

United States Department of Agriculture Natural Resources Conservation Service

Ecological Site Description

Site Type: Rangeland

Site Name: Claypan

Site ID: R063AY013SD

Major Land Resource Area (MLRA): 63A –
Northern Rolling Pierre Shale Plains



Physiographic Features

This site occurs on gently undulating to rolling sedimentary uplands.

Landform: stream terrace

Aspect: N/A

	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	1600	2700
Slope (percent):	0	6
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:	Medium	Very high

Climatic Features

MLRA 63A 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 ranges from 16 to 20 inches per year. The average annual temperature is about 47°F. January is the coldest month with average temperatures ranging from about 11°F (Pollock, South Dakota (SD)), to about 22°F (Cedar Butte, SD). July is the warmest month with temperatures averaging from about 72°F (Pollock, SD), to about 76°F (Cedar Butte, SD). The range of normal average monthly temperatures between the coldest and warmest months is about 58°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 annually, ranging from about 13 miles per hour during the spring to

about 10 miles per hour 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 miles per hour.

Growth of cool-season plants begins in early to mid-March, slowing or ceasing in late June. Warm-season plants begin growth about mid-May and continue to early or mid-September. Green up of cool-season plants may occur in September and October when adequate soil moisture is present.

	<u>Minimum</u>	<u>Maximum</u>
Frost-free period (days):	126	149
Freeze-free period (days):	149	165
Mean Annual Precipitation (inches):	16	20

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

	Precip. Min.	Precip. Max	Temp. Min.	Temp. Max.
January	0.40	0.41	-0.9	34.0
February	0.44	0.49	5.8	39.2
March	0.87	1.36	17.3	49.0
April	1.77	2.18	31.3	61.2
May	2.82	3.29	43.3	72.2
June	2.96	3.45	53.2	82.5
July	2.04	2.84	58.5	90.8
August	1.57	2.38	56.5	90.3
September	1.13	1.53	45.4	79.2
October	1.02	1.38	33.4	65.7
November	0.48	0.63	19.3	48.2
December	0.23	0.35	5.7	37.2

Climate Stations		Period	
Station ID	Location or Name	From	To
SD1539	Cedar Butte	1951	2004
SD1972	Cottonwood 3 E	1909	2004
SD6712	Pollock	1948	2004
SD6790	Presho 7 NW	1975	2004

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 silt loam to clayey textured subsoils and slopes of zero to six percent. The soils in this site are moderately well to well drained and formed in soft siltstone, shales, and alluvium. The loam to silt loam surface layer is 4 to 10 inches thick. The extremely hard clayey Btn horizon has round-topped or “bun shaped” columnar structure. These Btn horizons are high in sodium. This site should show slight to no evidence of rills, wind scoured areas, or pedestalled plants. Water flow paths are broken, irregular in appearance, or discontinuous with numerous debris dams or vegetative barriers. The soil surface is stable and intact.

These soils are mainly susceptible to water erosion. The hazard of water erosion increases on slopes greater than about five percent. Low available water capacity and very slow permeability strongly influences the soil-water-plant relationship.

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

Parent Material Kind: alluvium
Parent Material Origin: siltstone
Surface Texture: silt loam, loam
Surface Texture Modifier: none
Subsurface Texture Group: clayey
Surface Fragments ≤3" (% Cover): 0-25
Surface Fragments >3" (%Cover): 0
Subsurface Fragments ≤3" (% Volume): 5-25
Subsurface Fragments >3" (% Volume): 0

	<u>Minimum</u>	<u>Maximum</u>
Drainage Class	moderately well	well
Permeability Class:	very slow	slow
Depth to Bedrock (inches):	20	60
Electrical Conductivity (mmhos/cm)*:	0	16
Sodium Absorption Ratio*:	0	50
Soil Reaction (1:1 Water)*:	6.1	9.6
Soil Reaction (0.1M CaCl2)*:	NA	NA
Available Water Capacity (inches)*:	3	5
Calcium Carbonate Equivalent (percent)*:	0	15

*These attributes represent 0-40 inches in depth 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 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.

