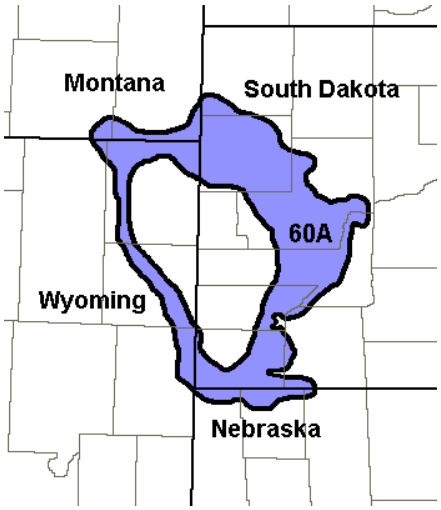
United States Department of Agriculture
Natural Resources Conservation Service

Ecological Site Description



Site Type: Rangeland

Site Name: Saline Upland

Site ID: R060AY026SD

Major Land Resource Area (MLRA): 60A – Pierre Shale Plains

Physiographic Features

This site occurs on gently to steeply sloping uplands.

Landform: hill, plain **Aspect:** N/A

	Minimum	Maximum
Elevation (feet):	2,500	4,300
Slope (percent):	0	45
Water Table Depth (inches):	None	None
Flooding:		
Frequency:	None	None
Duration:	None	None
Ponding:		
Depth (inches):	None	None
Frequency:	None	None
Duration:	None	None
Runoff Class:	High	Very high

Climatic Features

The climate in this MLRA is typical of the drier portions of the Northern Great Plains where sagebrush steppes to the west yield to grassland steppes to the east. Annual precipitation ranges from 13 to 18 inches per year, with most occurring during the growing season. Temperatures show a wide range between summer and winter and between daily maximums and minimums, due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Cold air masses from Canada in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Chinook winds may occur in winter and bring rapid rises in temperature. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring. The normal average annual temperature is about 46°F. January is the coldest month with average temperatures ranging from about 19°F (Moorcroft CAA, Wyoming (WY)), to about 22°F (Belle Fourche, South Dakota (SD)). July is the warmest month with temperatures averaging from about 70°F (Moorcroft CAA, WY), to about 72°F (Belle Fourche, SD). The range of normal average monthly temperatures between the coldest and warmest months is about 51°F. Hourly winds are estimated to average about 11 miles per hour (mph) annually, ranging from about 13 miles per hour 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 can continue to early or mid-September. Greenup of cool-season plants may occur in September and October when adequate soil moisture is present.

	Minimum	Maximum
Frost-free period (days):	122	129
Freeze-free period (days):	145	152
Mean Annual Precipitation (inches):	13	18

Average Monthly Precipitation (inches) and Temperature (ºF):

	Precip. Min.	Precip. Max	Temp. Min.	Temp. Max.
January	0.32	0.43	7.1	34.1
February	0.44	0.57	12.6	40.1
March	0.65	0.94	19.7	46.5
April	1.43	1.72	29.4	60.2
May	2.45	3.19	39.7	70.6
June	2.34	3.38	48.5	80.1
July	1.60	2.78	54.8	88.0
August	1.24	1.76	53.1	87.7
September	1.01	1.50	42.3	77.0
October	0.90	1.11	31.4	64.9
November	0.40	0.61	19.8	47.5
December	0.40	0.48	10.2	38.0

Climate Stations		Period	
Station ID	**Location or Name**	**From**	**To**
SD0236	Ardmore 2 N	1948	1999
SD0559	Belle Fourche	1948	1999
SD1124	Buffalo Gap	1951	1999
WY6395	Moorcroft CAA	1948	1998
WY9207	Upton 13 SW	1949	1998

For other climate stations that may be more representative, refer to http://www.wcc.nrcs.usda.gov.

Influencing Water Features

No significant water features influence this site.

Representative Soil Features

The soils of this site consist of shallow, gently sloping to steep, well-drained, saline clayey soils on uplands. These soils formed in material weathered from highly saline shale. They contain fragments of shale and many spots of segregated salts. Below a depth of 14 inches is soft shale. These soils have low fertility and high salt content. They take in water very slowly and have very low available water capacity. Runoff is rapid. These soils are susceptible to wind and water erosion. This site typically should show slight evidence of rills, wind scoured areas, and pedestalled plants. Water flow paths are broken, irregular in appearance, or discontinuous with numerous debris dams or vegetative barriers. The soil surface is moderately stable and intact. Subsurface soil layers are moderately restrictive to water movement and root penetration.

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 location.

