United States Department of Agriculture
Natural Resources Conservation Service

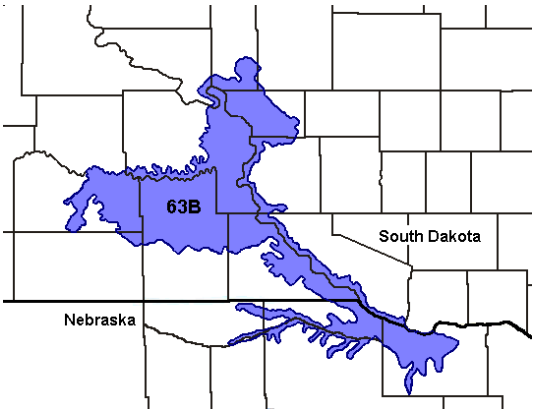
Ecological Site Description

Site Type: Rangeland

Site Name: Thin Claypan

Site ID: R063BY015SD

Major Land Resource Area (MLRA): 63B – Southern Rolling Pierre Shale Plains



Physiographic Features

This site occurs on nearly level to gently sloping uplands.

Landform: plain, stream terrace, flood plain **Aspect:** N/A

	Minimum	Maximum
Elevation (feet):	1,300	2,000
Slope (percent):	1	4
Water Table Depth (inches):	24	80
Flooding:		
Frequency:	None	None
Duration:	None	None
Ponding:		
Depth (inches):	None	None
Frequency:	None	None
Duration:	None	None
Runoff Class:	Medium	Very high

Climatic Features

MLRA 63B is considered to have a continental climate – cold winters and hot summers, low humidity, light rainfall, and much sunshine. Extremes in temperature may also abound. The climate is the result of this MLRA's location 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 19 to 24 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, South Dakota (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 this area's climate. 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. Greenup of cool-season plants may occur in September and October when adequate soil moisture is present.

	Minimum	Maximum
Frost-free period (days):	130	162
Freeze-free period (days):	148	180
Mean Annual Precipitation (inches):	19	24

Average Monthly Precipitation (inches) and Temperature (°F):

	Precip. Min.	Precip. Max	Temp. Min.	Temp. Max.
January	0.39	0.45	3.1	33.0
February	0.54	0.71	8.9	38.7
March	1.11	1.59	18.7	47.5
April	1.90	2.72	31.4	62.0
May	2.80	3.40	42.7	73.1
June	3.05	3.60	53.0	82.6
July	2.70	3.16	58.5	89.9
August	2.03	2.69	56.2	88.4
September	1.76	2.51	45.8	78.9
October	1.47	1.55	33.2	65.7
November	0.59	0.94	19.2	47.8
December	0.35	0.62	8.1	36.5

Climate Stations		Period	
Station ID	**Location or Name**	**From**	**To**
NE5040	Lynch	1948	2007
NE5960	Niobrara	1948	2005
SD7992	Stephan	1948	2007
SD9367	Winner	1948	2007

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

Riparian and Wetland Features

No riparian areas or wetland features are directly associated with this site.

Representative Soil Features

The common features of soils in this site are clay or silty clay textured subsoils and slopes of one to four percent. The soils in this site are typically moderately well to well-drained and formed in residuum or alluvium derived from shale. The silt loam surface layer is one to our inches thick. The extremely hard clayey Btn horizon has round-topped or “bun shaped” columnar or prismatic structured subsoil. These Btn horizons are high in sodium. The soils have a very slow infiltration rate. Wet surface compaction can occur with heavy traffic. This site should show slight to no evidence of rills, wind scoured areas, or pedestalled plants. The soil surface is stable and intact.

These soils are mainly susceptible to water erosion. The hazard of water erosion increases where vegetation is removed or severely disturbed. Loss of 30 percent or more of the surface layer of the soils on this site can result in a shift in species composition and/or production.

Access Web Soil Survey (http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm) for specific local soils information.