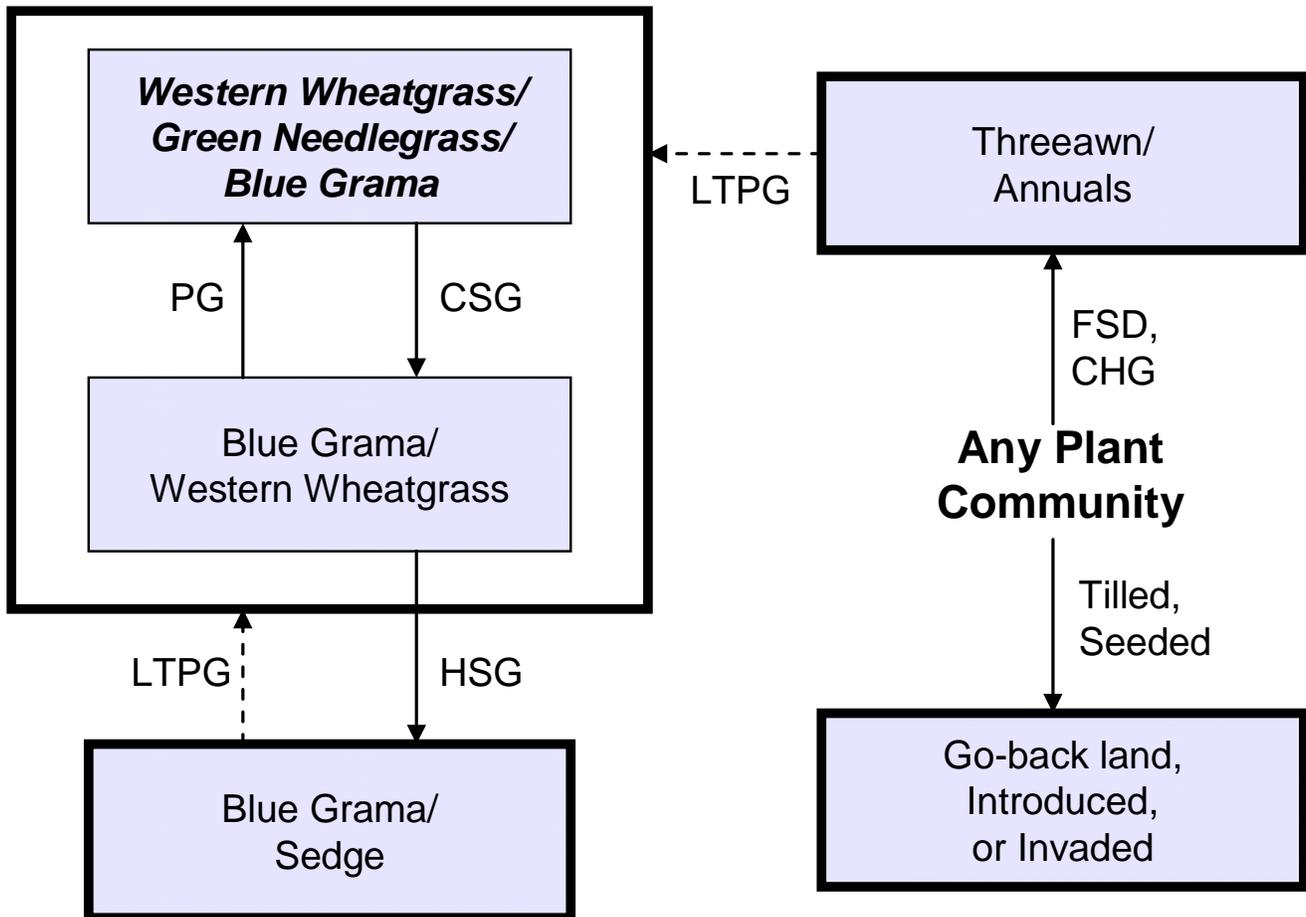
The plant community upon which interpretations are primarily based is the Western Wheatgrass/Green Needlegrass/Blue Grama plant community. It has been determined by study of rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily grazed to lightly grazed areas, seasonal use pastures, and historical accounts also have been used.

Continuous season-long grazing (during the typical growing season of May through October) and/or repeated seasonal grazing (e.g., every spring, every summer) without adequate recovery periods following each grazing occurrence causes this site to depart from the Western Wheatgrass/Green Needlegrass Plant Community. Blue grama and buffalograss will increase and eventually develop

into a sod. Western wheatgrass will increase initially and then begin to decrease. Green needlegrass will decrease in frequency and production.

The following is a diagram that illustrates the common plant communities that can occur 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.