Parent Material Kind: residuum, shale
Parent Material Origin: shale, unspecified
Surface Texture: clay, silty clay loam, loam
Surface Texture Modifier: none
Subsurface Texture Group: clayey
Surface Fragments ≤3" (% Cover): 0
Surface Fragments >3" (%Cover): 0
Subsurface Fragments ≤3" (% Volume): 0
Subsurface Fragments >3" (% Volume): 0

	Minimum	Maximum
Drainage Class:	moderately well	well
Permeability Class:	slow	very slow
Depth (inches):	10	80
Electrical Conductivity (mmhos/cm)*:	0	32
Sodium Absorption Ratio*:	0	13
Soil Reaction (1:1 Water)*:	6.1	9.4
Soil Reaction (0.1M CaCl2)*:	NA	NA
Available Water Capacity (inches)*:	1	5
Calcium Carbonate Equivalent (percent)*:	0	15

*These attributes represent from 0-40 inches or to the first restrictive layer.

Plant Communities

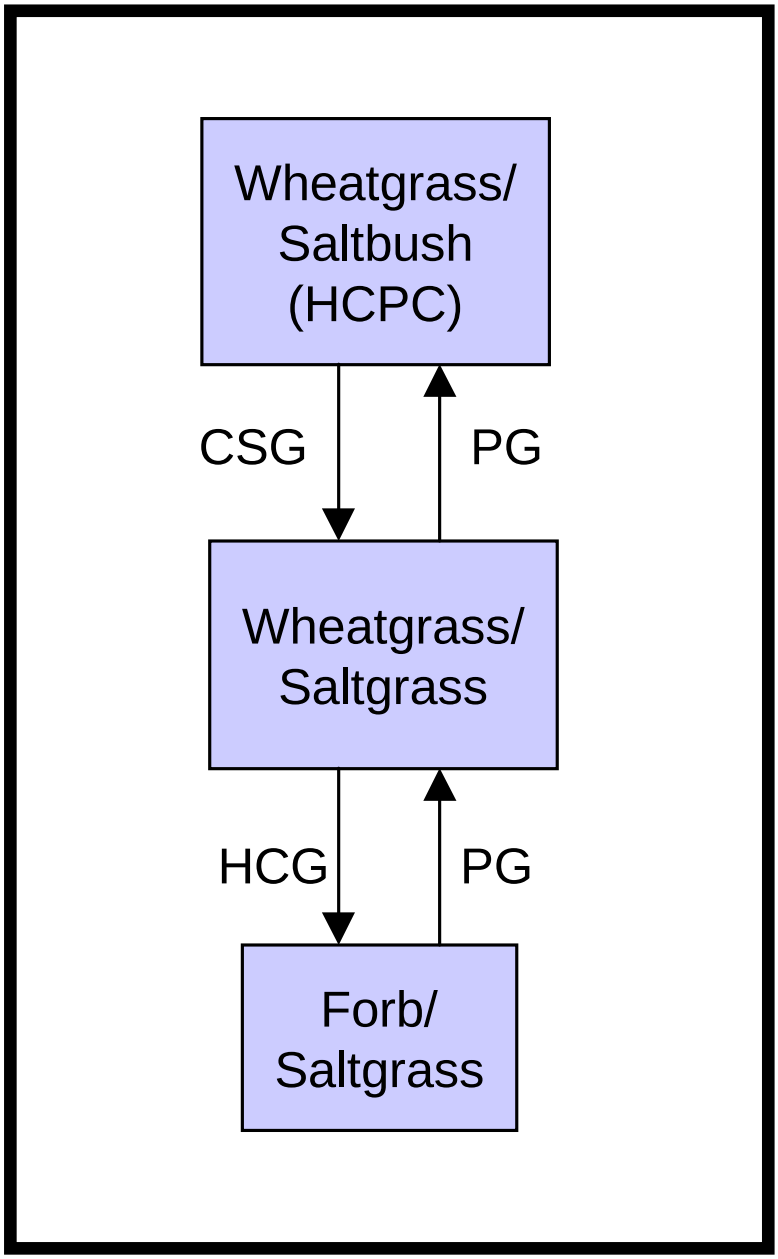
Ecological Dynamics of the Site:
This site developed under Northern Great Plains climatic conditions, natural influences of large herbivores, occasional fire, and other biotic and abiotic factors that typically influence soil/site development. Changes will occur in the plant communities due to short-term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

The high salt content and hydrology properties greatly influence the vegetation of this site. This site tends to influence the vegetation of surrounding sites, but surrounding sites have little influence on it. Wheatgrasses and desirable shrubs, such as Gardner's saltbush and winterfat, are the dominant species on this site. As it declines from mismanagement (over grazing or lack of recovery periods) species such as inland saltgrass, greasewood, woody aster, and annuals will increase. Grasses such as Indian ricegrass, alkali sacaton, and wheatgrasses, and desirable shrubs such as saltbush and winterfat decrease. Sweet clover tends to invade the site.