Parent Material Kind: alluvium, residuum
Parent Material Origin: shale, clayey
Surface Texture: silt loam
Surface Texture Modifier: none
Subsurface Texture Group: clayey
Surface Fragments ≤3" (% Cover): 0
Surface Fragments >3" (%Cover): 0
Subsurface Fragments ≤3" (% Volume): 0-4
Subsurface Fragments >3" (% Volume): 0

	Minimum	Maximum
Drainage Class:	moderately well	well
Permeability Class:	very slow	very slow
Depth (inches):	30	80
Electrical Conductivity (mmhos/cm)*:	0	30
Sodium Absorption Ratio*:	5	30
Soil Reaction (1:1 Water)*:	5.6	9.6
Soil Reaction (0.1M CaCl2)*:	NA	NA
Available Water Capacity (inches)*:	3	5
Calcium Carbonate Equivalent (percent)*:	0	25

*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, light to severe grazing by bison and other large herbivores, sporadic natural or man-caused wildfire (often of light intensities), 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 that will occur, severe disturbances, such as periods of well below average precipitation, can cause significant shifts in plant communities and/or species composition.

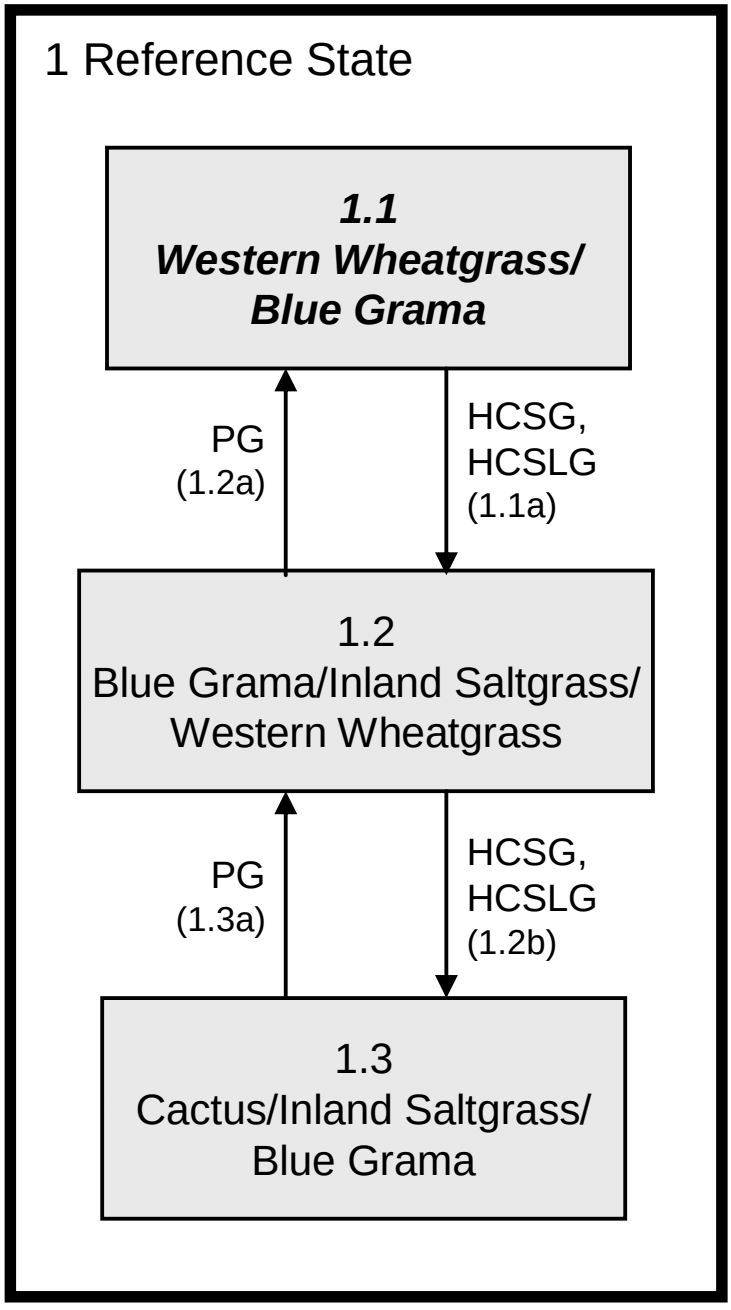
In association with this site are also areas of slick spots that usually have considerably more bare ground and are typically dominated by cactus. Slick spots are bare ground areas that are affected by high sodium concentrations. The soil factors are the dominant influence and grazing management is not necessarily the primary influence of these areas. These areas can occur as a complex with this site, sometimes being difficult to differentiate between the two.

