

Ecological site R063BY019SD

Closed Depression

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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): 063B–Southern Rolling Pierre Shale Plains

MLRA Notes: The Southern Rolling Pierre Shale Plains (MLRA 63B) is approximately 4,460 square miles in size. The majority of the MLRA is located in South Dakota (82 percent), and the remaining 18 percent is located in Nebraska. Interstate 90 crosses the northern portion through Chamberlin, SD. There are several Indian Reservations, including the Lower Brule, Crow Creek, Santee, and Yankton Reservations. This MLRA is an area of old plateaus and terraces that have been deeply eroded, with nearly level to rolling long slopes and well-defined dendritic drainage systems. The rivers and creek valleys have smooth floors and steep walls. The majority of the MLRA is located in the unglaciated section of the Missouri Plateau, Great Plains Province. The northeast corner of the MLRA, east of the Missouri River, is located in the glaciated section with higher areas having deposits of glacial drift. The southwestern tip is located in the High Plains Section. Elevations range from 1,310 feet to 1,640 feet on the bottom lands along the Missouri River, and from 1,310 feet to 1,970 feet on the shale plains uplands. The Missouri and Niobrara Rivers, and the confluence of the White and Missouri Rivers, occur within this MLRA. Lake Francis Case, Fort Randall Dam, and Lewis and Clark Lake are also within the borders of MLRA 63B. Cretaceous Pierre Shale underlies most of the area. This is a marine sediment with layers of volcanic ash that has been altered to smectitic clays. These clays shrink as they dry and swell as they become wet, causing significant problems for road and structural foundations. Younger Niobrara chalk occurs in the southern part of the MLRA. Alluvial sand and gravel underlie the valley floors along major streams. Soils are shallow to very deep, generally well drained, and with loamy or clayey textures. Annual precipitation is 19 to 26 inches, mostly falling during the growing season, as frontal storms during the spring and convective thunderstorms in summer. The average annual temperature is 45°-50°F. The freeze-free period averages 165 days, and ranges from 145 to 185 days. Vegetation is a transition between tall prairie grasses and mixed prairie grasses. Western wheatgrass, green needlegrass, porcupinegrass, and big bluestem are the major species. Little bluestem, buffalograss, sideoats grama, and sedges are dominant on the shallow soils. Buffaloberry, skunkbush sumac, and prairie rose are common on steep slopes along the major streams. Prairie cottonwood and a variety of willow species are common on flood plains along the major streams. Green ash, boxelder, chokecherry, bur oak, and buffaloberry occur in draws and narrow valleys. Encroachment of Rocky Mountain juniper and eastern redcedar on to the river breaks is becoming a concern. The majority of the land is utilized for ranching (60 percent) and farming (27 percent). Major resource concerns for the area are wind erosion, water erosion, maintenance of the content of organic matter and soil productivity, and management of soil moisture.

Classification relationships

USDA - Land Resource Region G – Western Great Plains Range and Irrigated Region, Major Land Resource Area (MLRA) 63B – Southern Rolling Pierre Shale Plains (USDA-NRCS, Ag Handbook 296). EPA - Level IV Ecoregions of the Conterminous United States: Northwestern Glaciated Plains - 42f – Southern Missouri Coteau Slopes, 42g – Ponca Plains, 42h – Southern River Breaks, 42p – Holt Tablelands North Western Great Plains - 43C – River Breaks, 43f – Subhumid Pierre Shale Plains, 43r – Niobrara River Breaks.

Ecological site concept

The Closed Depression ecological site occurs throughout MLRA 63B. It is located on level or nearly level upland landscapes with slopes ranging from 0 to 1 percent. The site is a poorly drained upland depression that will pond water from 15 to 60 days in the spring and after heavy rain events. Soils are formed from clayey alluvium. The texture of the surface layer is silty loam to clay. The high clay content of the subsurface soil layers are restrictive to water movement and root penetration. Depending on climatic cycles, the vegetation can range from nearly pure stands of rhizomatous wheatgrass in dry years to rushes, sedges, and smartweed during wet years. Some, but not all, Hoven soils will have a Btn horizon that is high in sodium. This soil may have plant communities where inland saltgrass makes up a significant portion of the total annual production.

