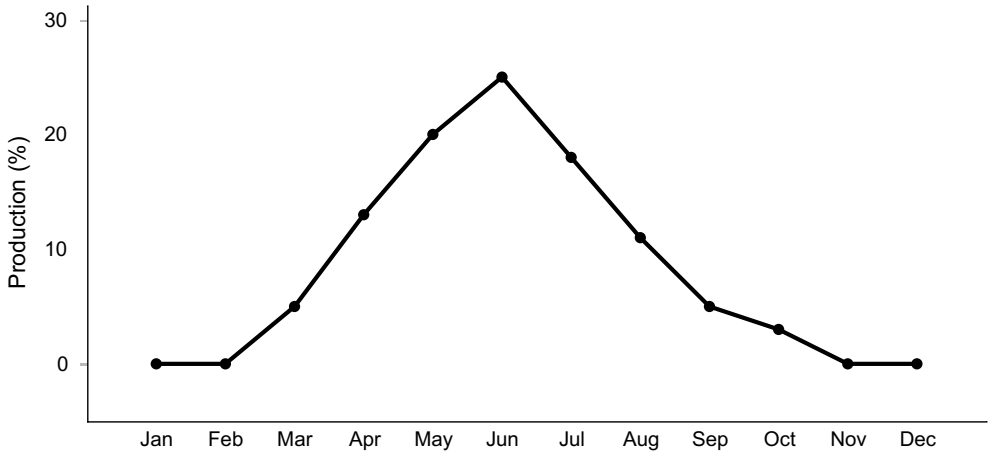

Figure 10. Plant community growth curve (percent production by month). SD6207, Black Hills, lowland cool-season dominant, warm-season sub-dominant. Lowland cool-season dominant, warm-season sub-dominant.

Transition T1A
State 1 to 2

Invasion of non-native cool-season grasses and weedy forbs; heavy grazing with no opportunity for plant recovery; heavy disturbance from livestock or recreation use; and/or a drained or significantly depleted stable water table will transition the Reference State (1.0) to the Native/Invaded State (2.0).

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Tall Warm-Season Grasses**			308–1541	
	prairie cordgrass	SPPE	*Spartina pectinata*	308–1541	–
2	**Cool-Season Grasses**			925–2158	
	bluejoint	CACA4	*Calamagrostis canadensis*	616–1541	–
	northern reedgrass	CASTI3	*Calamagrostis stricta ssp. inexpansa*	308–925	–
	reed canarygrass	PHAR3	*Phalaris arundinacea*	62–616	–
	plains bluegrass	POAR3	*Poa arida*	62–616	–
	inland bluegrass	PONEI2	*Poa nemoralis ssp. interior*	62–616	–
	fowl bluegrass	POPA2	*Poa palustris*	62–616	–
3	**Other Native Grasses**			308–616	
	marsh muhly	MURA	*Muhlenbergia racemosa*	123–308	–
	fowl mannagrass	GLST	*Glyceria striata*	62–308	–
	Grass, perennial	2GP	*Grass, perennial*	0–308	–
	western wheatgrass	PASM	*Pascopyrum smithii*	62–123	–
	American sloughgrass	BESY	*Beckmannia syzigachne*	0–123	–
4	**Grass-Likes**			1233–2774	
	Nebraska sedge	CANE2	*Carex nebrascensis*	616–1849	–
	beaked sedge	CARO6	*Carex rostrata*	123–925	–
	Northwest Territory sedge	CAUT	*Carex utriculata*	62–616	–

	spikerush	ELEOC	*Eleocharis*	123–616	–
	water sedge	CAAQ	*Carex aquatilis*	0–616	–
	rush	JUNCU	*Juncus*	0–308	–
	wheat sedge	CAAT2	*Carex atherodes*	62–308	–
	bulrush	SCHOE6	*Schoenoplectus*	62–308	–
	Hood's sedge	CAHO5	*Carex hoodii*	0–308	–
	inland sedge	CAIN11	*Carex interior*	0–308	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	0–123	–
5	**Non-Native Cool-Season Grasses**			–	
Forb					
6	**Forbs**			308–925	
	cinquefoil	POTEN	*Potentilla*	62–308	–
	Forb, native	2FN	*Forb, native*	0–308	–
	white prairie aster	SYFA	*Symphyotrichum falcatum*	0–185	–
	wild mint	MEAR4	*Mentha arvensis*	62–185	–
	Pennsylvania smartweed	POPE2	*Polygonum pensylvanicum*	0–123	–
	plantain	PLANT	*Plantago*	0–123	–
	Rocky Mountain iris	IRMI	*Iris missouriensis*	62–123	–
	scouringrush horsetail	EQHY	*Equisetum hyemale*	0–123	–
	swamp milkweed	ASIN	*Asclepias incarnata*	0–123	–
	swamp smartweed	POHY2	*Polygonum hydropiperoides*	0–123	–
	water hemlock	CICUT	*Cicuta*	0–123	–
	American licorice	GLLE3	*Glycyrrhiza lepidota*	0–123	–
	broadleaf cattail	TYLA	*Typha latifolia*	62–123	–
	smooth horsetail	EQLA	*Equisetum laevigatum*	0–123	–
	duckweed	LEMNA	*Lemna*	0–123	–
	white water crowfoot	RAAQ	*Ranunculus aquatilis*	0–62	–
	goldenrod	SOLID	*Solidago*	0–62	–
	poison hemlock	COMA2	*Conium maculatum*	0–62	–
Shrub/Vine					