Interpretations are primarily based on the Western Wheatgrass/Blue Grama Plant Community (1.1). It has been determined by study of rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily grazed to lightly grazed areas, seasonal use pastures, and historical accounts also have been used. Plant communities, states, transitional pathways, and thresholds have been determined through similar studies and experience.

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.

Plant Communities and Transitional Pathways



Refer to narrative for details on pathways: **HCSG** – Heavy continuous seasonal grazing; **HCSLG** – Heavy continuous season-long grazing; **PG** – Prescribed grazing.

Plant Community Composition and Group Annual Production

			1.1 Western Wheatgrass/Blue Grama		
COMMON/GROUP NAME	**SCIENTIFIC NAME**	**SYMBOL**	**Group**	**lbs./acre**	**% Comp**
GRASSES & GRASS-LIKES				*1200 - 1350*	*80 - 90*
WHEATGRASS			**1**	**375 - 675**	**25 - 45**
western wheatgrass	Pascopyrum smithii	PASM	1	375 - 675	25 - 45
SHORT WARM-SEASON GRASSES			**2**	**300 - 525**	**20 - 35**
blue grama	Bouteloua gracilis	BOGR2	2	225 - 375	15 - 25
buffalograss	Bouteloua dactyloides	BODA2	2	30 - 225	2 - 15
inland saltgrass	Distichlis spicata	DISP	2	30 - 225	2 - 15
sand dropseed	Sporobolus cryptandrus	SPCR	2	0 - 75	0 - 5
NEEDLEGRASS			**3**	**30 - 150**	**2 - 10**
needleandthread	Hesperostipa comata ssp. comata	HECOC8	3	30 - 150	2 - 10
green needlegrass	Nassella viridula	NAVI4	3	0 - 150	0 - 10
MID WARM-SEASON GRASSES			**4**	**0 - 75**	**0 - 5**
sideoats grama	Bouteloua curtipendula	BOCU	4	0 - 75	0 - 5
alkali sacaton	Sporobolus airoides	SPAI	4	0 - 75	0 - 5
OTHER NATIVE GRASSES			**5**	**30 - 75**	**2 - 5**
prairie junegrass	Koeleria macrantha	KOMA	5	15 - 75	1 - 5
Sandberg bluegrass	Poa secunda	POSE	5	15 - 45	1 - 3
tumblegrass	Schedonnardus paniculatus	SCPA	5	0 - 15	0 - 1
other grasses		2GRAM	5	0 - 45	0 - 3
GRASS-LIKES			**6**	**30 - 150**	**2 - 10**
needleleaf sedge	Carex duriuscula	CADU6	6	15 - 120	1 - 8
threadleaf sedge	Carex filifolia	CAFI	6	15 - 75	1 - 5
other grass-likes		2GL	6	0 - 45	0 - 3
FORBS			*8*	*75 - 150*	*5 - 10*
cudweed sagewort	Artemisia ludoviciana	ARLU	8	15 - 45	1 - 3
deathcamas	Zigadenus spp.	ZIGAD	8	0 - 15	0 - 1
green sagewort	Artemisia campestris	ARCA12	8	0 - 30	0 - 2
heath aster	Symphyotrichum ericoides	SYER	8	15 - 30	1 - 2
mealy goosefoot	Chenopodium incanum	CHIN2	8	0 - 15	0 - 1
Nuttall's violet	Viola nuttallii	VINU2	8	0 - 15	0 - 1
povertyweed	Iva axillaris	IVAX	8	0 - 15	0 - 1
rush skeletonweed	Lygodesmia juncea	LYJU	8	0 - 15	0 - 1
scarlet globemallow	Sphaeralcea coccinea	SPCO	8	15 - 45	1 - 3
slimflower scurfpea	Psoralidium tenuiflorum	PSTE5	8	15 - 30	1 - 2
spiny phlox	Phlox hoodii	PHHO	8	15 - 30	1 - 2
textile onion	Allium textile	ALTE	8	15 - 30	1 - 2
wild parsley	Musineon divaricatum	MUDI	8	0 - 15	0 - 1
woolly Indianwheat	Plantago patagonica	PLPA2	8	15 - 30	1 - 2
native forbs		2FN	8	15 - 45	1 - 3
SHRUBS			*9*	*75 - 150*	*5 - 10*
brittle cactus	Opuntia fragilis	OPFR	9	15 - 30	1 - 2
broom snakeweed	Gutierrezia sarothrae	GUSA2	9	15 - 30	1 - 2
fringed sagewort	Artemisia frigida	ARFR4	9	15 - 60	1 - 4
plains pricklypear	Opuntia polyacantha	OPPO	9	15 - 30	1 - 2
rose	Rosa spp.	ROSA5	9	15 - 30	1 - 2
saltbush	Atriplex spp.	ATRIP	9	0 - 30	0 - 2
other shrubs		2SHRUB	9	0 - 45	0 - 3

