USDA Natural Resources Conservation Service

Ecological site R058DY007SD
Saline Lowland

Last updated: 7/18/2024
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General information

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

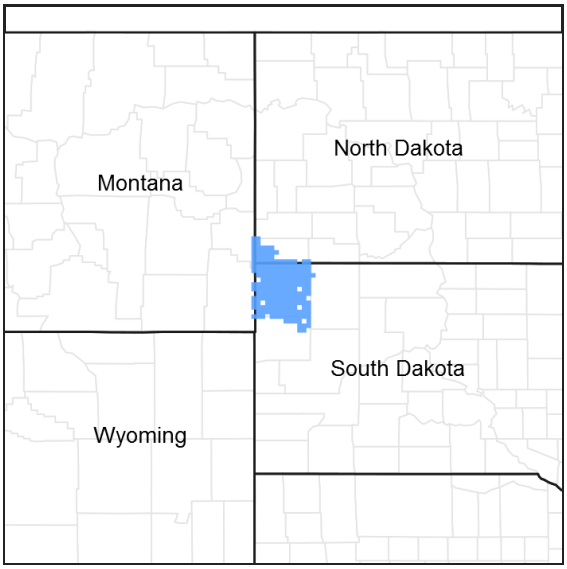

Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

MLRA notes

Major Land Resource Area (MLRA): 058D–Northern Rolling High Plains, Eastern Part

The Northern Rolling High Plains, Eastern Part (MLRA 58D) is shared between South Dakota (65 percent), Montana (21 percent), and North Dakota (14 percent). The MLRA is approximately 2,755 square miles. The small towns of Buffalo and Camp Crook, South Dakota, and Marmarth, North Dakota, are all within the boundary of this MLRA, and Baker, Montana, is on the northern most edge. Portions of the Little Missouri National Grassland and Custer National Forest are also in the MLRA. Portions of the Little Missouri River and the headwaters of major tributaries that eventually form the Grand and Moreau Rivers in South Dakota are also in this area.

The Northern Rolling High Plains, Eastern Part consists of Cretaceous marine and continental sediments of shale, siltstone, and sandstone. The continental and marine Hell Creek Formation is under approximately 85 percent of the MLRA, and the Fox Hills Sandstone forms the southern boundary of the MLRA. Tertiary deposits are in scattered areas throughout the MLRA. These deposits consist of the Paleocene Ludlow and Tongue River Formations, the Oligocene White River Group, and the Miocene Arikaree Group. These Tertiary deposits are resistant and positioned above the Cretaceous beds. Ponderosa pine growing in areas of these Tertiary formations further distinguishes these formations from the other formations in the MLRA. Pleistocene and Holocene river sand and gravel deposits are also on the valley floors and on the terraces along the larger rivers in the area. A large Quaternary eolian deposit is directly south of the town of Buffalo.

The average elevation of MLRA 58D ranges from 2,300 feet to 4,000 feet, increasing gradually from east to west. Harding Peak is the highest point at 4,019 feet. In places, flat-topped, steep-sided buttes rise sharply above the gently rolling plains below.

The dominant soil orders in this MLRA are Alfisols, Entisols, Inceptisols, and Mollisols. The soils in the area dominantly have a frigid soil temperature regime, an ustic soil moisture regime that borders on aridic, and mixed mineralogy. They are shallow to very deep, generally well drained, and loamy or clayey.

Annual precipitation is 14 to 17 inches and can fluctuate widely from year to year. Most rainfall occurs early in the growing season. Some high-intensity thunderstorms occur mid to late summer. The native vegetation in this MLRA consists primarily of grasses and forbs with a small component of trees and shrubs along streams. Ponderosa pine grow on the upper slopes and on the top of some of the higher buttes. Open grasslands are characterized by western wheatgrass, green needlegrass, blue grama, and buffalograss. Wyoming big sagebrush grows on clayey soils in the western part of the MLRA.

More than four-fifths of the MLRA is privately owned ranches running cattle, sheep, or both. Less than 5 percent of the area is federally owned. The major resource concerns are water quality, wind erosion, and water erosion (USDA, NRCS. 2006. Ag Handbook 296).

Classification relationships

USDA
Land Resource Region G—Western Great Plains Range and Irrigated Region:
Major Land Resource Area (MLRA) 58D—Northern Rolling High Plains, Eastern Part.

US Environmental Protection Agency (EPA)
Level IV Ecoregions of the Conterminous United States:
Northwestern Great Plains—43:
Forested Buttes—43d.
Sagebrush Steppe—43e.