Plant Communities and Transitional Pathways



CHG – Continuous heavy grazing; **CSG** – Continuous seasonal grazing;
FSD – Frequent and severe defoliation; **HSG** – Heavy seasonal grazing;
LTPG – Long-term prescribed grazing; **PG** – Prescribed grazing.

Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SCIENTIFIC NAME	SYMBOL	Western Wheatgrass/Green Needlegrass/Blue Grama		
			Group	lbs./acre	% Comp
GRASSES & GRASS-LIKES				1200 - 1440	75 - 90
WHEATGRASSES			1	240 - 560	15 - 35
western wheatgrass	Pascopyrum smithii	PASM	1	240 - 560	15 - 35
slender wheatgrass	Elymus trachycaulus	ELTR7	1	0 - 80	0 - 5
COOL-SEASON BUNCHGRASSES			2	160 - 480	10 - 30
green needlegrass	Nassella viridula	NAVI4	2	160 - 400	10 - 25
needleandthread	Hesperostipa comata ssp. comata	HECOC8	2	32 - 160	2 - 10
porcupine grass	Hesperostipa spartea	HESP11	2	0 - 80	0 - 5
MID & TALL WARM-SEASON GRASSES			3	32 - 160	2 - 10
prairie sandreed	Calamovilfa longifolia	CALO	3	0 - 160	0 - 10
sideoats grama	Bouteloua curtipendula	BOCU	3	0 - 160	0 - 10
SHORT WARM-SEASON GRASSES			4	80 - 240	5 - 15
blue grama	Bouteloua gracilis	BOGR2	4	80 - 160	5 - 10
buffalograss	Bouteloua dactyloides	BODA2	4	16 - 80	1 - 5
inland saltgrass	Distichlis spicata	DISP	4	16 - 48	1 - 3
threeawn	Aristida spp.	ARIST	4	16 - 32	1 - 2
OTHER NATIVE GRASSES			5	16 - 48	1 - 3
prairie junegrass	Koeleria macrantha	KOMA	5	16 - 48	1 - 3
Sandberg bluegrass	Poa secunda	POSE	5	0 - 32	0 - 2
other grasses		2GRAM	5	0 - 48	0 - 3
GRASS-LIKES			6	80 - 160	5 - 10
needleleaf sedge	Carex duriuscula	CADU6	6	32 - 128	2 - 8
threadleaf sedge	Carex filifolia	CAFI	6	16 - 80	1 - 5
other grass-likes		2GL	6	0 - 48	0 - 3
FORBS			8	80 - 160	5 - 10
American vetch	Vicia americana	VIAM	8	16 - 32	1 - 2
biscuitroot	Lomatium spp.	LOMAT	8	16 - 32	1 - 2
curweed sagewort	Artemisia ludoviciana	ARLU	8	16 - 48	1 - 3
curlycup gumweed	Grindelia squarrosa	GRSQ	8	0 - 16	0 - 1
deathcamas	Zigadenus spp.	ZIGAD	8	0 - 16	0 - 1
deervetch	Lotus unifoliolatus var. unifoliolatus	LOUNU	8	0 - 16	0 - 1
fairy candelabra	Androsace septentrionalis	ANSE4	8	0 - 16	0 - 1
goldenrod	Solidago spp.	SOLID	8	16 - 32	1 - 2
milkvetch	Astragalus spp.	ASTRA	8	16 - 32	1 - 2
prairie coneflower	Ratibida columnifera	RACO3	8	16 - 32	1 - 2
pussytoes	Antennaria spp.	ANTEN	8	0 - 16	0 - 1
rush skeletonweed	Lygodesmia juncea	LYJU	8	0 - 16	0 - 1
scarlet gaura	Gaura coccinea	GACO5	8	16 - 32	1 - 2
scarlet globemallow	Sphaeralcea coccinea	SPCO	8	16 - 32	1 - 2
scurfpea	Psoralidium spp.	PSORA2	8	16 - 48	1 - 3
slimpod 'Venus' looking-glass	Triodanis leptocarpa	TRLE3	8	0 - 16	0 - 1
textile onion	Allium textile	ALTE	8	0 - 16	0 - 1
wavyleaf thistle	Cirsium undulatum	CIUN	8	16 - 32	1 - 2
western wallflower	Erysimum capitatum var. capitatum	ERCAC	8	16 - 32	1 - 2
western yarrow	Achillea millefolium var. occidentalis	ACMIO	8	16 - 32	1 - 2
white prairie aster	Symphotrichum falcatum	SYFA	8	16 - 48	1 - 3
wild parsley	Musineon divaricatum	MUDI	8	16 - 32	1 - 2
woolly Indianwheat	Plantago patagonica	PLPA2	8	16 - 32	1 - 2
native forbs		2FN	8	16 - 64	1 - 4
SHRUBS			9	80 - 240	5 - 15
brittle cactus	Opuntia fragilis	OPFR	9	16 - 80	1 - 5
broom snakeweed	Gutierrezia sarothrae	GUSA2	9	0 - 48	0 - 3
fringed sagewort	Artemisia frigida	ARFR4	9	16 - 80	1 - 5
plains pricklypear	Opuntia polyacantha	OPPO	9	16 - 80	1 - 5
rubber rabbitbrush	Ericameria nauseosa	ERNA10	9	0 - 32	0 - 2
silver sagebrush	Artemisia cana	ARCA13	9	0 - 80	0 - 5
other shrubs		2SHRUB	9	0 - 80	0 - 5