Annual Production lbs./acre	LOW	RV	HIGH
GRASSES & GRASS-LIKES	860 -	1275	-1670
FORBS	70 -	113	-165
SHRUBS	70 -	113	-165
TOTAL	1000 -	1500	-2000

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

		1.1 Western Wheatgrass/ Blue Grama			1.2 Blue Grama/Inland Saltgrass/ Western Wheatgrass			1.3 Cactus/Inland Saltgrass/ Blue Grama		
COMMON/GROUP NAME	**SYMBOL**	**Grp**	**lbs./acre**	**% Comp**	**Grp**	**lbs./acre**	**% Comp**	**Grp**	**lbs./acre**	**% Comp**
GRASSES & GRASS-LIKES			*1200 - 1350*	*80 - 90*		*675 - 810*	*75 - 90*		*420 - 480*	*70 - 80*
WHEATGRASS		**1**	**375 - 675**	**25 - 45**	**1**	**90 - 180**	**10 - 20**	**1**	**6 - 60**	**1 - 10**
western wheatgrass	PASM	1	375 - 675	25 - 45	1	90 - 180	10 - 20	1	6 - 60	1 - 10
SHORT WARM-SEASON GRASSES		**2**	**300 - 525**	**20 - 35**	**2**	**270 - 450**	**30 - 50**	**2**	**150 - 300**	**25 - 50**
blue grama	BOGR2	2	225 - 375	15 - 25	2	180 - 360	20 - 40	2	30 - 150	5 - 25
buffalograss	BODA2	2	30 - 225	2 - 15	2	45 - 225	5 - 25	2	6 - 60	1 - 10
inland saltgrass	DISP	2	30 - 225	2 - 15	2	45 - 270	5 - 30	2	90 - 210	15 - 35
sand dropseed	SPCR	2	0 - 75	0 - 5	2	0 - 27	0 - 3	2	0 - 30	0 - 5
NEEDLEGRASS		**3**	**30 - 150**	**2 - 10**	**3**	**0 - 45**	**0 - 5**	**3**	**0 - 12**	**0 - 2**
needleandthread	HECOC8	3	30 - 150	2 - 10	3	0 - 45	0 - 5	3	0 - 12	0 - 2
green needlegrass	NAVI4	3	0 - 150	0 - 10	3	0 - 27	0 - 3			
MID WARM-SEASON GRASSES		**4**	**0 - 75**	**0 - 5**	**4**			**4**		
sideoats grama	BOCU	4	0 - 75	0 - 5						
alkali sacaton	SPAI	4	0 - 75	0 - 5						
OTHER NATIVE GRASSES		**5**	**30 - 75**	**2 - 5**	**5**	**18 - 45**	**2 - 5**	**5**	**12 - 30**	**2 - 5**
prairie junegrass	KOMA	5	15 - 75	1 - 5	5	9 - 27	1 - 3	5	6 - 12	1 - 2
Sandberg bluegrass	POSE	5	15 - 45	1 - 3	5	9 - 36	1 - 4	5	6 - 30	1 - 5
tumblegrass	SCPA	5	0 - 15	0 - 1	5	0 - 18	0 - 2	5	0 - 18	0 - 3
other grasses	2GRAM	5	0 - 45	0 - 3	5	0 - 36	0 - 4	5	0 - 18	0 - 3
GRASS-LIKES		**6**	**30 - 150**	**2 - 10**	**6**	**45 - 135**	**5 - 15**	**6**	**30 - 120**	**5 - 20**
needleleaf sedge	CADU6	6	15 - 120	1 - 8	6	18 - 90	2 - 10	6	18 - 90	3 - 15