USDA Forest Service
Ecological Subregions: Sections and Subsections of Conterminous United States:
Great Plains - Palouse Dry Steppe Province—331:
Missouri Plateau Section—331M.
Sagebrush Steppe Subsection—334Mi.

Ecological site concept

The Saline Lowland ecological site is of limited extent in MLRA 58D. It’s a run-in site in swale and drainageways. Slopes range from 0 to 3 percent. The soils are deep (greater than 20 inches), poorly drained, and are moderately to strongly saline. The surface layer is 3 to 5 inches in depth with loam or fine sandy loam textures. A permanent water table fluctuates between 1 and 3 feet below the surface.

The vegetation in Reference State (1.0) consists of saline tolerant grasses, forbs and shrubs including western wheatgrass, Nuttall’s alkaligrass, alkali cordgrass, inland saltgrass, and saltbush.

Associated sites

R058DY004SD	**Wet Meadow** The Wet Meadow ecological site is found on similar landscape positions as the Saline Lowland but without the high soluble salt in the soil profile.
R058DY013SD	**Claypan** The Claypan ecological site is found adjacent to or intermixed with the Saline Lowland ecological site.

Similar sites

R058DY004SD	**Wet Meadow** The Wet Meadow ecological site will have more prairie cordgrass; fewer saline-tolerant plants; and more vegetative production than the Saline Lowland ecological site.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Pascopyrum smithii* (2) *Puccinellia nuttalliana*

Physiographic features

The Saline Lowland ecological site is found in nearly level or gently sloping drainages.

Table 2. Representative physiographic features

Landforms	(1) Swale (2) Flood plain (3) Drainageway
Runoff class	Low to high
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	Occasional
Ponding frequency	None
Elevation	2,300–4,000 ft
Slope	0–3%
Water table depth	24–36 in
Aspect	Aspect is not a significant factor

Climatic features

The climate in MLRA 58D is typical of the drier portions of the Northern Great Plains where sagebrush steppes to the west yield to grassland to the east. Average annual precipitation ranges from 14 to 17 inches with most falling in the early growing season. Some high intensity, convective thunderstorms occur in the summer. Precipitation in winter occurs as snow. Temperatures show a wide range between summer and winter and between daily maximums and minimums. This wide range is due to the high elevation and dry air, which permit rapid incoming and outgoing radiation. Outbreaks of cold air from Canada in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Extreme storms may occur during the winter but have the most severe effect on ranching operations during late winter and in spring.

The normal average annual temperature is about 44 °F. January is the coldest month with average temperatures ranging from about 12 °F (Marmarth, North Dakota) to about 20 °F (Baker, Montana). July is the warmest month with temperatures averaging from about 70 °F (Marmarth, North Dakota) to about 76 °F (Baker, Montana). The range of normal average monthly temperatures between the coldest and warmest months is about 55 °F. Wind speeds 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 winds. Strong storms may bring brief periods of high winds with gusts of 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. Cool-season plants may green-up in September and October if adequate soil moisture is present.

Table 3. Representative climatic features

Frost-free period (characteristic range)	97-111 days
Freeze-free period (characteristic range)	121-129 days
Precipitation total (characteristic range)	15-17 in
Frost-free period (actual range)	93-115 days
Freeze-free period (actual range)	120-132 days
Precipitation total (actual range)	14-17 in
Frost-free period (average)	104 days
Freeze-free period (average)	125 days
Precipitation total (average)	16 in

Climate stations used

- (1) BAKER 1 E [USC00240412], Baker, MT
- (2) LADNER 9SW [USC00394671], Camp Crook, SD
- (3) CAMP CROOK [USC00391294], Camp Crook, SD
- (4) BUFFALO ASOS [USW00094037], Buffalo, SD
- (5) BUFFALO 13 ESE [USW00094081], Reva, SD
- (6) REDIG 11 NE [USC00397062], Buffalo, SD
- (7) HOOVER [USC00393945], Newell, SD

Influencing water features

No significant water features influence this site.

Soil features

Soils common to the Saline Lowland ecological site have a loam or fine sandy loam textured surface layer that is 3 to 5 inches thick. Slopes range from 0 to 3 percent. Soils are deep (greater than 20 inches) and formed in alluvium. These soils are moderately to strongly saline. Higher concentrations of soluble salt are typically found in the subsoil. Subsurface layers are nonrestrictive to water movement and root penetration. They are poorly drained and have a very slow to moderately slow infiltration rate. A fluctuating water table will occur between 1 to 3 feet below the surface. The water table is within reach of plants during most of the growing season. These areas are subject to occasional overflow.