The plant community upon which interpretations are primarily based is the Historic Climax Plant Community (HCPC). The HCPC 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 diagram illustrates the common plant communities and vegetation states commonly occurring on the site and the transition pathways between communities and states. The ecological processes are discussed in more detail in the plant community descriptions following the diagram.

Plant Communities and Transitional Pathways



CSG - Continuous seasonal grazing; **HCG** - Heavy, continuous grazing; **HCPC** - Historic Climax Plant Community; **PG** - Prescribed grazing.

Plant Community Composition and Group Annual Production

			Wheatgrass/Saltbush (HCPC)		
COMMON/GROUP NAME	**SCIENTIFIC NAME**	**SYMBOL**	**Group**	**lbs./acre**	**% Comp**
GRASSES & GRASS-LIKES				*270 - 420*	*45 - 70*
RHIZOMATOUS WHEATGRASSES			**1**	**120 - 210**	**20 - 35**
western wheatgrass	Pascopyrum smithii	PASM	1	120 - 210	20 - 35
Montana wheatgrass	Elymus albicans	ELAL7	1	120 - 210	20 - 35
thickspike wheatgrass	Elymus lanceolatus ssp. lanceolatus	ELLAL	1	120 - 210	20 - 35
NATIVE GRASSES & GRASS-LIKES			**2**	**60 - 180**	**10 - 30**
alkali sacaton	Sporobolus airoides	SPAI	2	30 - 90	5 - 15
Indian ricegrass	Achnatherum hymenoides	ACHY	2	0 - 60	0 - 10
bottlebrush squirreltail	Elymus elymoides	ELEL5	2	0 - 60	0 - 10
inland saltgrass	Distichlis spicata	DISP	2	30 - 90	5 - 15
Sandberg bluegrass	Poa secunda	POSE	2	0 - 30	0 - 5
prairie junegrass	Koeleria macrantha	KOMA	2	0 - 30	0 - 5
blue grama	Bouteloua gracilis	BOGR2	2	0 - 30	0 - 5
threadleaf sedge	Carex filifolia	CAFI	2	0 - 30	0 - 5
other perennial grasses		2GP	2	0 - 30	0 - 5
FORBS			*4*	*12 - 60*	*2 - 10*
American licorice	Glycyrrhiza lepidota	GLLE3	4	0 - 18	0 - 3
American vetch	Vicia americana	VIAM	4	0 - 18	0 - 3
aster	Aster spp.	ASTER	4	0 - 18	0 - 3
hawksbeard	Crepis spp.	CREPI	4	0 - 18	0 - 3
milkvetch	Astragalus spp.	ASTRA	4	6 - 30	1 - 5
penstemon	Penstemon spp.	PENST	4	0 - 18	0 - 3
prairie coneflower	Ratibida columnifera	RACO3	4	0 - 18	0 - 3
purple prairie clover	Dalea purpurea	DAPU5	4	0 - 18	0 - 3
scarlet gaura	Gaura coccinea	GACO5	4	0 - 18	0 - 3
stemless hymenoxys	Tetraneuris acaulis	TEAC	4	0 - 18	0 - 3
white prairie clover	Dalea candida	DACA7	4	0 - 18	0 - 3
wild onion	Allium spp.	ALLIU	4	0 - 18	0 - 3
other perennial forbs		2FP	4	0 - 18	0 - 3
SHRUBS			*5*	*150 - 270*	*25 - 45*
big sagebrush	Artemisia tridentata	ARTR2	5	0 - 30	0 - 5
black greasewood	Sarcobatus vermiculatus	SAVE4	5	0 - 60	0 - 10
Gardner's saltbush	Atriplex gardneri	ATGA	5	120 - 240	20 - 40
rubber rabbitbrush	Ericameria nauseosa	ERNA10	5	0 - 30	0 - 5
winterfat	Krascheninnikovia lanata	KRLA2	5	0 - 60	0 - 10
other shrubs		2SHRUB	5	0 - 30	0 - 5

Annual Production lbs./acre	LOW	RV	HIGH
GRASSES & GRASS-LIKES	245 -	354	- 435
FORBS	10 -	36	- 65
SHRUBS	145 -	210	- 300
TOTAL	400 -	600	- 800

This list of plants and their relative proportions are based on near normal years. Fluctuations in species composition and relative production may change from year to year dependent upon precipitation or other climatic factors. RV = Representative value.