threadleaf sedge	CAFI	6	15 - 75	1 - 5	6	9 - 63	1 - 7	6	6 - 48	1 - 8
other grass-likes	2GL	6	0 - 45	0 - 3	6	0 - 27	0 - 3	6	0 - 12	0 - 2
NON-NATIVE GRASSES		**7**			**7**	**0 - 90**	**0 - 10**	**7**	**0 - 48**	**0 - 8**
bluegrass	POA				7	0 - 27	0 - 3	7	0 - 12	0 - 2
cheatgrass	BRTE				7	0 - 90	0 - 10	7	0 - 48	0 - 8
Japanese bromegrass	BRJA				7	0 - 90	0 - 10	7	0 - 48	0 - 8
FORBS		*8*	*75 - 150*	*5 - 10*	*8*	*18 - 90*	*2 - 10*	*8*	*12 - 60*	*2 - 10*
common dandelion	TAOF				8	0 - 18	0 - 2	8	0 - 18	0 - 3
cudweed sagewort	ARLU	8	15 - 45	1 - 3	8	0 - 27	0 - 3	8	0 - 12	0 - 2
curly dock	RUCR				8	0 - 18	0 - 2	8	0 - 18	0 - 3
deathcamas	ZIGAD	8	0 - 15	0 - 1	8	0 - 9	0 - 1	8	0 - 6	0 - 1
green sagewort	ARCA12	8	0 - 30	0 - 2	8	0 - 9	0 - 1			
heath aster	SYER	8	15 - 30	1 - 2	8	0 - 18	0 - 2			
mealy goosefoot	CHIN2	8	0 - 15	0 - 1	8	0 - 18	0 - 2	8	0 - 12	0 - 2
Nuttall's violet	VINU2	8	0 - 15	0 - 1						
povertyweed	IVAX	8	0 - 15	0 - 1	8	0 - 9	0 - 1	8	0 - 6	0 - 1
rush skeletonweed	LYJU	8	0 - 15	0 - 1	8	0 - 9	0 - 1	8	0 - 6	0 - 1
scarlet globemallow	SPCO	8	15 - 45	1 - 3	8	0 - 27	0 - 3	8	0 - 12	0 - 2
slimflower scurfpea	PSTE5	8	15 - 30	1 - 2	8	0 - 9	0 - 1			
spiny phlox	PHHO	8	15 - 30	1 - 2	8	0 - 18	0 - 2	8	0 - 6	0 - 1
sweetclover	MELIL				8	0 - 45	0 - 5	8	0 - 48	0 - 8
textile onion	ALTE	8	15 - 30	1 - 2	8	0 - 9	0 - 1			
western salsify	TRDU				8	0 - 18	0 - 2	8	0 - 12	0 - 2
wild parsley	MUDI	8	0 - 15	0 - 1						
woolly Indianwheat	PLPA2	8	15 - 30	1 - 2	8	9 - 18	1 - 2	8	6 - 18	1 - 3
native forbs	2FN	8	15 - 45	1 - 3	8	0 - 18	0 - 2	8	0 - 12	0 - 2
introduced forbs	2FI				8	0 - 45	0 - 5	8	0 - 30	0 - 5
SHRUBS		*9*	*75 - 150*	*5 - 10*	*9*	*45 - 135*	*5 - 15*	*9*	*60 - 120*	*10 - 20*
brittle cactus	OPFR	9	15 - 30	1 - 2	9	9 - 36	1 - 4	9	6 - 48	1 - 8
broom snakeweed	GUSA2	9	15 - 30	1 - 2	9	9 - 27	1 - 3	9	6 - 30	1 - 5
fringed sagewort	ARFR4	9	15 - 60	1 - 4	9	9 - 36	1 - 4	9	6 - 60	1 - 10
plains pricklypear	OPPO	9	15 - 30	1 - 2	9	9 - 36	1 - 4	9	6 - 36	1 - 6
rose	ROSA5	9	15 - 30	1 - 2	9	0 - 9	0 - 1	9	0 - 6	0 - 1
saltbush	ATRIP	9	0 - 30	0 - 2	9	0 - 9	0 - 1			
other shrubs	2SHRUB	9	0 - 45	0 - 3	9	0 - 27	0 - 3	9	0 - 18	0 - 3