This site could show slight to moderate evidence of rills and pedestalled plants. Water flow paths are somewhat continuous, but irregular in appearance with few debris' dams or vegetative barriers.

The major soils correlated to the Saline Lowland ecological site include, Dogiecreek, Grail, Regan, and Sage.

More information can be found in the various soil survey reports. Contact the local USDA Service Center for soil survey reports that include more detail specific to your area of interest, or use the internet to access USDA's Web Soil Survey.

Table 4. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Fine sandy loam (2) Loam
Family particle size	(1) Loamy
Drainage class	Poorly drained
Permeability class	Very slow to moderately slow
Soil depth	80 in

Surface fragment cover <=3"	0–5%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	4–5 in
Calcium carbonate equivalent (0-40in)	0–25%
Electrical conductivity (0-40in)	8–32 mmhos/cm
Sodium adsorption ratio (0-40in)	0–5
Soil reaction (1:1 water) (0-40in)	5.1–9
Subsurface fragment volume <=3" (Depth not specified)	0–5%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

The Saline Lowland ecological site developed under the Northern Great Plains climatic conditions; light to severe grazing by bison and other large herbivores; 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, effects of native and exotic plant and animal species, and management actions. While the following plant community descriptions are typical of the transitions between communities, 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 species composition.

As this site deteriorates, species such as inland saltgrass and foxtail barley increase, and annual species may invade the site. Grasses such as alkali sacaton, rhizomatous wheatgrasses, and Nuttall's alkaligrass will decrease in frequency and production. The high salt content of the soils greatly influences the plant species present. Plant vigor can vary on a year-to-year basis in relation to current precipitation amounts, which influences the translocation of salts in the soil profile. Typically, only salt tolerant plants are found on this site.

The plant community upon which interpretations are primarily based is the Rhizomatous Wheatgrass-Alkaligrass Plant Community (1.1). This plant community has been determined by studying 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 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

Saline Lowland – R058DY007SD 1/5/20

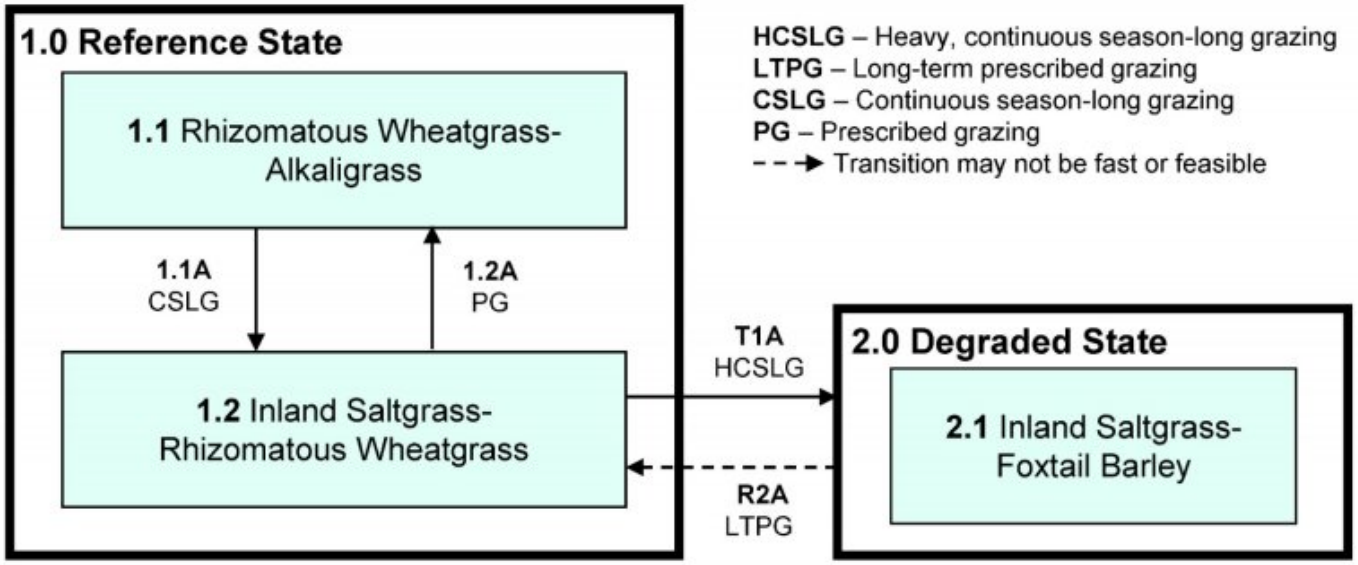

Diagram Legend: Saline Lowland - R058DY007SD

T1A	1.0 to 2.0	Heavy, continuous season-long grazing without change in season of use or adequate recovery time.
R2A	2.0 to 1.0	Long-term prescribed grazing with proper stocking rates, change in season of use, and adequate recovery periods following grazing events. Transition may not be fast or meet management objectives.
1.1A	1.1 to 1.2	Continuous, season-long grazing without change in season of use or adequate recovery time.
1.2A	1.2 to 1.1	Prescribed grazing including change in season of use, proper stocking, and adequate time for plant recovery following grazing event.