Annual Production lbs./acre	LOW	RV	HIGH
GRASSES & GRASS-LIKES	950 -	1320	-1745
FORBS	75 -	120	-180
SHRUBS	75 -	160	-275
TOTAL	1100 -	1600	-2200

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

COMMON/GROUP NAME	SYMBOL	Western Wheatgrass/Green Needlegrass/Blue Grama			Blue Grama/ Western Wheatgrass			Blue Grama/Sedge		
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp
GRASSES & GRASS-LIKES										
WHEATGRASSES										
western wheatgrass	PASM	1	240 - 560	15 - 35	1	120 - 240	10 - 20	1	0 - 72	0 - 8
slender wheatgrass	ELTR7	1	0 - 80	0 - 5	1	0 - 24	0 - 2			
COOL-SEASON BUNCHGRASSES										
green needlegrass	NAV14	2	160 - 400	10 - 25	2	12 - 120	1 - 10			
needleandthread	HECOC8	2	32 - 160	2 - 10	2	24 - 96	2 - 8	2	0 - 45	0 - 5
porcupine grass	HESP11	2	0 - 80	0 - 5						
MID & TALL WARM-SEASON										
prairie sandreed	CALO	3	0 - 160	0 - 10	3	0 - 36	0 - 3			
sideoats grama	BOCU	3	0 - 160	0 - 10	3	0 - 60	0 - 5			
SHORT WARM-SEASON GRASSES										
blue grama	BOGR2	4	80 - 160	5 - 10	4	180 - 360	15 - 30	4	180 - 360	20 - 40
buffalograss	BODA2	4	16 - 80	1 - 5	4	12 - 120	1 - 10	4	18 - 135	2 - 15
inland saltgrass	DISP	4	16 - 48	1 - 3	4	12 - 60	1 - 5	4	9 - 90	1 - 10
threeawn	ARIST	4	16 - 32	1 - 2	4	12 - 60	1 - 5	4	9 - 90	1 - 10
OTHER NATIVE GRASSES										
prairie junegrass	KOMA	5	16 - 48	1 - 3	5	12 - 24	1 - 2	5	0 - 9	0 - 1
Sandberg bluegrass	POSE	5	0 - 32	0 - 2	5	0 - 48	0 - 4	5	0 - 45	0 - 5
other grasses	2GRAM	5	0 - 48	0 - 3	5	0 - 60	0 - 5	5	0 - 45	0 - 5
GRASS-LIKES										
needleleaf sedge	CADU6	6	32 - 128	2 - 8	6	60 - 180	5 - 15	6	45 - 180	5 - 20
threadleaf sedge	CAFI	6	16 - 80	1 - 5	6	24 - 96	2 - 8	6	18 - 90	2 - 10
other grass-likes	2GL	6	0 - 48	0 - 3	6	0 - 60	0 - 5	6	0 - 45	0 - 5
NON-NATIVE GRASSES										
bluegrass	POA				7	12 - 60	1 - 5	7	9 - 45	1 - 5
cheatgrass	BRTE				7	0 - 60	0 - 5	7	9 - 45	1 - 5
FORBS										
American vetch	VIAM	8	16 - 32	1 - 2	8	0 - 12	0 - 1			
biscuitroot	LOMAT	8	16 - 32	1 - 2	8	0 - 12	0 - 1			
cudweed sagewort	ARLU	8	16 - 48	1 - 3	8	12 - 48	1 - 4	8	9 - 45	1 - 5
curlycup gumweed	GRSQ	8	0 - 16	0 - 1	8	0 - 24	0 - 2	8	9 - 45	1 - 5
deathcamas	ZIGAD	8	0 - 16	0 - 1	8	0 - 12	0 - 1	8	0 - 9	0 - 1
deervetch	LOUNU	8	0 - 16	0 - 1	8	0 - 12	0 - 1			
fairy candelabra	ANSE4	8	0 - 16	0 - 1	8	0 - 12	0 - 1			
goldenrod	SOLID	8	16 - 32	1 - 2	8	12 - 24	1 - 2	8	9 - 27	1 - 3
milkvetch	ASTRA	8	16 - 32	1 - 2	8	0 - 12	0 - 1			