Annual Production lbs./acre	LOW	RV	HIGH	LOW	RV	HIGH	LOW	RV	HIGH
GRASSES & GRASS-LIKES	860	1275	1670	545	756	1055	335	474	605
FORBS	70	113	165	15	54	95	10	36	65
SHRUBS	70	113	165	40	90	150	55	90	130
TOTAL	1000	1500	2000	600	900	1300	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. Refer to PLANTS database for scientific names and codes: http://plants.usda.gov

Plant Community and Vegetation State Narratives

Reference State (State 1)

This state represents the natural range of variability that dominates the dynamics of this ecological site (ES). This state is dominated by cool-season grasses, with warm-season grasses being subdominant. In pre-European times, the primary disturbance mechanisms for this site in the reference condition included precipitation cycles and grazing by large herding ungulates. Fire was not a major factor influencing vegetation as this site does not typically have sufficient fuel loads to carry a fire. Timing of grazing coupled with weather events dictated the dynamics that occurred within the natural range of variability. Today, this state can be found on areas that are properly managed with grazing and sometimes on areas receiving occasional short periods of rest. Cool-season species can decline and a corresponding increase in short, warm-season grasses will occur.

1.1 Western Wheatgrass/Blue Grama Plant Community Phase

Interpretations are based primarily on the 1.1 Western Wheatgrass/Blue Grama Plant Community, which is also considered to be climax. This plant community evolved with grazing by large herbivores and variations in precipitation cycles, and can be maintained with prescribed grazing, or by occasional short periods of rest or deferment. The potential vegetation is about 80 percent grasses or grass-like plants, 10 percent forbs, and 10 percent shrubs. Cool-season grasses dominate the plant community, while warm-season grasses are subdominant. The major grasses include western wheatgrass and blue grama. Other grasses and grass-likes occurring on this site include buffalograss, inland saltgrass, needleandthread, and sedge. The dominant forbs include scarlet globemallow, cudweed sagewort, heath aster, and woolly Indianwheat. Shrubs that can occur in this plant community are brittle cactus, saltbush, and plains pricklypear.

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 sites potential. Plant litter is properly distributed with some movement offsite and natural plant mortality is low. Low to moderate available water capacity coupled with high accumulations of sodium and slow permeability strongly influences the soil-water-plant relationships.

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: SD6302
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:

- 1.1a – Heavy continuous seasonal grazing (heavy stocking levels at the same time of year each year), or heavy continuous season-long grazing will shift this community to the *1.2 Blue Grama/Inland Saltgrass/Western Wheatgrass Plant Community Phase*.