State 1
Reference State

The Reference State (1.0) represents what is believed to show the natural range of variability that dominated the dynamics of the Saline Lowland ecological site prior to European settlement. This site is dominated by a mixture of salt-tolerant warm- and cool-season grasses, forbs and shrubs. In pre-European settlement times, the primary disturbances included grazing by large ungulates and small mammals, drought, and a fluctuating water table. Favorable growing conditions occurred during the spring and the warm months of June through August. Today, a similar state can be found in areas where proper livestock use has occurred.

Dominant plant species

- greasewood (*Sarcobatus vermiculatus*), shrub
- fourwing saltbush (*Atriplex canescens*), shrub
- Gardner's saltbush (*Atriplex gardneri*), shrub
- rubber rabbitbrush (*Ericameria nauseosa*), shrub
- alkali sacaton (*Sporobolus airoides*), grass
- Nuttall's alkaligrass (*Puccinellia nuttalliana*), grass
- alkali cordgrass (*Spartina gracilis*), grass
- prairie cordgrass (*Spartina pectinata*), grass
- saltgrass (*Distichlis spicata*), grass
- thickspike wheatgrass (*Elymus lanceolatus*), grass
- plains bluegrass (*Poa arida*), grass

- foxtail barley (*Hordeum jubatum*), grass
- sedge (*Carex*), grass
- povertyweed (*Iva axillaris*), other herbaceous
- redwool plantain (*Plantago eriopoda*), other herbaceous
- seepweed (*Suaeda*), other herbaceous

Community 1.1
Rhizomatous Wheatgrass-Alkaligrass

The interpretive plant community for this site is the Rhizomatous Wheatgrass-Alkaligrass Plant Community. This is also considered to be Reference Plant Community (1.1). Potential vegetation is about 85 percent grasses or grass-like plants, 5 percent forbs, and 10 percent shrubs. Saline-tolerant grasses dominate the plant community. Major grasses include rhizomatous wheatgrasses, alkali sacaton, Nuttall's alkaligrass, alkali cordgrass and prairie cordgrass. Other grasses or grass-like species occurring on the site include inland saltgrass, thickspike wheatgrass, plains bluegrass, foxtail barley, and sedges. Significant forbs include povertyweed, alkali plantain, and seepweed. The significant shrubs that occur include black greasewood, fourwing saltbush, Gardner's saltbush, and rubber rabbitbrush. This plant community is well adapted to the Northern Great Plains climatic conditions. Individual species can vary greatly in production depending on growing conditions (timing and amount of precipitation and temperature). Community dynamics, nutrient cycle, water cycle and energy flow are functioning at the site's potential. Plant litter is properly distributed with some movement offsite and natural plant mortality is low. The diversity in plant species allows for high drought tolerance.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1260	2175	2970
Shrub/Vine	120	250	400
Forb	20	75	130
Total	**1400**	**2500**	**3500**

Figure 9. Plant community growth curve (percent production by month). SD5807, Northern Rolling High Plains, cool-season dominant, warm-season subdominant. Cool-season dominant, Warm-season subdominant, Lowland.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	13	20	25	18	11	5	3	0	0

Community 1.2
Inland Saltgrass-Rhizomatous Wheatgrass

This plant community occurs as a result of long-term continuous season-long grazing. Grasses comprise about 85 percent, forbs 5 percent, and shrubs 10 percent. Dominant grasses include inland saltgrass, western wheatgrass, foxtail barley, and thickspike wheatgrass. Other grasses and grass-like plants include Nuttall's alkaligrass, alkali sacaton, alkali cordgrass, prairie cordgrass, and sedge. Forbs include povertyweed, alkali plantain, seepweed and saltwort, while non-native forbs such as cocklebur may invade. When compared to the Rhizomatous Wheatgrass-Alkaligrass Plant Community, saltgrass has increased, while Nuttall's alkaligrass, alkali sacaton, and alkaligrass and prairie cordgrass have been greatly diminished.