Plant Community Composition and Group Annual Production

		Wheatgrass/Saltbush (HCPC)			Wheatgrass/Saltgrass			Forb/Saltgrass		
COMMON/GROUP NAME	**SYMBOL**	**Grp**	**lbs./acre**	**% Comp**	**Grp**	**lbs./acre**	**% Comp**	**Grp**	**lbs./acre**	**% Comp**
GRASSES & GRASS-LIKES			*270 - 420*	*45 - 70*		*375 - 425*	*75 - 85*		*188 - 281*	*50 - 75*
RHIZOMATOUS WHEATGRASSES		**1**	**120 - 210**	**20 - 35**	**1**	**50 - 150**	**10 - 30**	**1**	**8 - 38**	**2 - 10**
western wheatgrass	PASM	1	120 - 210	20 - 35	1	50 - 150	10 - 30	1	8 - 38	2 - 10
Montana wheatgrass	ELAL7	1	120 - 210	20 - 35	1	50 - 150	10 - 30	1	8 - 38	2 - 10
thickspike wheatgrass	ELLAL	1	120 - 210	20 - 35	1	50 - 150	10 - 30	1	8 - 38	2 - 10
NATIVE GRASSES & GRASS-LIKES		**2**	**60 - 180**	**10 - 30**	**2**	**125 - 350**	**25 - 70**	**2**	**94 - 263**	**25 - 70**
alkali sacaton	SPAI	2	30 - 90	5 - 15	2	0 - 15	0 - 3	2	0 - 11	0 - 3
Indian ricegrass	ACHY	2	0 - 60	0 - 10	2	0 - 15	0 - 3	2	0 - 11	0 - 3
bottlebrush squirreltail	ELEL5	2	0 - 60	0 - 10	2	0 - 25	0 - 5	2	19 - 38	5 - 10
inland saltgrass	DISP	2	30 - 90	5 - 15	2	75 - 200	15 - 40	2	56 - 150	15 - 40
Sandberg bluegrass	POSE	2	0 - 30	0 - 5	2	0 - 25	0 - 5	2	19 - 38	5 - 10
prairie junegrass	KOMA	2	0 - 30	0 - 5	2	25 - 50	5 - 10	2	19 - 38	5 - 10
blue grama	BOGR2	2	0 - 30	0 - 5	2	25 - 75	5 - 15	2	19 - 38	5 - 10
threadleaf sedge	CAFI	2	0 - 30	0 - 5	2	25 - 75	5 - 15	2	19 - 38	5 - 10
needleandthread	HECOC8				2	25 - 75	5 - 15	2	19 - 38	5 - 10
other perennial grasses	2GP	2	0 - 30	0 - 5	2	0 - 25	0 - 5	2	0 - 19	0 - 5
NON-NATIVE GRASSES		**3**			**3**			**3**	**19 - 38**	**5 - 10**
cheatgrass	BRTE							3	19 - 38	5 - 10
FORBS		*4*	*12 - 60*	*2 - 10*	*4*	*25 - 75*	*5 - 15*	*4*	*38 - 131*	*10 - 35*
American licorice	GLLE3	4	0 - 18	0 - 3	4	0 - 15	0 - 3	4	0 - 11	0 - 3
American vetch	VIAM	4	0 - 18	0 - 3	4	0 - 15	0 - 3	4	0 - 11	0 - 3
aster	ASTER	4	0 - 18	0 - 3	4	5 - 25	1 - 5	4	4 - 19	1 - 5
curlycup gumweed	GRSQ				4	0 - 25	0 - 5	4	4 - 19	1 - 5
goldenpea	THRH							4	4 - 19	1 - 5
hairy goldaster	HEVI4				4	0 - 15	0 - 3	4	4 - 19	1 - 5
hawksbeard	CREPI	4	0 - 18	0 - 3	4	0 - 15	0 - 3	4	0 - 11	0 - 3
milkvetch	ASTRA	4	6 - 30	1 - 5	4	5 - 50	1 - 10	4	4 - 38	1 - 10
penstemon	PENST	4	0 - 18	0 - 3	4	0 - 15	0 - 3	4	0 - 11	0 - 3
prairie coneflower	RACO3	4	0 - 18	0 - 3	4	0 - 15	0 - 3	4	0 - 11	0 - 3
purple prairie clover	DAPU5	4	0 - 18	0 - 3	4	0 - 15	0 - 3	4	0 - 8	0 - 2
scarlet gaura	GACO5	4	0 - 18	0 - 3	4	0 - 15	0 - 3	4	4 - 19	1 - 5
smooth woodyaster	XYGL							4	4 - 38	1 - 10
stemless hymenoxys	TEAC	4	0 - 18	0 - 3	4	0 - 15	0 - 3	4	0 - 11	0 - 3
sweetclover	MELIL				4	0 - 75	0 - 15	4	19 - 113	5 - 30
white prairie clover	DACA7	4	0 - 18	0 - 3	4	0 - 15	0 - 3	4	0 - 11	0 - 3
wild onion	ALLIU	4	0 - 18	0 - 3	4	0 - 15	0 - 3	4	0 - 11	0 - 3
other perennial forbs	2FP	4	0 - 18	0 - 3	4	0 - 25	0 - 5	4	0 - 19	0 - 5
SHRUBS		*5*	*150 - 270*	*25 - 45*	*5*	*25 - 50*	*5 - 10*	*5*	*19 - 56*	*5 - 15*
big sagebrush	ARTR2	5	0 - 30	0 - 5	5	0 - 40	0 - 8	5	19 - 38	5 - 10
black greasewood	SAVE4	5	0 - 60	0 - 10	5	0 - 15	0 - 3	5	19 - 56	5 - 15
broom snakeweed	GUSA2				5	5 - 50	1 - 10	5	8 - 38	2 - 10
cactus	OPUNT				5	5 - 50	1 - 10	5	8 - 38	2 - 10
Gardner's saltbush	ATGA	5	120 - 240	20 - 40	5	0 - 15	0 - 3	5	0 - 4	0 - 1
rubber rabbitbrush	ERNA10	5	0 - 30	0 - 5	5	0 - 15	0 - 3	5	0 - 19	0 - 5
winterfat	KRLA2	5	0 - 60	0 - 10	5	0 - 35	0 - 7	5	0 - 4	0 - 1
other shrubs	2SHRUB	5	0 - 30	0 - 5	5	0 - 15	0 - 3	5	0 - 11	0 - 3