1.2 Blue Grama/Inland Saltgrass/Western Wheatgrass Plant Community Phase

This plant community can develop from the adverse effects of heavy continuous seasonal grazing and/or heavy continuous season-long grazing. Short grasses tend to increase to dominate the site and annual production decreases dramatically.

Lack of litter and short plant heights result in higher soil temperatures, poor water infiltration rates, and high evaporation, which gives blue grama a competitive advantage over cool-season mid-grasses. This plant community can occur throughout the pasture, on spot grazed areas, and around water sources where season-long grazing patterns occur. Blue grama and inland saltgrass are the dominant species. Other grasses and grass-likes occurring include western wheatgrass, buffalograss, Sandberg bluegrass, sedge, and sometimes annual grasses. Forbs such as cudweed sagewort, scarlet globemallow, and woolly Indianwheat may also be present. Some nonnative species will begin to invade this plant community including western salsify, sweetclover, and annual bromegrass. There is usually more than 25 percent bare ground.

This plant community is quite resilient. The thick sod and competitive advantage prevents other species from establishing. This plant community is less productive than the 1.1 Western Wheatgrass/Blue Grama Plant Community Phase. Runoff increases and infiltration will decrease. Soil erosion will be minimal due to the sod forming habit of blue grama.

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: SD6304
Growth curve name: Pierre Shale Plains, warm-season dominant, cool-season subdominant.
Growth curve description: Warm-season dominant, cool-season subdominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	7	18	25	25	15	7	1	0	0

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

- 1.2a – Prescribed grazing (alternating season of use and providing adequate recovery periods) or periodic light to moderate grazing possibly including periodic rest will convert this plant community to the *1.1 Western Wheatgrass/Blue Grama Plant Community Phase*.

- 1.2b – Heavy continuous seasonal grazing (heavy stocking levels at the same time of year each year), or heavy continuous season-long grazing will shift this community to the *1.3 Cactus/Inland Saltgrass/Blue Grama Plant Community Phase*.

1.3 Cactus/Inland Saltgrass/Blue Grama Plant Community Phase

This plant community can develop from the adverse effects of heavy continuous seasonal grazing and/or heavy continuous season-long grazing. Brittle cactus and plains pricklypear, as well as, short warm-season grasses tend to increase to dominate the site and annual production decreases further. Lack of litter and short plant heights result in higher soil temperatures, poor water infiltration rates, and high evaporation, which gives cactus and short warm-season grasses a competitive advantage. This plant community can occur throughout the pasture, on spot grazed areas, and around water sources where season-long grazing patterns occur. Brittle cactus, plains pricklypear, inland saltgrass, and blue grama are the dominant species. Other grasses and grass-likes occurring include western wheatgrass, buffalograss, Sandberg bluegrass, and sedge. Forbs such as cudweed sagewort, common dandelion, sweetclover, and woolly Indianwheat may also be present. In addition to the cactus, fringed sagewort is also a prevalent shrub. There is usually more than 25 percent bare ground.

This plant community is quite resilient. The thick sod and competitive advantage prevents other species from establishing. This plant community is the least productive plant community phase. Runoff increases and infiltration will decrease. Soil erosion will be minimal due to the sod forming

habit of the short warm-season grasses.

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: SD6305
Growth curve name: Pierre Shale Plains, warm-season dominant.
Growth curve description: Warm-season dominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	2	5	15	25	30	15	7	1	0	0

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

- 1.3a – Prescribed grazing (alternating season of use and providing adequate recovery periods) or periodic light to moderate grazing possibly including periodic rest will convert this plant community to the *1.2 Blue Grama/Inland Saltgrass/Western Wheatgrass Plant Community Phase*.