Table 6. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	950	1360	1870
Shrub/Vine	75	120	165
Forb	75	120	165
Total	**1100**	**1600**	**2200**

Figure 11. Plant community growth curve (percent production by month). SD5808, Northern Rolling High Plains, lowland cool-season/warm-season codominant. Cool-season, Warm-season codominant, Lowland.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	4	11	19	23	20	12	6	5	0	0

Pathway 1.1A
Community 1.1 to 1.2

Continuous season-long grazing without change in season of use, or adequate recovery periods between grazing events will shift the Rhizomatous Wheatgrass-Alkaligrass Plant Community (1.1) to the Inland Saltgrass-Rhizomatous Wheatgrass Plant Community (1.2).

Pathway 1.2A
Community 1.2 to 1.1

Prescribed grazing including proper stocking rates, change in season of use, and adequate time for recovery following grazing event will shift the Inland Saltgrass-Rhizomatous Wheatgrass Plant Community (1.2) to the Rhizomatous Wheatgrass-Alkaligrass Plant Community (1.1).

Conservation practices

Prescribed Grazing

State 2
Degraded State

Heavy, long-term animal impacts have altered soil site stability, hydrologic function, and the biotic integrity of the site. Salt accumulation near or at the soil surface has reduced the vigor of many of the species present in the Reference State (1.0). This State is resistant to change, and a restoration pathway may not be feasible.

Dominant plant species

- saltgrass (*Distichlis spicata*), grass
- foxtail barley (*Hordeum jubatum*), grass
- mat muhly (*Muhlenbergia richardsonis*), grass
- scratchgrass (*Muhlenbergia asperifolia*), grass
- western wheatgrass (*Pascopyrum smithii*), grass
- sedge (*Carex*), grass
- seepweed (*Suaeda*), other herbaceous
- red swampfire (*Salicornia rubra*), other herbaceous
- povertyweed (*Iva axillaris*), other herbaceous

Community 2.1
Inland Saltgrass-Foxtail Barley

This plant community is the result of heavy continuous season-long grazing over a long period of time. Inland saltgrass and foxtail barley dominate this plant community. Other grasses and grass-likes that occur include mat muhly, alkali muhly, western wheatgrass, and sedges. Forbs common in this plant community are seepweed, red saltwort, and povertyweed. Bare ground has increased, and production has decreased. The soils of this plant community are not well protected. The biotic integrity is compromised by introduced species, loss of the dominant climax species, and bare ground. Excessive runoff may occur.

Table 7. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	650	962	1370
Forb	50	110	170
Shrub/Vine	0	28	60
Total	**700**	**1100**	**1600**

Figure 13. Plant community growth curve (percent production by month). SD5809, Northern Rolling High Plains, warm-season dominant, cool-season subdominant. Warm-season dominant, cool-season subdominant, lowland..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	10	16	22	23	14	7	5	0	0

Transition T1A
State 1 to 2

Heavy, continuous season-long grazing without adequate recovery periods between grazing events will transition the Reference State (1.0) to the Disturbed State (2.0). This transition is most likely to occur from the Inland Saltgrass-Foxtail Barley Plant Community (1.2).

Restoration pathway R2A
State 2 to 1

Under long-term prescribed grazing, possibly including extended rest (non-use) periods, and avoiding grazing when hoof action would contribute to additional soil compaction and sedimentation, this plant community could return the Degraded State (2.0) to the Inland Saltgrass-Rhizomatous Wheatgrass Plant Community (1.2). Depending on the severity of compaction, sedimentation, and if adequate perennial plants exist, this change could take an extended period of time and may not meet management goals.

Conservation practices

Prescribed Grazing

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Rhizomatous Wheatgrass**			500–1000	
	western wheatgrass	PASM	*Pascopyrum smithii*	375–875	–
	thickspike wheatgrass	ELLAL	*Elymus lanceolatus ssp. lanceolatus*	125–375	–
	Montana wheatgrass	ELAL7	*Elymus albicans*	0–250	–
2	**Cool-Season Bunchgrass**			250–625	
	Nuttall's alkaligrass	PUNU2	*Puccinellia nuttalliana*	250–500	–
	plains bluegrass	POAR3	*Poa arida*	0–125	–
	foxtail barley	HOJU	*Hordeum jubatum*	25–125	–
	slender wheatgrass	ELTR7	*Elymus trachycaulus*	0–125	–
	squirreltail	ELEL5	*Elymus elymoides*	0–75	–
3	**Tall and Mid- Warm-Season Grasses**			125–500	