prairie coneflower	RACO3	8	16 - 32	1 - 2	8	12 - 24	1 - 2	8	0 - 9	0 - 1
pussytoes	ANTEN	8	0 - 16	0 - 1	8	0 - 12	0 - 1	8	0 - 9	0 - 1
rush skeletonweed	LYJU	8	0 - 16	0 - 1	8	0 - 12	0 - 1			
scarlet gaura	GACO5	8	16 - 32	1 - 2	8	0 - 12	0 - 1			
scarlet globemallow	SPCO	8	16 - 32	1 - 2	8	12 - 24	1 - 2	8	9 - 18	1 - 2
scurfpea	PSORA2	8	16 - 48	1 - 3	8	12 - 48	1 - 4	8	9 - 45	1 - 5
slimpod Venus' looking-glass	TRLE3	8	0 - 16	0 - 1						
textile onion	ALTE	8	0 - 16	0 - 1	8	0 - 12	0 - 1			
wavyleaf thistle	CIUN	8	16 - 32	1 - 2	8	12 - 24	1 - 2	8	0 - 9	0 - 1
western wallflower	ERCAC	8	16 - 32	1 - 2	8	12 - 24	1 - 2	8	9 - 18	1 - 2
western yarrow	ACMIO	8	16 - 32	1 - 2	8	12 - 36	1 - 3	8	9 - 36	1 - 4
white prairie aster	SYFA	8	16 - 48	1 - 3	8	12 - 48	1 - 4	8	9 - 27	1 - 3
wild parsley	MUDI	8	16 - 32	1 - 2	8	0 - 12	0 - 1			
woolly Indianwheat	PLPA2	8	16 - 32	1 - 2	8	12 - 24	1 - 2	8	9 - 27	1 - 3
native forbs	2FN	8	16 - 64	1 - 4	8	12 - 60	1 - 5	8	9 - 45	1 - 5
introduced forbs	2FI				8	0 - 60	0 - 5	8	0 - 45	0 - 5
SHRUBS										
brittle cactus	OPFR	9	16 - 80	1 - 5	9	12 - 96	1 - 8	9	18 - 108	2 - 12
broom snakeweed	GUSA2	9	0 - 48	0 - 3	9	12 - 60	1 - 5	9	9 - 72	1 - 8
fringed sagewort	ARFR4	9	16 - 80	1 - 5	9	24 - 96	2 - 8	9	18 - 90	2 - 10
plains pricklypear	OPPO	9	16 - 80	1 - 5	9	12 - 96	1 - 8	9	9 - 90	1 - 10
rubber rabbitbrush	ERNA10	9	0 - 32	0 - 2	9	0 - 12	0 - 1			
silver sagebrush	ARCA13	9	0 - 80	0 - 5	9	0 - 36	0 - 3			
other shrubs	2SHRUB	9	0 - 80	0 - 5	9	0 - 36	0 - 3	9	0 - 27	0 - 3
Annual Production lbs./acre										
		LOW	RV	HIGH	LOW	RV	HIGH	LOW	RV	HIGH
GRASSES & GRASS-LIKES		950	1320	1745	690	990	1270	475	698	905
FORBS		75	120	180	55	90	130	40	68	95
SHRUBS		75	160	275	55	120	200	85	135	200
TOTAL		1100	1600	2200	800	1200	1600	600	900	1200

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

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 recurring plant communities. The plant composition tables shown above have been developed from the best available knowledge at the time of this revision. As more data is collected, some of these plant communities may be revised or removed, and new ones may be added. None of these plant communities should necessarily be thought of as “Desired Plant Communities (DPC).” According to the United States Department of Agriculture (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.