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

-- Under Development --

Western Wheatgrass/Blue Grama Plant Community Phases (1.1):

Blue Grama/Inland Saltgrass/Western Wheatgrass Plant Community Phase (1.2):

Cactus/Inland Saltgrass/Blue Grama Plant Community Phase (1.3):

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

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
Grasses and 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 U	D P P D	U D P U	D P P D	D P P D	U D P U	U D P U
buffalograss	U U D U	N U D U	U U D U	N U D U	N U D U	U U D U	U U D U
green needlegrass	U P U D	N P N P	U P U D	N P N P	N P N P	U P U D	U 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
needleandthread	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
needleleaf sedge	U D U D	U P N D	U D U D	U D U D	U D U D	U D U D	U D U D
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
sand dropseed	N U N N	N U N N	N U N N	N U N N	N U N N	N U N N	N U N N
Sandberg bluegrass	N U N N	N D N N	N U N N	N D N N	N D N N	N U N N	N U N N
sideoats grama	U D P U	U P D U	U D P U	U P D U	U P D U	U D P U	U D P U
threadleaf sedge	U D U D	U P N D	U D U D	U D U D	U D U D	U D U D	U D U D
tumblegrass	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
western 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
Forbs							
cudweed sagewort	U 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
deathcamas	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T
green sagewort	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U
heath aster	U U D U	U U P U	U U D U	U U P U	U U P U	U U D U	U U P U
mealy goosefoot	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
Nuttall's violet	N U N N	N U N N	N U N N	N U N N	N U N N	N U N N	N U N N
povertyweed	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N
rush skeletonweed	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N
scarlet globemallow	U U D U	U D D U	U U D U	U D D U	U D D U	U U D U	U D D U
slimflower scurfpea	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
spiny phlox	U D U U	U P P U	U D U U	U P P U	U P P U	U D U U	U P P U
textile 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
wild parsley	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
woolly Indianwheat	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
Shrubs							
brittle cactus	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
broom snakeweed	N N N N	U U U U	N N N N	U U U U	U U U U	N N N N	U U U U
fringed sagewort	U U U U	U U U U	U U U U	U D D U	U P P D	U U U U	U U U D
plains pricklypear	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
rose	U D D U	U D D U	U D D U	U D D U	U D D U	U D D U	U D D U
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

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 ES description). Because of this, a resource inventory is necessary to document plant composition and production.

More accurate carrying capacity estimates should eventually be calculated using the following stocking rate information along with animal preference data and actual stocking records, particularly when grazers other than cattle are involved. 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)
Western Wheatgrass/Blue Grama (1.1)	1,500	0.41
Blue Grama/Inland Saltgrass/Western Wheatgrass (1.2)	900	0.25
Cactus/Inland Saltgrass/Blue Grama (1.3)	600	0.16

*Based on 912 lbs./acre (air-dry weight) per Animal Unit Month (AUM) and on 25 percent harvest efficiency (refer to United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), National Range and Pasture Handbook).

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

Hydrology 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 where shortgrasses form a strong sod and dominate the site. Dominance by blue grama and/or 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 esthetic 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.

Supporting Information

Associated Sites

Clayey (R063BY011SD), Loamy (R063BY010SD), Claypan (R063BY013SD)

Similar Sites

(R063BY013SD) – Claypan [more green needlegrass, higher diversity; higher production]

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.

Data Source	Number of Records	Sample Period	State	County
SCS-RANGE-417	1	2006	SD	Buffalo

State Correlation

This site has been correlated with Nebraska (NE) and SD in MLRA 63B.

Field Offices/Counties

Ainsworth, NE	Keya Paha/Rock	Highmore, SD	Hyde	Pierre, SD	Hughes
Bloomfield, NE	Knox	Kennebec, SD	Lyman	Spencer, NE	Boyd
Burke, SD	Gregory	Lake Andes, SD	Charles Mix	White River, SD	Todd/Mellette
Chamberlain, SD	Brule/Buffalo	O'Neill, NE	Holt		

Relationship to Other Established Classifications

Level IV Ecoregions of the Conterminous United States: 42h - Southern River Breaks.

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

Site Description Approval

_____ _____
SD, State Range Management Specialist Date

_____ _____
NE, State Range Management Specialist Date