	alkali sacaton	SPAI	*Sporobolus airoides*	125–375	–
	alkali cordgrass	SPGR	*Spartina gracilis*	0–375	–
	prairie cordgrass	SPPE	*Spartina pectinata*	0–125	–
4	**Short Warm Season Grasses**			125–250	
	saltgrass	DISP	*Distichlis spicata*	125–250	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	0–75	–
	scratchgrass	MUAS	*Muhlenbergia asperifolia*	0–75	–
5	**Other Native Grasses**			0–250	
	Grass, perennial	2GP	*Grass, perennial*	0–250	–
6	**Grass-Likes**			0–75	
	rush	JUNCU	*Juncus*	0–75	–
	sedge	CAREX	*Carex*	0–75	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	0–75	–
7	**Non-Native Cool-Season Grasses**			0	
Forb					
8	**Forbs**			25–125	
	Forb, native	2FN	*Forb, native*	0–125	–
	povertyweed	IVAX	*Iva axillaris*	25–75	–
	seepweed	SUAED	*Suaeda*	0–50	–
	western dock	RUAQ	*Rumex aquaticus*	0–50	–
	redwool plantain	PLER	*Plantago eriopoda*	0–50	–
	bighead pygmycudweed	EVPR	*Evax prolifera*	0–25	–
	cinquefoil	POTEN	*Potentilla*	0–25	–
	red swampfire	SARU	*Salicornia rubra*	0–25	–
Shrub/Vine					
9	**Shrubs**			125–375	
	greasewood	SAVE4	*Sarcobatus vermiculatus*	0–200	–
	fourwing saltbush	ATCA2	*Atriplex canescens*	25–125	–
	Gardner's saltbush	ATGA	*Atriplex gardneri*	25–125	–
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	0–125	–
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–125	–

Table 9. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Rhizomatous Wheatgrass**			240–400	
	western wheatgrass	PASM	*Pascopyrum smithii*	160–320	–
	thickspike wheatgrass	ELLAL	*Elymus lanceolatus ssp. lanceolatus*	16–160	–
	Montana wheatgrass	ELAL7	*Elymus albicans*	0–64	–
2	**Cool-Season Bunchgrass**			160–400	
	foxtail barley	HOJU	*Hordeum jubatum*	80–240	–
	Nuttall's alkaligrass	PUNU2	*Puccinellia nuttalliana*	0–112	–
	plains bluegrass	POAR3	*Poa arida*	0–32	

	plains bluegrass	POAR3	*Poa arida*	0–32	–
	squirreltail	ELEL5	*Elymus elymoides*	0–32	–
	slender wheatgrass	ELTR7	*Elymus trachycaulus*	0–32	–
3	**Tall and Mid- Warm-Season Grasses**			0–80	
	alkali sacaton	SPAI	*Sporobolus airoides*	0–80	–
	alkali cordgrass	SPGR	*Spartina gracilis*	0–80	–
	prairie cordgrass	SPPE	*Spartina pectinata*	0–80	–
4	**Short Warm-Season Grasses**			160–400	
	saltgrass	DISP	*Distichlis spicata*	160–320	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	0–80	–
	scratchgrass	MUAS	*Muhlenbergia asperifolia*	0–80	–
5	**Other Native Grasses**			0–112	
	Grass, perennial	2GP	*Grass, perennial*	0–112	–
6	**Grass-Likes**			0–80	
	rush	JUNCU	*Juncus*	0–80	–
	sedge	CAREX	*Carex*	0–80	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	0–80	–
7	**Non-Native Cool-Season Grasses**			0–80	
	Kentucky bluegrass	POPR	*Poa pratensis*	0–80	–
	cheatgrass	BRTE	*Bromus tectorum*	0–80	–
Forb					
8	**Forbs**			80–160	
	Forb, native	2FN	*Forb, native*	0–80	–
	Forb, introduced	2FI	*Forb, introduced*	0–80	–
	povertyweed	IVAX	*Iva axillaris*	16–48	–
	seepweed	SUAED	*Suaeda*	0–48	–
	redwool plantain	PLER	*Plantago eriopoda*	0–48	–
	red swampfire	SARU	*Salicornia rubra*	0–32	–
	bighead pygmycudweed	EVPR	*Evax prolifera*	0–16	–
Shrub/Vine					
9	**Shrubs**			80–160	
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	0–112	–
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–48	–
	greasewood	SAVE4	*Sarcobatus vermiculatus*	0–32	–
	fourwing saltbush	ATCA2	*Atriplex canescens*	0–32	–
	Gardner's saltbush	ATGA	*Atriplex gardneri*	0–32	–