7	**Shrubs**			123–925	
	Bebb willow	SABE2	*Salix bebbiana*	62–616	–
	redosier dogwood	COSE16	*Cornus sericea*	62–308	–
	sageleaf willow	SACA4	*Salix candida*	62–308	–
	sandbar willow	SAIN3	*Salix interior*	0–308	–
	shrubby cinquefoil	DAFRF	*Dasiphora fruticosa ssp. floribunda*	62–123	–
	water birch	BEOC2	*Betula occidentalis*	0–123	–
	diamondleaf willow	SAPL2	*Salix planifolia*	0–123	–
	dwarf birch	BENA	*Betula nana*	0–62	–
	yellow willow	SALU2	*Salix lutea*	0–62	–
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–62	–
	autumn willow	SASE2	*Salix serissima*	0–62	–
Tree					
8	**Trees**			0–62	
	peachleaf willow	SAAM2	*Salix amygdaloides*	0–62	–
	quaking aspen	POTR5	*Populus tremuloides*	0–62	–
	Tree	2TREE	*Tree*	0–62	–

Animal community

Wildlife Interpretations
The Black Hills and Bear Lodge Mountains of South Dakota and Wyoming are truly a forested island in a grassland sea. To regional Native Americans, they are ‘Paha Sapa” or “hills that are black”, and from a distance, the ponderosa pine-covered slopes do appear like black hills (Larson, 1999).

The Black Hills and Bear Lodge Mountains are located in the drier areas of a northern mixed-grass prairie ecosystem in which sagebrush steppes to the west yield to grassland steppes to the east. Prior to European settlement, MLRA 62 consisted of diverse grassland, shrubland, and forest habitats interspersed with varying densities of depressional, instream wetlands and woody riparian corridors. These habitats provided critical life cycle components for many users. Many species of grassland birds, small mammals, reptiles, and amphibians and herds of roaming bison, elk, and pronghorn were among the inhabitants adapted to this semi-arid region. Roaming herbivores, as well as several species of small mammals and insects, were the primary consumers linking the grassland resources to large predators, such as the wolf, mountain lion, and grizzly bear, and to smaller carnivores, such as the coyote, bobcat, fox, and raptors.

Beaver inhabited surface waters associated with instream wetlands and woody riparian

corridors along streams and drainages. Beaver occupation served as a mechanism to maintain water tables along flood plains and valley floors. During pre-European times, the extent of the wet land sites was likely much more wide-spread and persistent during dry periods, however excessive trapping and removal since that time has changed the hydrology and limited the extent of these sites while drying former mesic areas throughout the MLRA.

Grazing Interpretations
Production and accessibility of plant communities described in the Subirrigated ecological site can be highly variable, a complete resource inventory is necessary to document plant composition and production. Accurate estimates of carrying capacity should be calculated using vegetative clipping data, animal preference data, and actual stocking records.

Initial suggested stocking rates should be calculated using a base of 912 lb/acre (air-dry weight) per animal-unit-month (AUM). Use a 25 percent harvest efficiency of preferred and desirable forage species (refer to USDA-NRCS National Range and Pasture Handbook). An AUM is defined as the equivalent amount of forage required by a 1,000-pound cow with or without calf, for one month.

Grazing by domestic livestock is one of the major income-producing industries in the area. Rangeland in this area may provide yearlong forage for livestock. During the dormant period, the forage for livestock likely has insufficient protein to meet livestock requirements. Added protein allows ruminants to better utilize the energy stored in grazed plant materials. A forage quality test should be used to determine the level of supplementation needed.

Hydrological functions

This site is dominated by soils in hydrologic groups C and D. Infiltration and runoff potential for this site varies from low to negligible. Refer to the USDA-NRCS National Engineering Handbook, Part 630, for hydrologic soil groups, runoff quantities, and hydrologic curves.

Recreational uses

This site provides opportunities for hiking, hunting upland game species and waterfowl, bird watching, and photography. The wide variety of plants that bloom from spring until fall have aesthetic value that appeals to visitors.

Wood products

No appreciable wood products are typically present on this site.

Other products

Harvesting the seeds of native plants can provide additional income on this site.

Other information

Revision Notes: Provisional
This provisional ecological site description (ESD) has passed quality control (QC) and quality assurance (QA) to ensure the it meets the 2014 NESH standards for a provisional ecological site description. This site should not be considered an Approved ESD, as it is only the foundational site concepts and requires further data collection, site investigations, and final State-and-Transition Model (STM) reviews before it can be used as an Approved ESD meeting NESH standards.

Site Development and Testing Plan
Future work, as described in an official project plan, is necessary to validate the information in this provisional ecological site description. The plan will include field activities for low-, medium-, and high-intensity sampling, soil correlations, and analysis of the data. Annual field reviews should be done by soil scientists and vegetation specialists. Final field review, peer review, quality control, and quality assurance reviews are required 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: Stan Boltz, range management specialist (RMS), NRCS; Dan Brady, soil scientist (SS), NRCS; Mitch Faulkner, RMS, NRCS; Rick Peterson, (RMS), NRCS; Mathew Scott, RMS, USFS; and Jim Westerman, (SS), NRCS. All inventory information and data records are compiled within the Rapid City, SD USDA-NRCS Shared “S” network drive.

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Acknowledgments

This ecological site description developed by Rick L. Peterson on April 1, 2021.

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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)	
Contact for lead author	
Date	03/14/2026
Approved by	Suzanne Mayne-Kinney
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

   _____

2. **Presence of water flow patterns:**

   _____

3. **Number and height of erosional pedestals or terracettes:**

   _____

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

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5. **Number of gullies and erosion associated with gullies:**

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6. **Extent of wind scoured, blowouts and/or depositional areas:**

---

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

---

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

---

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

---

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

---

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

---

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:

    Sub-dominant:

    Other:

Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

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

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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:**

17. **Perennial plant reproductive capability:**