Annual Production lbs./acre	LOW RV HIGH	LOW RV HIGH	LOW RV HIGH
GRASSES & GRASS-LIKES	245 · 354 - 435	360 · 413 - 465	200 · 253 - 305
FORBS	10 · 36 - 65	20 · 50 - 80	35 · 84 - 135
SHRUBS	145 · 210 - 300	20 · 38 - 55	15 · 38 - 60
TOTAL	400 · 600 - 800	400 · 500 - 600	250 · 375 - 500

This list of plants and their relative proportions are based on near normal years. Fluctuations in species composition and relative production may change from year to year dependent upon precipitation or other climatic factors. RV = Representative value.

Plant Community and Vegetation State Narratives

Following are the narratives for each of the described plant communities. These plant communities may not represent every possibility, but they are the most prevalent and repeatable plant communities. The plant composition tables shown above have been developed from the best available knowledge at the time of this revision. As more information is collected, some of these plant community descriptions may be revised or removed and new ones added. None of these plant communities should necessarily be thought of as "Desired Plant Communities" (DPCs). According to the USDA Natural Resources Conservation Service (NRCS) National Range and Pasture Handbook, DPCs will be determined by the decision makers and will meet minimum quality criteria established by the NRCS. The main purpose for including any description of a plant community here is to capture the current knowledge and experience at the time of this revision.

Wheatgrass/Saltbush Plant Community

The plant community upon which interpretations are primarily based is the Wheatgrass/Saltbush Plant Community. This is also considered the HCPC. Potential vegetation is about 45-70 percent grasses or grass-like plants, 2-10 percent forbs, and 25-45 percent shrubs. Saline tolerant shrubs such as Gardner's saltbush and winterfat dominate. Major grasses include rhizomatous wheatgrasses, inland saltgrass, alkali sacaton, and Indian ricegrass. Other grasses occurring include bottlebrush squirreltail and Sandberg bluegrass. This plant community provides valuable winter grazing for wildlife and domestic livestock.

This plant community is sensitive to management. Only plants that are adapted to high salt conditions comprise this site. Reduction in vigor and abundance of the desirable species (wheatgrasses, alkali sacaton, Indian ricegrass, Gardner's saltbush, and winterfat) results in the loss of forage quantity and quality. These plants will generally be replaced by saltgrass. As the dominant desirable plant community declines, this also creates more bare ground. The increase in bare ground will increase the susceptibility to soil erosion and invasive forbs such as sweet clover. Plant litter is properly distributed with some movement offsite and natural plant mortality is low.

The following growth curve is an estimate of the monthly percentages of total annual growth of the dominant species expected during an average year:
Growth curve number: SD6002
Growth curve name: Pierre Shale Plains, cool-season dominant, warm-season subdominant.
Growth curve description: Cool-season dominant, warm-season subdominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	10	23	34	15	6	5	4	0	0

Transitions or pathways leading to other plant communities are as follows:

- Continuous seasonal grazing will convert this plant community to the *Wheatgrass/Saltgrass Plant Community.*

Wheatgrass/Saltgrass Plant Community

This plant community is developed under continuous seasonal grazing or short-term heavy grazing with inadequate recovery periods. This plant community may be the result of historic long-term use by sheep, and does not commonly occur in the western portion of the MLRA. The potential vegetation is made up of 75-85 percent grass, 5-15 percent forbs, and 5-10 percent shrubs.

The dominant grass is still the native wheatgrasses but comprises a lower percentage and exhibits lower vigor. Inland saltgrass has increased along with the other short grasses such as prairie

Junegrass, threadleaf sedge, and blue grama. The forb community is similar to HCPC, but it will also include less desirable forbs such as gumweed and sweet clover. Saltbush has disappeared or declined, while big sagebrush, cactus, and broom snakeweed may be present or have increased.