Associated sites

R063BY010SD	Loamy The Loamy site can be found on the higher landscape positions adjacent to or surrounding the Closed Depression site.
R063BY011SD	Clayey The Clayey site can be found on the higher landscape positions adjacent to or surrounding the Closed Depression site.

Similar sites

R063BY021SD	Clayey Overflow The Clayey Overflow site will have more plant diversity, tall warm-season grasses like big bluestem, more green needlegrass, and shrub species.
R063BY013SD	Claypan The Claypan site will typically not occur in a concave depression, will not pond water for any length of time, will have more shortgrass species, and lower forage production than the 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 occurs on concave to nearly level depressions on uplands.

Table 2. Representative physiographic features

Landforms	(1) Depression
Flooding frequency	None
Ponding duration	Long (7 to 30 days)
Ponding frequency	Occasional to frequent
Elevation	400 – 610 m

Slope	0 %
Ponding depth	0 – 30 cm
Water table depth	0 – 200 cm
Aspect	Aspect is not a significant factor

Climatic features

MLRA 63B is considered to have a continental climate: cold winters and hot summers, low humidity, light rainfall, and ample sunshine. Extremes in temperature may also abound. The climate is the result of the location of MLRA 63B 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 typically ranges from 18 to 25 inches per year. The average annual temperature is about 48°F. January is the coldest month with average temperatures ranging from about 15°F (Stephan, SD), to about 22°F (Winner, SD). July is the warmest month with temperatures averaging from about 73°F (Stephan, SD), to about 76°F (Winner, SD). The range of normal average monthly temperatures between the coldest and warmest months is about 56°F. This large annual range attests to the continental nature of the climate of this area. Hourly winds are estimated to average about 11 miles per hour (mph) annually, ranging from about 13 mph during the spring to about 10 mph 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 mph. 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 (characteristic range)	110-120 days
Freeze-free period (characteristic range)	130-150 days
Precipitation total (characteristic range)	530-610 mm
Frost-free period (actual range)	110-130 days
Freeze-free period (actual range)	130-160 days
Precipitation total (actual range)	510-640 mm
Frost-free period (average)	120 days
Freeze-free period (average)	140 days
Precipitation total (average)	580 mm

- (2) LYNCH [USC00255040], Lynch, NE
- (3) WINNER [USC00399367], Winner, SD
- (4) NIOBRARA [USC00255960], Niobrara, NE
- (5) GANN VALLEY 4NW [USC00393217], Gann Valley, SD
- (6) STEPHAN 2 NW [USC00397992], Highmore, SD
- (7) WOOD [USC00399442], Wood, SD

Influencing water features

This site is occasionally to frequently flooded, in the spring to the late summer months. Annual ponding lasts between 15 and 60 days.

Wetland description

Palustrine System; Emergent Wetland Class (Cowardin System).

Soil features

The common features of soils in this site are the silty loam to clay-textured surface layer, and slopes ranging from 0 to 1 percent. The soils in this site are poorly drained and formed in alluvium. The surface layer is 2 to 9 inches thick. Subsoil textures consist of clay and clay loam. The subsurface soil layers are restrictive to water movement and root penetration and have a very slow infiltration rate. Available water capacity is 4 to 6 inches. Soils will tend to crack when dry, and when they are wet, heavy traffic can cause surface compaction.

Major soils correlated to the Closed Depression site include Hoven, Kolls, Plankinton, and Scott.

The Hoven soil will exhibit an extremely hard clayey Btn horizon that has a round-topped columnar structure. The Btn horizon is high in sodium.

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.