Western Wheatgrass/Green Needlegrass/Blue Grama Plant Community

The plant community upon which interpretations are primarily based is the Western Wheatgrass/Green Needlegrass/Blue Grama Plant Community (this is also considered climax). Potential vegetation is about 80-85 percent grasses or grass-like plants, and 5-10 percent forbs, and 5-15 percent woody plants. Cool-season grasses dominate. Major grasses include western wheatgrass, green needlegrass, needleandthread, blue grama, buffalograss, and sedges. Forbs occurring in this plant community are cudweed sagewort, scurfpeas, and white prairie aster. Cactus, fringed sagewort, and silver sagebrush are most likely to occur in this plant community.

This plant community is stable and well adapted to the Northern Great Plains climatic conditions. The diversity in plant species allows for high drought resistance. This is a sustainable plant community (site/soil stability, watershed function, and biologic integrity). Occasionally, this plant community will have areas influenced by natural geologic erosion and will exhibit considerable bare ground.

The following growth curve shows the estimated 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

Transitional pathways and/or community pathways leading to other plant communities are as follows:

- Continuous seasonal grazing (extended grazing at the same time of year every year) will convert the plant community to the *Blue Grama/Western Wheatgrass Plant Community*.

Blue Grama/Western Wheatgrass Plant Community

This plant community develops under continuous seasonal grazing (i.e., grazing an area during the same season every year) or from over utilization during extended drought periods. The potential vegetation is about 75-90 percent grasses or grass-like plants, 5-10 percent forbs, and 5-15 percent shrubs. A fairly even mix of cool-season grasses and short warm-season grasses dominates this plant community.

Blue grama and western wheatgrass are the dominant grasses. Other grasses and grass-like plants occurring include needleandthread, buffalograss, prairie Junegrass, threadleaf sedge, dropseed, Sandberg bluegrass, and inland saltgrass. Significant forbs and shrubs include silverleaf scurfpea,

cudweed sagewort, western yarrow, fringed sagewort, rubber rabbitbrush, broom snakeweed, and cactus.

This plant community is somewhat resistant to change. The dominant herbaceous species are very adapted to grazing; however, the mid-grass species and the more palatable forbs will decrease in the community through continuous seasonal grazing. If the herbaceous component is intact, it tends to be resilient if disturbance is not long-term. Because of the sod forming habit of the shortgrass species, water infiltration decreases and runoff increases.

The following growth curve shows the estimated monthly percentages of total annual growth of the dominant species expected during an average year:

Growth curve number: SD6303

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 and/or community pathways leading to other plant communities are as follows:

- Heavy seasonal grazing will convert this plant community to the *Blue Grama/Sedge Plant Community*.
- Prescribed grazing, including adequate rest periods, will move this community through the successional stages leading to the *Western Wheatgrass/Green Needlegrass/Blue Grama Plant Community*. Depending on the slope, aspect, and size, and if adequate perennial plants exist, this change can occur more rapidly.

Blue Grama/Sedge Plant Community

This plant community results from heavy seasonal grazing. Shortgrasses and forbs increase to dominate the plant community and annual production decreases dramatically. Lack of litter and short plant heights result in high soil temperatures, high soil water loss, and poor water infiltration rates, 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 sedge are the prominent species with the balance being lesser amounts of buffalograss, inland saltgrass, Sandberg bluegrass, threeawn, western wheatgrass, and needleandthread. Common forbs on the site include cudweed sagewort, curlycup gumweed, scurfpea, and western yarrow. This plant community is relatively stable. The thick sod and competitive advantage prevents other species from establishing. This plant community is less productive than the Western Wheatgrass/Green Needlegrass/Blue Grama Plant Community. Runoff increases and infiltration will decrease. Soil erosion will be minimal due to the sod forming habit of blue grama and buffalograss.

The following growth curve shows the estimated monthly percentages of total annual growth of the dominant species expected during an average year:

Growth curve number: SD6303

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

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

- Under long-term prescribed grazing, including adequate rest periods, this plant community will move through the successional stages leading to the *Western Wheatgrass/Green Needlegrass Plant Community*. Depending on the slope, aspect, and size, and if adequate perennial plants exist, this change can occur more rapidly.

Threeawn/Annuals Plant Community

This plant community develops from frequent and severe defoliation due to such occurrences as prairie dog towns. Frequent defoliation of blue grama and buffalograss will lead to an increase in saltgrass, along with threeawn and annual plants. Annual production decreases dramatically. Lack of litter and short plant heights result in higher soil temperatures, poor water infiltration rates, and high evaporation.