Table 10. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Rhizomatous Wheatgrass**			0–55	
	western wheatgrass	PASM	*Pascopyrum smithii*	0–55	–
	thickspike wheatgrass	ELLAL	*Elymus lanceolatus ssp. lanceolatus*	0–33	–
2	**Cool-Season Bunchgrass**			165–330	
	foxtail barley	HOJU	*Hordeum jubatum*	165–330	–
3	**Tall and Mid- Warm-Season Grasses**			0–11	
	alkali cordgrass	SPGR	*Spartina gracilis*	0–11	–
4	**Short Warm-Season Grasses**			275–550	
	saltgrass	DISP	*Distichlis spicata*	275–495	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	0–55	–
	scratchgrass	MUAS	*Muhlenbergia asperifolia*	0–55	–
5	**Other Native Grasses**			0–55	
	Grass, perennial	2GP	*Grass, perennial*	0–55	–
6	**Grass-Likes**			0–55	
	rush	JUNCU	*Juncus*	0–55	–
	sedge	CAREX	*Carex*	0–55	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	0–55	–
7	**Non-Native Cool-Season Grasses**			0–33	
	Kentucky bluegrass	POPR	*Poa pratensis*	0–33	–
	cheatgrass	BRTE	*Bromus tectorum*	0–33	–
Forb					
8	**Forbs**			55–165	
	Forb, introduced	2FI	*Forb, introduced*	33–132	–
	Forb, native	2FN	*Forb, native*	0–55	–
	seepweed	SUAED	*Suaeda*	0–44	–
	povertyweed	IVAX	*Iva axillaris*	11–33	–
	redwool plantain	PLER	*Plantago eriopoda*	0–33	–
	red swampfire	SARU	*Salicornia rubra*	0–22	–
	bighead pygmycudweed	EVPR	*Evax prolifera*	0–11	–
Shrub/Vine					
9	**Shrubs**			0–55	
	greasewood	SAVE4	*Sarcobatus vermiculatus*	0–55	–
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	0–55	–
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–22	–

Animal community

Wildlife Interpretations

MLRA 58D lies within the drier portion of the northern mixed-grass prairie ecosystem where sagebrush steppes to the west yield to grassland steppes to the east. Prior to European settlement, this area consisted of diverse grass- and shrubland 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, 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 small mammal and insect species, were the primary consumers linking the grassland resources to predators such as the gray wolf, mountain lion, and grizzly bear, and smaller carnivores such as the coyote, bobcat, fox, and raptors. The prairie dog was once abundant; however, the species remains a keystone species within its range. The black-footed ferret, burrowing owl, ferruginous hawk, mountain plover, and swift fox were associated with prairie dog complexes.

Historically, the northern mixed-grass prairie was a disturbance-driven ecosystem with fire, herbivory, and climate functioning as the primary disturbance factors either singly or in combination. Following European settlement, livestock grazing, cropland conversion, elimination of fire, energy development, and other anthropogenic factors influenced species composition and abundance. Introduced and invasive species further impacted plant and animal communities. The bison was a historical keystone species but had been extirpated in this area as a free-ranging herbivore. The loss of the bison and reduction of prairie dog populations and fire as ecological drivers greatly influenced the character of the remaining native plant communities and altered wildlife habitats. Human development has reduced habitat quality for area-sensitive species.

Within MLRA 58D, the Saline Lowland ecological site provides upland/wetland complex cover with an associated shrub/forb component. It is typically part of an expansive grassland landscape that included combinations of Shallow Loamy, Shallow Clayey, Thin Loamy, Thin Claypan, Sandy, Sandy Claypan, Loamy, Loamy Terrace, Sandy Terrace, and Clayey ecological sites.

The Saline Lowland ecological site has remained relatively intact. This site may have sufficient hydrology to support hydrophytic vegetation and wildlife species associated with saturated saline soil conditions. Due to high salinity concentrations, both plant and wildlife species diversity is limited.

Reference State (1.0)
The predominance of saline tolerant hydrophytic vegetation, including shrubs, does not favor any particular wildlife group. However, the site may receive limited shorebird use. This plant community provides habitat for limited invertebrate populations. Herptile use is either extremely limited or nonexistent. Raptors such as northern harrier, short-eared owl, Swainson’s hawk, and American kestrel will use this site. Prey populations are limited to small mammals such as water shrew and meadow vole and invertebrates.