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 – clayey shale (2) Residuum – clayey shale
Surface texture	(1) Silt loam (2) Clay (3) Silty clay
Family particle size	(1) Clayey
Drainage class	Poorly drained
Permeability class	Very slow
Soil depth	200 cm

Available water capacity (0-101.6cm)	2.54 – 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)	5.6 – 10
Subsurface fragment volume <=3" (Depth not specified)	0 – 10 %

Ecological dynamics

This site developed under Northern Great Plains climatic conditions, natural influences of large herbivores, occasional fire, and other biotic and abiotic factors that typically influence soil/site development. Changes will occur in the plant communities due to short-term weather variations, impacts of native and/or exotic plant and animal species, and management actions. While the following plant community descriptions specify more typical transitions between communities that will occur, severe disturbances, such as periods of well-below average precipitation, and the introduction of non-native cool-season grasses, can cause significant shifts in plant communities and/or species composition.

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 two plant communities phases are influenced strongly by precipitation alone (Western Wheatgrass and Grass-likes, Forbs) make up the natural fluctuation of what could be considered the Reference Plant Community (1.1).

Interpretations are primarily based on the Western Wheatgrass/Grass-Likes/Forbs Plant Community (1.1). These 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 used. Plant communities, states, transitional pathways, and thresholds have been determined through similar studies and experience.

The Reference State may be difficult to locate in this MLRA with the introduction of non-native cool-season grasses. Plant Community Phase

2.1 is most similar to the Reference Plant Community, but a restoration pathway to the Reference State is not believed to be achievable because of the persistence of non-native cool-season grasses.

The following is a diagram that illustrates the common plant community phases that can occur on the site and the transition pathways between communities. These are the most common plant community phases based on current knowledge and experience, and changes may be made as more data is collected. Narratives following the diagram contain more detail pertaining to the ecological processes.

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	–
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	0-196	–
2	Cool-Season Bunchgrasses			196-1569	
	foxtail barley	HOJU	<i>Hordeum jubatum</i>	78-1373	–
	Nuttall's alkaligrass	PUNU2	<i>Puccinellia nuttalliana</i>	78-588	–
3	Short Warm-Season Grasses			1-392	
	saltgrass	DISP	<i>Distichlis spicata</i>	0-392	–
	buffalograss	BODA2	<i>Bouteloua dactyloides</i>	0-196	–
4	Other Native Grasses			78-392	
	Graminoid (grass or grass-like)	2GRAM	<i>Graminoid (grass or grass-like)</i>	0-392	–
	plains bluegrass	POAR3	<i>Poa arida</i>	39-196	–
	fowl bluegrass	POPA2	<i>Poa palustris</i>	39-196	–
5	Grass-likes			392-1765	
	common spikerush	ELPA3	<i>Eleocharis palustris</i>	196-1569	–
	needle spikerush	ELAC	<i>Eleocharis acicularis</i>	39-588	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0-392	–
	sedge	CAREX	<i>Carex</i>	78-392	–
	rush	JUNCU	<i>Juncus</i>	0-196	–
Forb					
6	Forbs			196-2354	
	Forb, native	2FN	<i>Forb, native</i>	0-785	–
	curlytop knotweed	POLA4	<i>Polygonum lapathifolium</i>	0-588	–
	Pennsylvania smartweed	POPE2	<i>Polygonum pensylvanicum</i>	0-588	–
	pale dock	RUAL4	<i>Rumex altissimus</i>	0-588	–
	western dock	RUAQ	<i>Rumex aquaticus</i>	0-392	–
	Pursh seepweed	SUCA2	<i>Suaeda calceoliformis</i>	0-392	–
	New England aster	SYNO2	<i>Symphotrichum novae-angliae</i>	0-392	–
	lambquarters	CHAL7	<i>Chenopodium album</i>	0-392	–
	mealy goosefoot	CHIN2	<i>Chenopodium incanum</i>	0-196	–
	golden tickseed	COTI3	<i>Coreopsis tinctoria</i>	0-196	–
	Indianhemp	APCA	<i>Apocynum cannabinum</i>	0-196	–
	American licorice	GLLE3	<i>Glycyrrhiza lepidota</i>	0-196	–
	povertyweed	IVAX	<i>Iva axillaris</i>	0-196	–
	bushy knotweed	PORA3	<i>Polygonum ramosissimum</i>	0-196	–
	cinquefoil	POTEN	<i>Potentilla</i>	0-196	–
	plantain	PLANT	<i>Plantago</i>	0-196	–
	mint	MENTH	<i>Mentha</i>	0-196	–
	evening primrose	OENOT	<i>Oenothera</i>	0-196	–