Go-back land, Introduced, or Invaded

The **Go-back Land** state can be reached whenever severe mechanical disturbance occurs (e.g., tilled and abandoned land, either past or present). During the early successional stages, the species that mainly dominate are annual grasses and forbs, later being replaced by both native and introduced perennials. The vegetation on this site varies greatly, sometimes being dominated by threeawn, bluegrass, smooth brome, annual brome, crested wheatgrass, buffalograss, broom snakeweed, sweetclover, and nonnative thistles. Other plants that commonly occur on the site include western wheatgrass, deathcamas, prickly lettuce, maretail, kochia, foxtail, and sunflowers. Bare ground is prevalent due to the loss of organic matter and lower overall soil health.

The **Introduced** state is normally those areas seeded to crested wheatgrass, pubescent wheatgrass, intermediate wheatgrass, alfalfa, or other introduced species. Refer to the associated Forage Suitability Group description for adapted species.

The **Invaded** state includes areas that have been invaded by species such as smooth brome, bluegrass, nonnative thistles, field bindweed, knapweeds, leafy spurge, hoary cress, and other introduced species.

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

-- Under Development --

Western Wheatgrass/Green Needlegrass/Blue Grama Plant Community:

Blue Grama/Western Wheatgrass Plant Community:

Blue Grama/Sedge Plant Community:

Threeawn/Annuals Plant Community:

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

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
Grasses & Grass-likes							
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
porcupine grass	U P U D	N D N U	U P U D	N D N U	N D N U	U P U D	U P 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
prairie sandreed	U D D U	U D U U	U D D U	U U D U	U U D U	U D D U	U D D U
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
slender wheatgrass	U P U U	N D U N	U P U U	N D U N	N D U N	U P U U	U P U 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
threeawn	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							
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
biscuitroot	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
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
curlycup gumweed	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
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
deervetch	U U U U	U D D U	U U U U	U D D U	U D D U	U U U U	U D D U
goldenrod	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
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
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
pussytoes	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
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 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
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
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
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
wavyleaf thistle	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
western wallflower	U D U U	N U U N	U D U U	N U U N	N U U N	U D U U	N U U N
western yarrow	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 aster	U U D U	N N N N	U U D U	N N N N	N N N N	U U D U	N N N N
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
rubber rabbitbrush	N N N N	D U U D	N N N N	D U U D	U D D U	N N N N	D U U U
silver sagebrush	D U U D	D U U D	D U U D	P D D P	P P P P	D U U D	D U U D

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)
Western Wheatgrass/Green Needlegrass/Blue Grama	1600	0.44
Blue Grama/Western Wheatgrass	1200	0.33
Blue Grama/Sedge	900	0.25

*Based on 912 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 is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic group 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. 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

Timber harvest of eastern redcedar may occur on localized areas of this site.

Other Products

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

Supporting Information

Associated Sites

Clayey (R063AY011SD), Saline Lowland (R063AY015SD), Thin Claypan (R063AY015SD), Dense Clay (R063AY018SD)

Similar Sites

(R063AY011SD) – Clayey [more green needlegrass; higher production]

(R060AY015SD) – Thin Claypan [lower production; greater dominance of short grass and salt tolerant species]

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; Kent Cooley, Soil Scientist, NRCS; Rick Peterson, RMS, NRCS; and L. Michael Stirling, RMS, NRCS.

State Correlation

MLRA 63A lies entirely within SD, so no cross-state correlation has occurred.

Field Offices/Counties

Dupree, SD	Ziebach	McIntosh, SD	Corson	Pierre, SD	Hughes/Stanley
Faith, SD	Meade	Mound City, SD	Campbell	Selby, SD	Walworth
Gettysburg, SD	Potter	Murdo, SD	Jones	Timber Lake, SD	Dewey
Kadoka, SD	Jackson	Onida, SD	Sully	Wall, SD	East Pennington
Kennebec, SD	Lyman	Philip, SD	Haakon	White River, SD	Mellette

Relationship to Other Established Classifications

Level IV Ecoregions of the Conterminous United States: 43c – River Breaks and 43f – Subhumid Pierre Shale Plains.

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://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

USDA, NRCS, Various Published Soil Surveys

Site Description Approval

SD, State Range Management Specialist

Date