The following growth curve is an estimate of the monthly percentages of total annual growth of the dominant species expected during an average year:
Growth curve number: SD6002
Growth curve name: Pierre Shale Plains, cool-season dominant, warm-season subdominant.
Growth curve description: Cool-season dominant, warm-season subdominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	10	23	34	15	6	5	4	0	0

Transitions or pathways leading to other plant communities are as follows:

- Heavy continuous grazing will convert this plant community to the *Forb/Saltgrass Plant Community*.

- Prescribed grazing will convert this plant community to the *Wheatgrass/Saltbush Plant Community*.

Forb/Saltgrass Plant Community
This plant community typically occurs more often in the western portion of the MLRA. Currently this plant community is found under moderate, season-long grazing by livestock. Greasewood, woody aster, cheatgrass, and bare ground are a major part of this plant community. Sparse saline tolerant grasses make up the majority of the understory with the balance made up of annual cool-season grass and miscellaneous forbs.

Dominant grasses include inland saltgrass, Sandberg bluegrass, and squirreltail. Other grasses that occur include threadleaf sedge, prairie Junegrass, and blue grama. Forbs commonly found in this plant community include hairy goldaster, goldenpea, curlycup gumweed, broom snakeweed, and scarlet globemallow. Plains pricklypear and winterfat can also occur. Depending on precipitation and climatic factors various invasive forbs, such as sweet clover, will dominate the site.

When compared to the HCPC, greasewood, woody aster, and cheatgrass have increased. Indian ricegrass, alkali sacaton, Gardner's saltbush, and winterfat have decreased.

The site is at risk and not well protected from excessive erosion. Grazing for wildlife and livestock has been reduced. The biotic integrity of this plant community is not intact. The amount of bare ground puts the watershed at risk.

The following growth curve is an estimate of the monthly percentages of total annual growth of the dominant species expected during an average year:
Growth curve number: SD6003
Growth curve name: Pierre Shale Plains, cool-season/warm-season codominant.
Growth curve description: Cool-season, warm-season codominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	10	20	28	21	10	5	3	0	0

Transitional pathways leading to other plant communities are as follows:

- Prescribed grazing will convert this plant community to the *Wheatgrass/Saltgrass Plant Community*.

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

The MLRA 60A 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/shrub land habitats interspersed with varying densities of depressional, in-stream wetlands, and woody riparian corridors. These habitats provided critical life cycle components for many of its 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 wolf, mountain lion, and grizzly bear, as well as, 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. Bison was a historical keystone species but have been extirpated as a free-ranging herbivore. The loss of the bison and prairie dog 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 60A, the Saline Upland 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 Upland 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.

Rhizomatous Wheatgrass/Saltbush (HCPC) and Wheatgrass/Saltgrass: The predominance of shrubs and forbs and lesser amounts grasses is adequate for grazers and mixed-feeders, such as deer, pronghorn, and small mammals. Insects, such as pollinators, play a large role in maintaining the forb community and provide a forage base for grassland birds and other species. Chestnut-collared longspur, Brewer's and vesper sparrow, long-billed curlew, and western meadowlark, are common and benefit from the structure and composition this plant community provides. Big sagebrush benefits pronghorn, as well as, greater sage-grouse nesting and brood rearing. Prey populations are likely less dense but may be more available for grassland raptors such as ferruginous hawk, Swainson's hawk, and northern harrier. This plant community provides lower quality habitat for Great Plains toad, bull snake, and western rattlesnake.

Resulting from continuous seasonal grazing or short-term heavy grazing with inadequate recovery periods, saltgrass and wheatgrass will dominate. Inland saltgrass significantly increases and provides little forage opportunity for herbivores. Both forb diversity and abundance increase, providing a suitable forage base for insects, small mammals, and their predators. Shrub abundance is drastically reduced; however, the big sagebrush component is still present.

Forbs/Saltgrass: Resulting from heavy continuous grazing, forbs will dominate. The predominance of shrubs and forbs, and lower grass abundance substantially limits grazers and mixed-feeders, such as deer, pronghorn, and small mammals. Insects, such as pollinators, play a large role in maintaining the forb community and provide a forage base for grassland birds and other species. Chestnut-collared longspur, Brewer's and vesper sparrow, long-billed curlew, and western meadowlark, benefit from the structure and composition this plant community provides. Big sagebrush benefits pronghorn, as well as, greater sage-grouse nesting and brood rearing. Prey populations are likely less dense but may be more available for grassland raptors such as ferruginous hawk, Swainson's hawk, and northern harrier. This plant community provides lower quality habitat for Great Plains toad, bull snake, and western rattlesnake.