	creeping woodsorrel	OXCO	<i>Oxalis corniculata</i>	0-118	–
	tall fringed bluebells	MECI3	<i>Mertensia ciliata</i>	0-118	–
	smooth horsetail	EQLA	<i>Equisetum laevigatum</i>	0-118	–

Table 6. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1	Wheatgrasses			370-1480	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	370-1480	–
2	Cool-Season Bunchgrasses			123-493	
	foxtail barley	HOJU	<i>Hordeum jubatum</i>	74-370	–
	Nuttall's alkaligrass	PUNU2	<i>Puccinellia nuttalliana</i>	25-247	–
3	Short Warm-Season Grasses			0-493	
	saltgrass	DISP	<i>Distichlis spicata</i>	0-493	–
	buffalograss	BODA2	<i>Bouteloua dactyloides</i>	0-74	–
4	Other Native Grasses			0-123	
	Graminoid (grass or grass-like)	2GRAM	<i>Graminoid (grass or grass-like)</i>	0-123	–
	plains bluegrass	POAR3	<i>Poa arida</i>	0-74	–
	fowl bluegrass	POPA2	<i>Poa palustris</i>	0-74	–
5	Grass-likes			123-616	
	common spikerush	ELPA3	<i>Eleocharis palustris</i>	49-370	–
	sedge	CAREX	<i>Carex</i>	0-197	–
	needle spikerush	ELAC	<i>Eleocharis acicularis</i>	0-123	–
	rush	JUNCU	<i>Juncus</i>	0-123	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0-123	–
6	Non-Native Grasses			123-370	
	bluegrass	POA	<i>Poa</i>	123-370	–
	cheatgrass	BRTE	<i>Bromus tectorum</i>	25-123	–
Forb					
7	Forbs			123-863	
	lambquarters	CHAL7	<i>Chenopodium album</i>	0-247	–
	Forb, introduced	2FI	<i>Forb, introduced</i>	0-247	–
	curlytop knotweed	POLA4	<i>Polygonum lapathifolium</i>	0-247	–
	Pennsylvania smartweed	POPE2	<i>Polygonum pensylvanicum</i>	0-247	–
	bushy knotweed	PORA3	<i>Polygonum ramosissimum</i>	0-123	–
	creeping woodsorrel	OXCO	<i>Oxalis corniculata</i>	0-123	–
	plantain	PLANT	<i>Plantago</i>	0-123	–
	Forb, native	2FN	<i>Forb, native</i>	0-123	–
	povertyweed	IVAX	<i>Iva axillaris</i>	0-123	–
	cocklebur	XANTH2	<i>Xanthium</i>	0-123	–
	Pursh seepweed	SUCA2	<i>Suaeda calceoliformis</i>	0-123	–
	New England aster	SYNO2	<i>Symphyotrichum novae-angliae</i>	0-74	–
	evening primrose	OENOT	<i>Oenothera</i>	0-74	–
	Indianhemp	APCA	<i>Apocynum cannabinum</i>	0-74	–
	mealy goosefoot	CHIN2	<i>Chenopodium incanum</i>	0-74	–
	smooth horsetail	EQLA	<i>Equisetum laevigatum</i>	0-74	–