Grazing Interpretations
The following list suggests annual, initial stocking rates for average growing conditions. These estimates are conservative and should be used only as guidelines in the initial stages of conservation planning. Commonly, 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 estimates of carrying capacity 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. In consultation with the land manager, a more intensive grazing management program that results in improved harvest efficiencies and increased carrying capacity may be developed.

The following suggested initial stocking rates are based on 912 lb/acre (air-dry weight) per animal-unit-month (AUM) with 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.

Plant Community: Rhizomatous Wheatgrass-Alkaligrass (1.1)
Average Production (lb/acre, air-dry): 2,500
Stocking Rate (AUM/acre): 0.69

Plant Community: Inland Saltgrass-Rhizomatous Wheatgrass (1.2)
Average Production (lb/acre, air-dry): 1,600*
Stocking Rate (AUM/acre): Variable*

Plant Community: Inland Saltgrass-Foxtail Barley (2.1)
Average Production (lb/acre, air-dry): 1,100*

Stocking Rate (AUM/acre): Variable*

* Total annual production and stocking rates are highly variable and require onsite sampling.

Total onsite annual production may contain vegetation deemed undesirable or untargeted by the grazing animal. Therefore, AUM values may need to be 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 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 (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 groups B and D. Infiltration and runoff potential for this site varies from moderate to 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 where shortgrasses form a strong sod and dominate the site. Normally areas where ground cover is less than 50 percent have the greatest potential to have reduced infiltration and higher runoff. 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 hunting upland and wetland game species. 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: “Previously Approved” 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 ESD is an updated “Previously Approved” ESD that represented 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 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 5 years and is a proven functional document for conservation planning. The “Previously Approved” ESD may not contain all tabular and narrative entries as required in the current “Approved” level of documentation, but continued refinement toward an “Approved” status is expected.

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 description include: Ryan Beer, Range Management Specialist (RMS), NRCS; Chuck Berdan, Biologist (BIO), Bureau of Land Management (BLM); Stan Boltz, RMS, NRCS; Dave Dewald, Wildlife BIO, NRCS; Mitch Faulkner, RMS, NRCS; Jody Forman, RMS, NRCS; Dennis Froemke, RMS, NRCS; Tom Juntti, BIO, United States Forest Service (USFS); Cheryl Nielsen, RMS, NRCS; Jeff Printz, RMS, NRCS; Mike Stirling, RMS, NRCS; Dan Svingen, BIO, USFS; Darrell Vanderbusch, Soil Scientist, NRCS; Cindy Zachmeier, BIO, NRCS; and Tim Zachmeier, BIO, BLM.

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Approval

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Acknowledgments

This ecological site description was updated by Rick L. Peterson on February 5, 2020.

The ESDs were available for QC review by Mark Hayek, Emily Helms, Ryan Beer, and Mitch Faulkner.

All ecological sites were then reviewed and approved at the Provisional Level by David Kraft, Regional ESS, Salina, KS in September 2020.

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	Stan Boltz, Mitch Iverson, Thad Berrett, Cheryl Nielsen
Contact for lead author	stanley.boltz@sd.usda.gov, 605-352-1236
Date	05/07/2010
Approved by	Suzanne Mayne-Kinney
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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.

5. **Number of gullies and erosion associated with gullies:** None.

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

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

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil aggregate stability ratings should typically be greater than 3. Surface organic matter adheres to the soil surface. Soil surface fragments will typically retain structure at least for short periods when dipped in distilled water. Some fragments will dissolve in less than 1 minute.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** A-horizon should be 3 to 19 inches thick with dark grayish brown colors when moist. Structure typically is coarse sub-angular blocky in the A-horizon.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Deep rooted species (mid and tall rhizomatous cool- and warm-season grasses and grass-likes) with fine and coarse roots positively influences infiltration.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None – when dry, B horizons can be hard and appear to be compacted, but no platy structure will be present.

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

    Dominant: Mid cool-season rhizomatous grasses >> Cool-season bunchgrasses >

    Sub-dominant: Tall warm-season rhizomatous grasses > Shrubs >

    Other: Short warm-season grasses > Forbs > Grass-likes

    Additional:

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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.

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

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Production ranges from 1,400-3,500 lbs./acre (air-dry weight). Reference value production is 2,500 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:** State and local noxious weeds; Russian olive can dominate this site in localized areas

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17. **Perennial plant reproductive capability:** All species exhibit high vigor relative to climatic conditions. Do not rate based solely on seed production. Perennial grasses and grass-likes should have vigorous rhizomes or tillers.