Animal Preferences (Quarterly – 1,2,3,4[†])

Common Name	Cattle				Sheep				Horses				Deer				Antelope				Bison				Elk			
Grasses & Grass-likes																												
alkali sacaton	U	D	D	U	N	U	N	N	U	D	D	U	N	U	N	N	N	U	N	N	U	D	D	U	U	D	D	U
blue grama	U	D	P	D	D	P	P	D	U	D	P	U	D	P	P	D	D	P	P	D	U	D	P	U	U	D	P	U
bottlebrush squirreltail	U	D	U	U	N	D	U	N	U	D	U	U	N	D	U	N	N	D	U	N	U	D	U	U	U	D	U	U
Indian ricegrass	D	P	U	D	N	P	N	D	D	P	U	D	N	P	N	D	N	P	N	D	D	P	U	D	D	P	U	D
inland saltgrass	N	U	U	N	N	N	N	N	N	U	U	N	N	N	N	N	N	N	N	N	N	U	U	N	N	U	U	N
Montana wheatgrass	U	P	D	U	N	D	N	N	U	P	D	U	N	D	N	N	N	D	N	N	U	P	D	U	U	P	D	U
prairie junegrass	U	D	U	D	N	D	N	U	U	D	U	D	N	D	N	U	N	D	N	U	U	D	U	D	U	D	U	D
Sandberg bluegrass	U	U	U	U	U	D	U	U	N	U	N	N	N	D	N	N	N	D	N	N	N	U	N	N	N	U	N	N
thickspike wheatgrass	U	D	D	U	U	D	U	U	U	D	D	U	N	D	N	N	N	D	N	N	U	D	D	U	U	D	D	U
threadleaf sedge	U	P	U	D	U	P	U	D	U	D	U	D	U	D	U	D	U	D	U	D	U	D	U	D	U	D	U	D
western wheatgrass	U	P	D	D	U	D	U	U	U	P	D	U	N	D	N	N	N	D	N	N	U	P	D	U	U	P	D	U
Forbs																												
American licorice	U	U	D	U	N	U	U	N	U	U	D	U	N	U	U	N	N	U	U	N	U	U	D	U	N	U	U	N
American vetch	U	D	P	U	U	P	P	U	U	D	P	U	U	P	P	U	U	P	P	U	U	D	P	U	U	P	P	U
aster	U	U	D	U	U	U	D	U	U	U	D	U	U	U	D	U	U	U	D	U	U	U	D	U	U	U	D	U
hawksbeard	U	U	D	U	N	D	U	N	U	U	D	U	N	D	U	N	N	D	U	N	U	U	D	U	N	D	U	N
milkvetch	U	U	U	U	U	D	U	U	U	U	U	U	U	D	U	U	U	D	U	U	U	U	U	U	U	D	U	U
penstemon	U	U	U	U	U	P	P	U	U	U	U	U	U	P	P	U	U	P	P	U	U	U	U	U	U	P	P	U
prairie coneflower	U	U	D	U	U	P	P	U	U	U	D	U	U	P	P	U	U	P	P	U	U	U	D	U	U	P	P	U
purple prairie clover	U	D	P	U	U	P	P	U	U	D	P	U	U	P	P	U	U	P	P	U	U	D	P	U	U	P	P	U
scarlet gaura	U	U	U	U	N	U	U	N	U	U	U	U	N	U	U	N	N	U	U	N	U	U	U	U	N	U	U	N
stemless hymenoxys	U	U	U	U	N	U	U	N	U	U	U	U	N	U	U	N	N	U	U	N	U	U	U	U	N	U	U	N
white prairie clover	U	D	P	U	U	P	P	U	U	D	P	U	U	P	P	U	U	P	P	U	U	D	P	U	U	P	P	U
wild onion	U	D	U	U	U	D	D	U	U	D	U	U	U	D	D	U	U	D	D	U	U	D	U	U	U	D	D	U
Shrubs																												
big sagebrush	U	U	U	U	D	U	U	D	U	N	U	U	P	U	D	P	P	P	P	P	U	N	U	U	D	U	U	U
black greasewood	U	D	D	U	T	T	T	T	U	D	D	U	D	U	U	D	D	U	U	D	U	D	D	U	D	U	U	U
Gardner's saltbush	P	D	D	P	P	D	D	P	P	D	D	P	P	D	D	P	P	D	D	P	P	D	D	P	P	D	D	P
rubber rabbitbrush	N	N	N	N	D	U	U	D	N	N	N	N	D	U	U	D	U	P	P	U	N	N	N	N	D	U	U	U
winterfat	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

N = not used; **U** = undesirable; **D** = desirable; **P** = preferred; **T** = toxic
[†] Quarters: 1 – Jan., Feb., Mar.; 2 – Apr., May, Jun.; 3 – Jul., Aug., Sep.; 4 – Oct., Nov., Dec.