	American licorice	GLLE3	<i>Glycyrrhiza lepidota</i>	0-74	–
	curlycup gumweed	GRSQ	<i>Grindelia squarrosa</i>	0-74	–
	pale dock	RUAL4	<i>Rumex altissimus</i>	0-74	–
	western dock	RUAQ	<i>Rumex aquaticus</i>	0-74	–
	curly dock	RUCR	<i>Rumex crispus</i>	0-74	–
	cinquefoil	POTEN	<i>Potentilla</i>	0-25	–

Table 7. Community 3.1 plant community composition

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

Table 8. Community 3.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 9. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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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). Therefore, 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. The following suggested initial stocking rates are based on 912 lbs./acre (air-dry weight) per Animal Unit Month (AUM), and a 25 percent harvest efficiency of preferred and desirable forage species (refer to USDA NRCS, National Range and Pasture Handbook). Plant Community: Wheatgrass/Grass-Likes/Forbs (1.1) Average Annual Production (lbs./acre, air-dry): 3500 Stocking Rate (AUM/acre): 0.96 Plant Community: Western Wheatgrass-Bluegrass/Grass-Likes/Forbs (2.1) Average Annual Production (lbs./acre, air-dry): 2200 Stocking Rate (AUM/acre): 0.60 Plant Community: Foxtail Barley-Bluegrass (> 30%) (3.1) Average Annual Production (lbs./acre, air-dry): 1200 Stocking Rate (AUM/acre): 0.33 Total annual production on-site may contain vegetation deemed undesirable or untargeted by the grazing animal. Therefore, AUM values may have been reduced to reflect only preferred or desirable forage species. 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 slow and runoff potential for this site is high. In many cases, areas with greater than 75 percent ground cover have the greatest potential for higher infiltration and lower runoff. An example of an exception would be an area where shortgrasses form a strong sod and dominate the site. Dominance by inland saltgrass 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, 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 requirements as an "Approved" ESD as laid out in the 1997, rev.1, 2003 National Range and Pasture Handbook (NRPH). The document fully described 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 toward an "Approved" status. Site Development and Testing Plan: Future work, as described in a Project Plan, is necessary to validate the information in this Provisional Ecological Site Description. 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. The final field review, peer review, quality control, and quality assurance reviews of the ESD will be required to produce the final document. Non-discrimination Statement In accordance with Federal civil rights law and U.S. Department of Agriculture

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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; and Dana Larsen, RMS, NRCS.

Other references

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Approval

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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.

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Date	02/20/2009
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. Number and extent of rills: None.

2. Presence of water flow patterns: None.

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

4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground): 0 to 10 percent is typical during normal precipitation cycles. Considerably higher amounts can occasionally occur after flooding/drying cycles, up to 50%.

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. Little movement occurs.

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 can range widely. Readings of 2-3 are not uncommon, but can range up to 5-6. Surface organic matter adheres to the soil surface, but due to the inherent content of soluble salts in these soils, flocculation can readily occur. Soil surface fragments can dissolve quickly 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 4 to 16 inches thick with dark gray colors when moist. Structure typically is thin platy to subangular blocky in the A-horizon.

10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: Infiltration is greatly reduced on this site due to the nature of the soils. Plant composition changes have little effect. Default rating of none to slight is acceptable.

11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site): A-horizon naturally has some platy structure. Compaction layers, if formed by management, do not typically persist. Compaction will be difficult to determine. Evidence of compaction can be confirmed by signs of recent concentration of livestock.

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: Wheatgrasses (mid, cool-season) > mid, cool-season bunchgrasses > grass-like species >

Sub-dominant: Forbs >

Other: Short, warm-season grasses > short, cool-season bunchgrasses

Additional:

13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence): Very little evidence of decadence or mortality. Bunch grasses have strong, healthy centers and shrubs are vigorous.

14. Average percent litter cover (%) and depth (in): Litter cover can range widely, from 20 to 70 percent.

15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production): Total annual production ranges from 2,000 to 4,500 pounds/acre, with the reference value being 3,500 pounds/acre (air-dry basis).

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.
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17. Perennial plant reproductive capability: Perennial grasses should have vigorous rhizomes or tillers.
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