Animal Community – Grazing Interpretations

The following table lists annual, suggested initial stocking rates with average growing conditions. These are conservative estimates that should be used only as guidelines in the initial stages of conservation planning. Often, the current plant composition does not entirely match any particular plant community (as described in this Ecological Site Description). Because of this, a resource inventory is necessary to document plant composition and production. More accurate carrying capacity estimates should eventually be calculated using the following stocking rate information along with animal preference data and actual stocking records, particularly when grazers other than cattle are involved. With consultation of the land manager, more intensive grazing management may result in improved harvest efficiencies and increased carrying capacity.

Plant Community	Average Annual Production (lbs./acre, air-dry)	Stocking Rate* (AUM/acre)
Wheatgrass/Saltbush	600	0.19
Wheatgrass/Saltgrass	500	0.16
Forb/Saltgrass	375	0.12

*Based on 790 lbs./acre (air-dry weight) per Animal Unit Month (AUM), and on 25 percent harvest efficiency (refer to USDA NRCS, National Range and Pasture Handbook).

Grazing by domestic livestock is one of the major income-producing industries in the area. Rangeland in this area may provide yearlong forage. During the dormant period, the forage for livestock will likely be lacking protein to meet livestock requirements and added protein will allow ruminants to better utilize the energy stored in grazed plant materials. A forage quality test (either directly or through fecal sampling) should be used to determine the level of supplementation needed.

Hydrology Functions

Water and salinity are the principal factors limiting forage production on this site. This site is dominated by soils in hydrologic group D. Infiltration ranges from slow to moderate. Runoff potential for this site varies from high to very high depending on slope and ground cover. In many cases, areas with greater than 75 percent ground cover have the greatest potential for high infiltration and lower runoff. An exception would be where short grasses 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 Section 4, NRCS National Engineering Handbook, for runoff quantities and hydrologic curves).

Recreational Uses

This site provides hunting opportunities for upland game species. The wide varieties of plants which bloom from spring until fall have an esthetic value that appeals to visitors.

Wood Products

Other Products

Seed harvest of native plant species can provide additional income on this site.

Supporting Information

Associated Sites

(060AY016SD) – Very Shallow
(060AY017SD) – Shallow Clayey
(060AY007SD) – Saline Lowland
(060AY018SD) – Dense Clay
(060AY024SD) – Shallow Loamy

Similar Sites

(060AY007SD) – Saline Lowland
[higher production, higher water table, cordgrass present]

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: Everet Bainter, Range Management Specialist (RMS), NRCS; Stan Boltz, RMS, NRCS; Brandon Brazee, RMS, NRCS; Darrel DuVall, RMS, NRCS; Jill Epley, RMS, NRCS; Glen Mitchell, RMS, NRCS; Cheryl Nielsen, RMS, NRCS; Rick Peterson, RMS, NRCS; and Mike Stirling, RMS, NRCS.

Data Source	Number of Records	Sample Period	State	County
SCS-RANGE-417				

State Correlation

This site has been correlated between Montana (MT), Nebraska (NE), SD, and WY in MLRA 60A.

Field Offices

Belle Fourche, SD	Custer, SD	Hot Springs, SD	Pine Ridge, SD	Sundance, WY
Broadus, MT	Ekalaka, MT	Lusk, WY	Rapid City, SD	Wall, SD
Buffalo, SD	Faith, SD	Martin, SD	Rushville, NE	
Chadron, NE	Gillette, WY	Newcastle, WY	Sturgis, SD	

Relationship to Other Established Classifications

Level IV Ecoregions of the Conterminous United States: 43e – Sagebrush Steppe, 43g – Semi-arid Pierre Shale Plains, and 43k – Dense Clay Prairie.

Other References

High Plains Regional Climate Center, University of Nebraska, 830728 Chase Hall, Lincoln, NE 68583-0728. (http://www.hprcc.unl.edu/)

USDA, NRCS. National Water and Climate Center, 101 SW Main, Suite 1600, Portland, OR 97204-3224. (http://www.wcc.nrcs.usda.gov/)

USDA, NRCS. National Range and Pasture Handbook, September 1997.

USDA, NRCS. National Soil Information System, Information Technology Center, 2150 Centre Avenue, Building A, Fort Collins, CO 80526. (http://soils.usda.gov/technical/nasis)

USDA, NRCS, 2002. National Soil Survey Handbook, Title 430-VI. (http://soils.usda.gov/technical/handbook/)

USDA, NRCS. 2001. The PLANTS Database, Version 3.1 (http://plants.usda.gov). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

USDA, NRCS, Various Published Soil Surveys.

Site Description Approval

MT, State Range Management Specialist	Date	NE, State Range Management Specialist	Date
SD, State Range Management Specialist	Date	WY, State Range Management Specialist	Date